TATA MOTORS
Connecting Aspirations

CII Presentation

Tata Motors Lucknow Plant

Presented By :

1. Mr. Gaurav Bansal

Energy Manager and DGM-Technical Services

2. Ms. Jyoti Ghosh

Energy Co-Ordinator

3. Mr. Nirmal Singh

Shop Energy Co-Ordinator

OUR CULTURE CREDO

AT TATA MOTORS

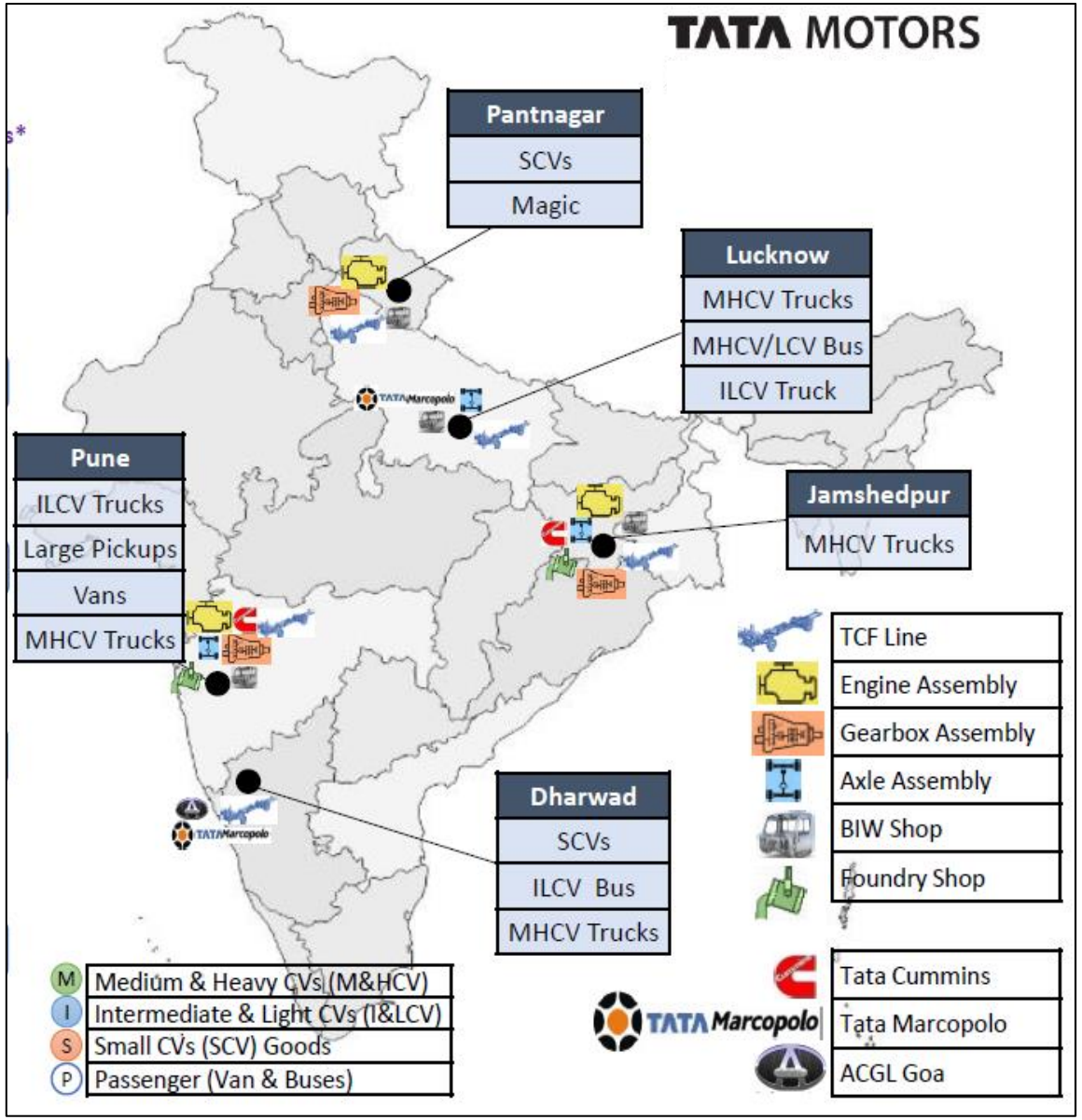
We are connecting aspirations by being bold in thought and action, owning every opportunity and challenge, Solving together as one team and engaging all our stakeholders with empathy.

We are **MORE WHEN ONE!**

© Copyright, Confidential, Tata Motors Limited

Tata Motors Limited- Commercial Vehicles: Introduction

TATA MOTORS
Connecting Aspirations



❖Tata Motors Limited is

- India's largest automobile manufacturing company, with an extensive range of integrated, smart and e-mobility solutions in its portfolio
- Consolidated revenues of **Rs. 3.5 lakh crore's (44 Billion USD) in 2023**
- We are the **leader in commercial vehicles** in each segment

❖Tata Motors -**CVBU Lucknow** Fact File:

- Established in **1992** to meet the demand of Commercial Vehicles in Indian & overseas market and is strongly backed up by ERC and service setup to support the latest technology.
- Specialized in the designing and manufacturing of a range of modern buses – Low floor, Ultra Low floor, CNG & RE Buses.
- Prominent customers include **DTC , MSRTC, KSRTC,APSRTC, TSRTC JnNURM, UPSRTC and other STUs.**
- Nearly **5,500** employees
- Manufactures **400** vehicles per day (**108K** vehicles / year)

Product Portfolio:

HCV Trucks (Diesel, CNG)
25 T - 55 T

Buses (Diesel, CNG, EV)
4 T - 16 T

ILMCV Trucks (Diesel, CNG)
4 T - 19 T

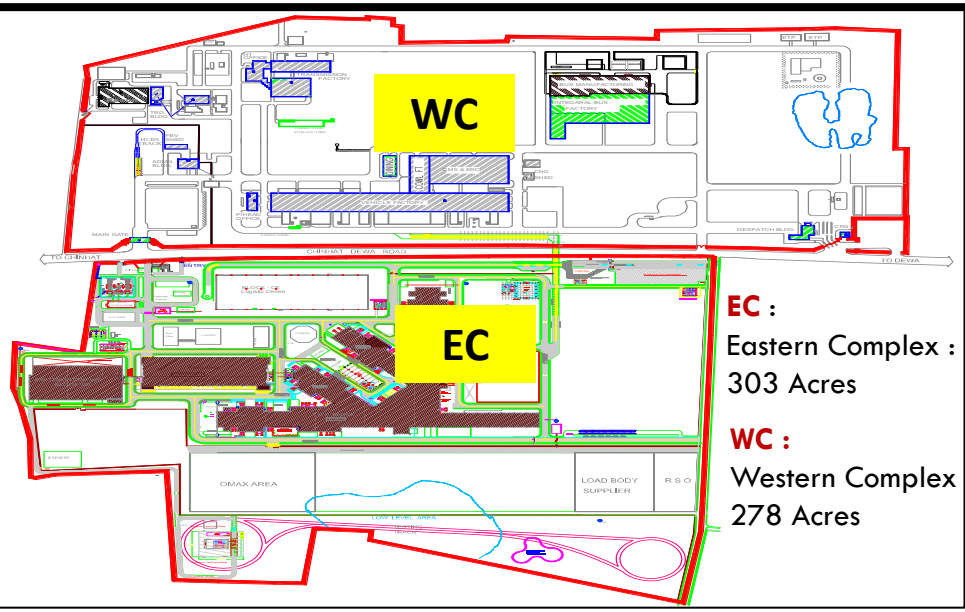
163 VCs across 3 Product Lines Planned from Lucknow

MOREWHENONE

Tata Motors-Lucknow provides complete Mobility solutions for Commercial Vehicles

Tata Motors Limited- Lucknow Plant

TATA MOTORS
Connecting Aspirations



EC :
Eastern Complex :
303 Acres

WC :
Western Complex :
278 Acres

Certifications:

IATF 16949 : 2016

ISO 14001 : 2015

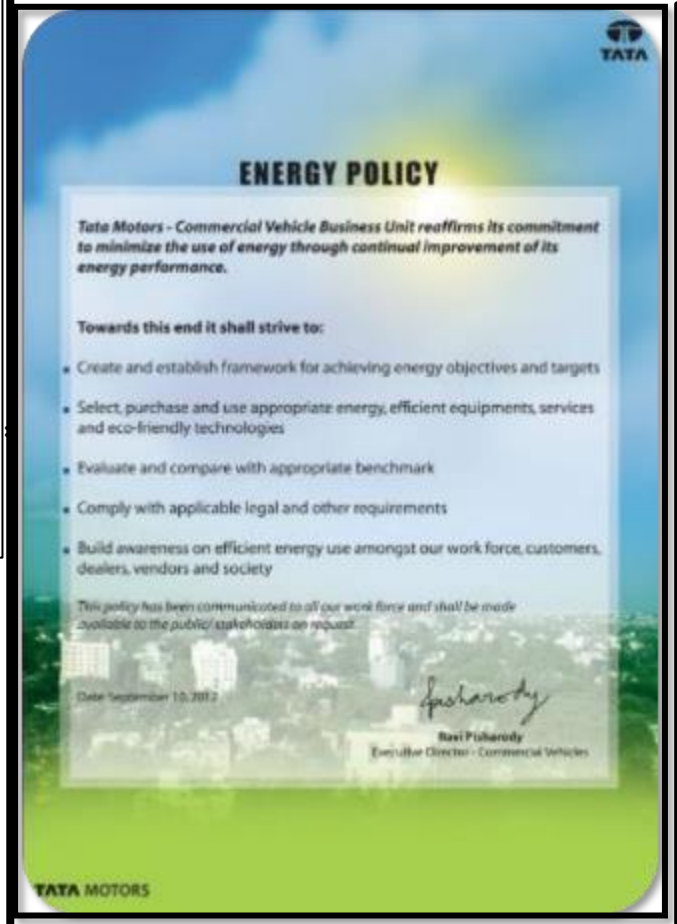
ISO 45001 : 2018

ISO 50001:2018

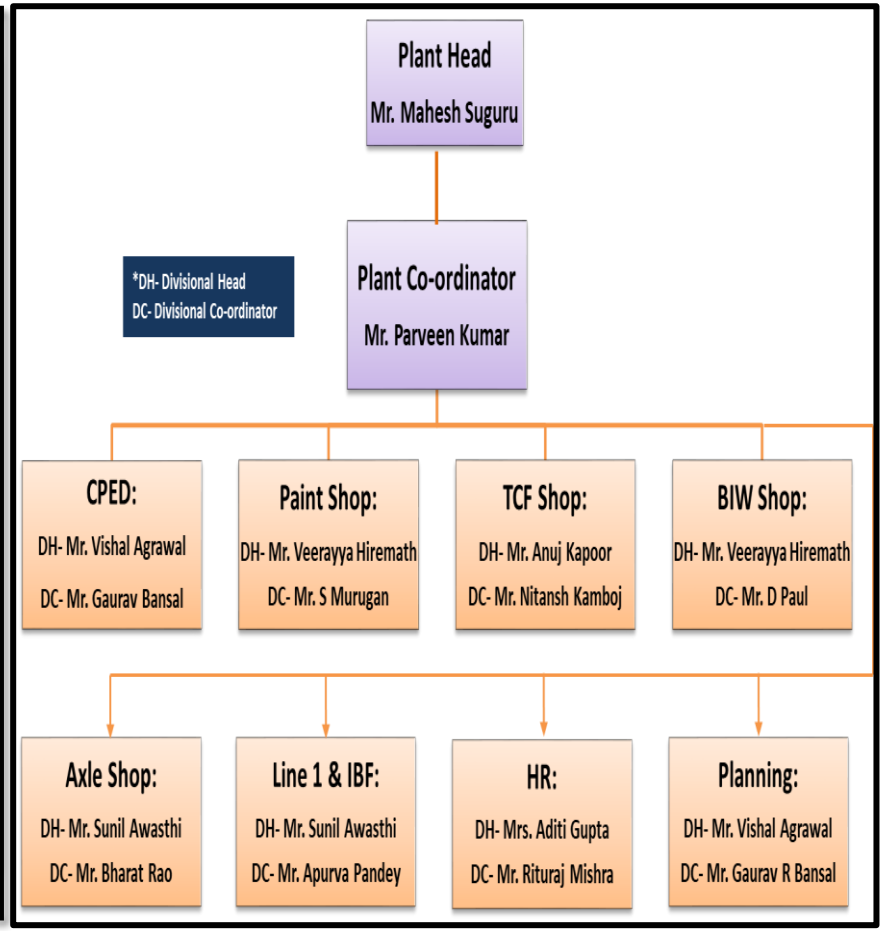
Water Positive
(Nov'22)

MORE WHEN ONE

Energy Policy



Energy Organization



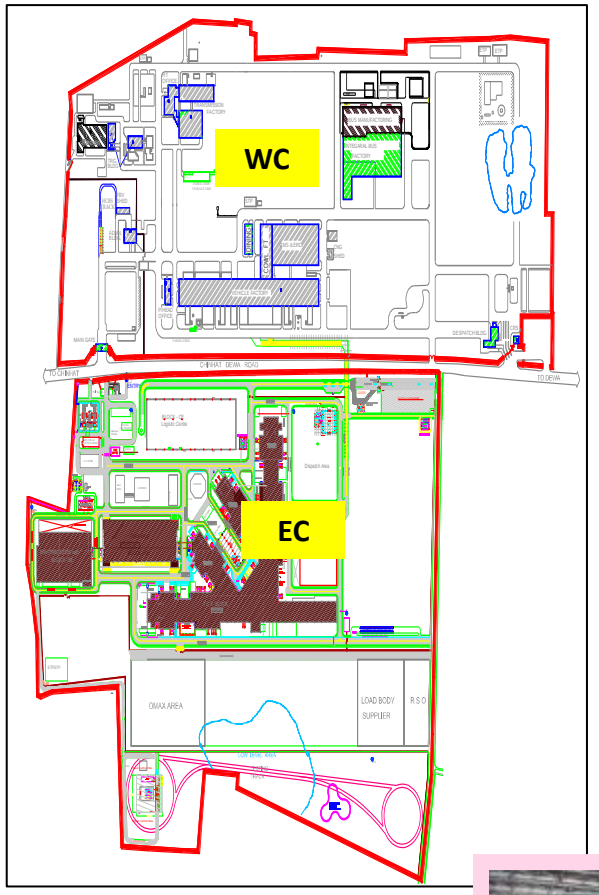
Participation Category → Excellence in Energy Management

Sector → Automobile

© Copyright, Confidential, Tata Motors Limited

Brief Introduction on Plant

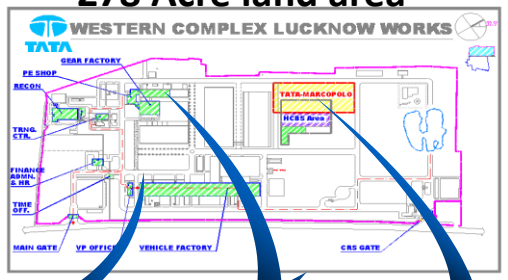
TATA MOTORS
Connecting Aspirations



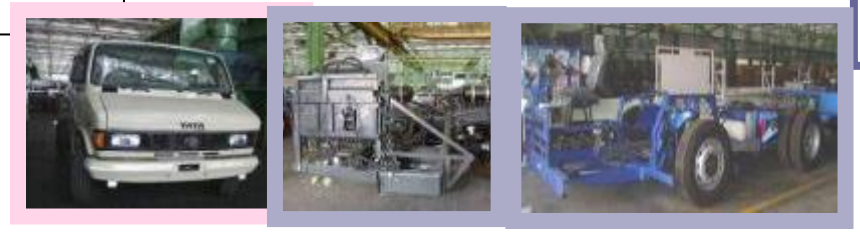
WC- Western Complex
EC- Eastern Complex

Lucknow Works

278 Acre land area



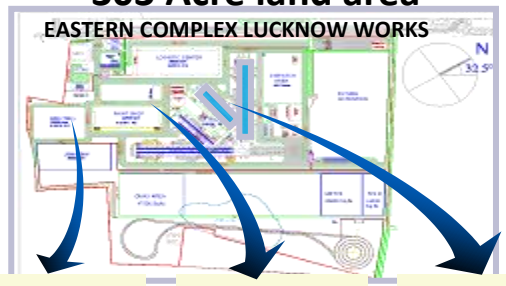
EV Vehicle Factory	PE & Axle Shop	Integral Bus Factory
Frame	Front Axle	Module Fabrication
Cowl	Production Engineering	Module Assembly
Vehicle Assembly		



- Bus Focused ERC setup
- Prolife
- Fully Build Vehicle
- Tata Marcopolo Motors Limited
- Service Training center

Facilities @ Lucknow

303 Acre land area



Weld Shop	Paint Shop	TCF & Option Part
		Cowl & Cabin
		Vehicle Assembly
		Option Part

MOREWHEN ONE

© Copyright, Confidential, Tata Motors Limited

Brief Introduction on Plant

TATA MOTORS
Connecting Aspirations

Plant Process

SUPPLY CHAIN

Material from Vendor base - Local, Pune & Jamshedpur

Drive Axle Assembly

Front Axle Assembly

Engine Assembly

EV Assembly Line Western Complex

Bus Assembly Line TMML

Vehicle Assembly Line Eastern Complex

DISPATCH

DTC*

STU**

Private Operator

Chassis Assembly

Cowl Assembly

Paint Shop

BIW Shop

* Delhi Transport Corporation

**State Transport Unit

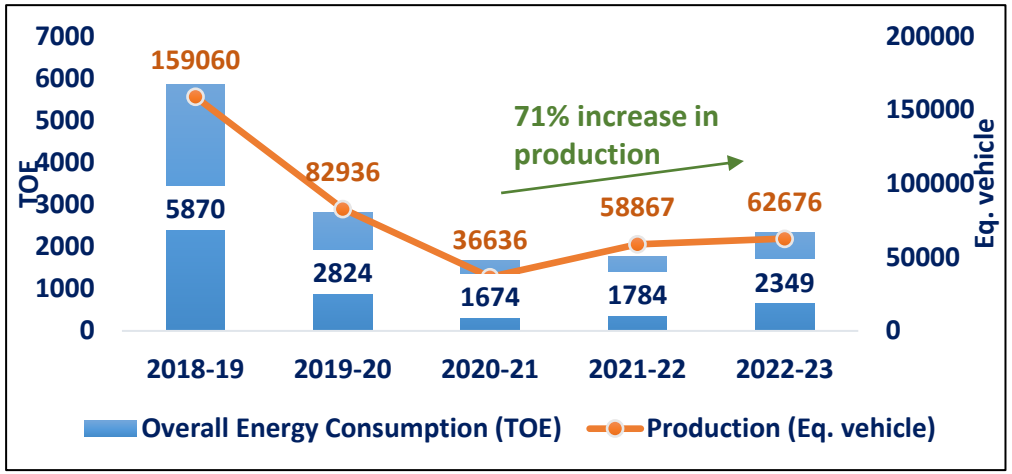
MORE WHEN ONE

© Copyright, Confidential, Tata Motors Limited

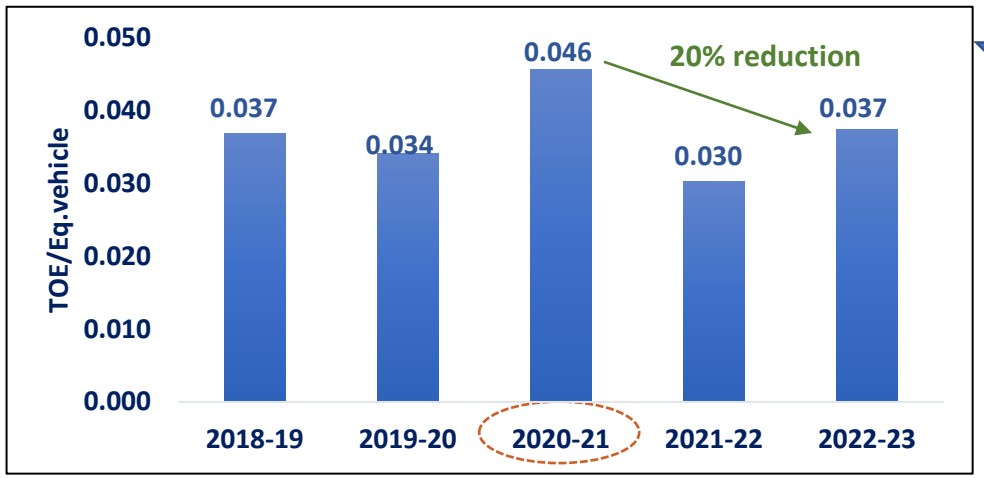
Specific Energy Consumption in Last 5 years (2018-23)

TATA MOTORS
Connecting Aspirations

Overall Energy (TOE) and Production – Last 5 years

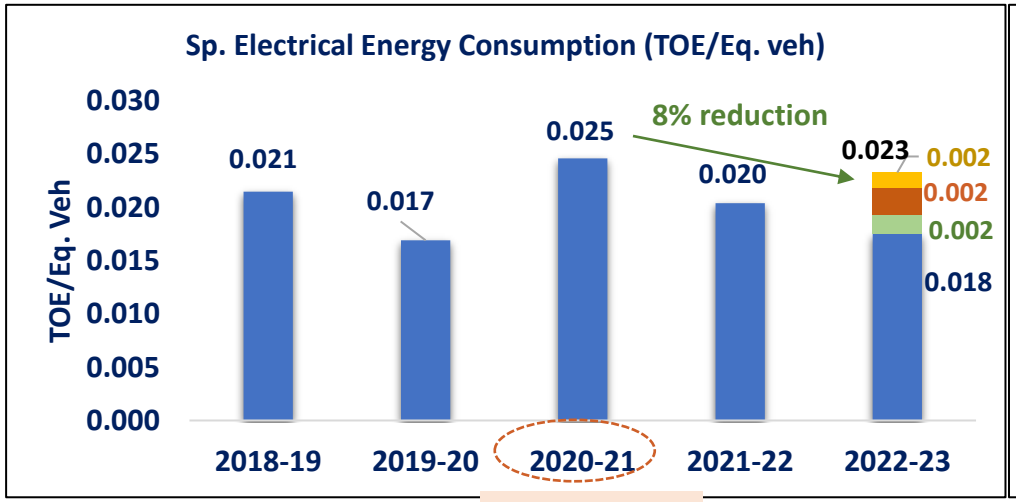


Specific Overall Energy consumption (TOE/Eq. Veh.)



Covid Impact

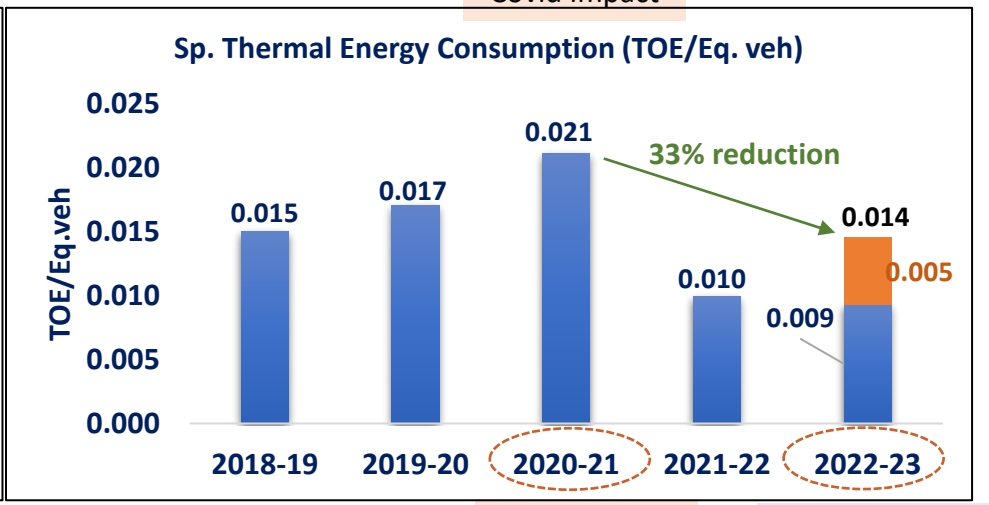
Sp. Electrical Energy Consumption (TOE/Eq. veh)



Covid Impact

ILCV impact, HVAC impact, ENCON Savings

Sp. Thermal Energy Consumption (TOE/Eq. veh)



Covid Impact

ILCV impact

Fuels used in Shops: Propane in Paint Shop

Major Actions Taken:

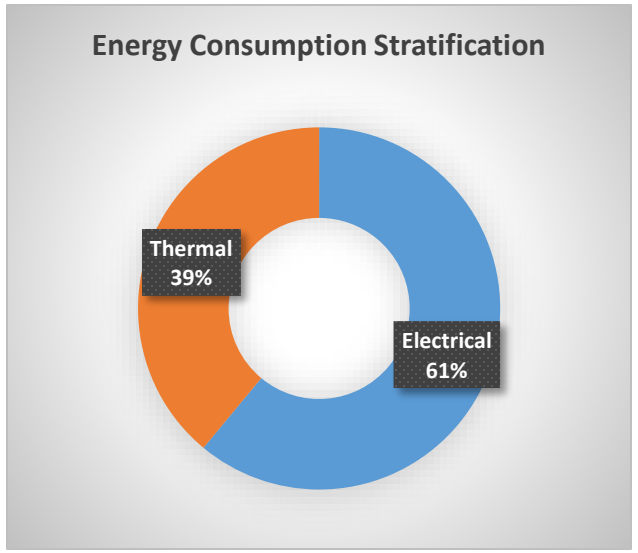
1. LED Migration Project- 75% (lights working more than 10 hrs)
2. Industry 4.0: Implementation in Paint Shop, Power Monitoring,
3. Use of Portable Compressors during non working days.
4. LT Ring System to Switch-off no load Transformer in Paint Shop and BIW

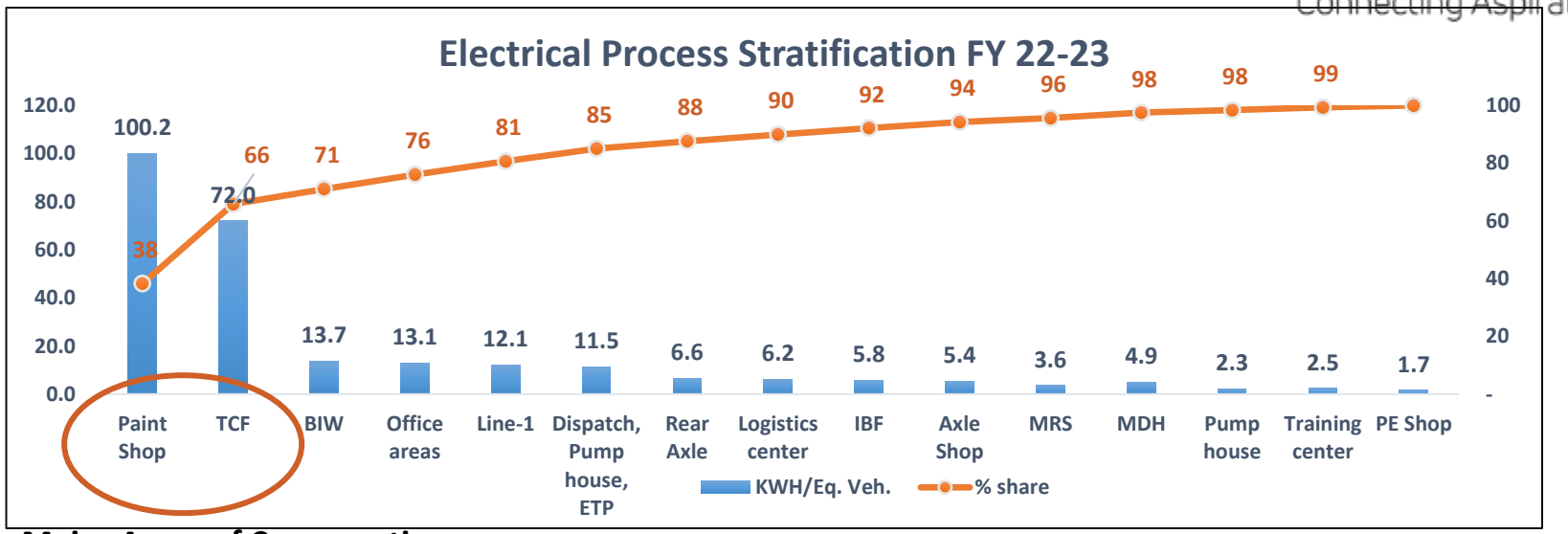
ILCV Production started at Lucknow in 2022-23, Capacity increased

HVAC:
2020-21: No comfort load
2021-22: 25% Comfort load
2022-23: 100 % Comfort load in use post COVID.

Overall Specific Energy Consumption reduced by 20% over the last 3 years while production increased by 71%

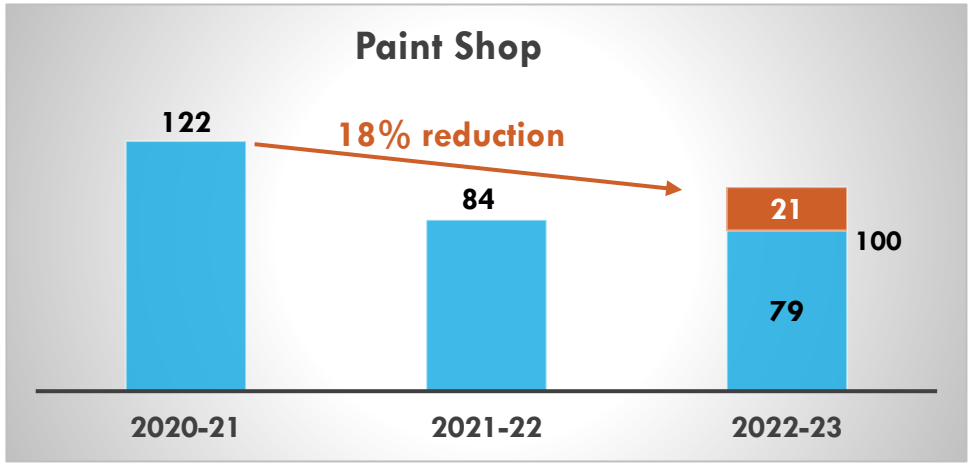
Energy Consumption Stratification

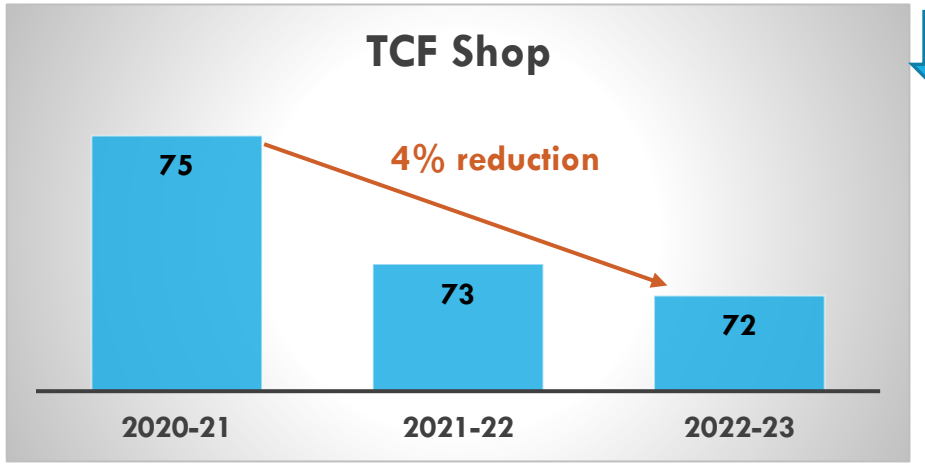




Major Areas of Consumption

Specific Energy Consumption for Process (KWH/Eq. Veh.)





Actions taken in Paint Shop:

1. Installation of VFDs in ASU
2. Optimized running of PTED
3. Booth Balancing.
4. LT Ring system for non working days.

Actions taken in TCF Shop:

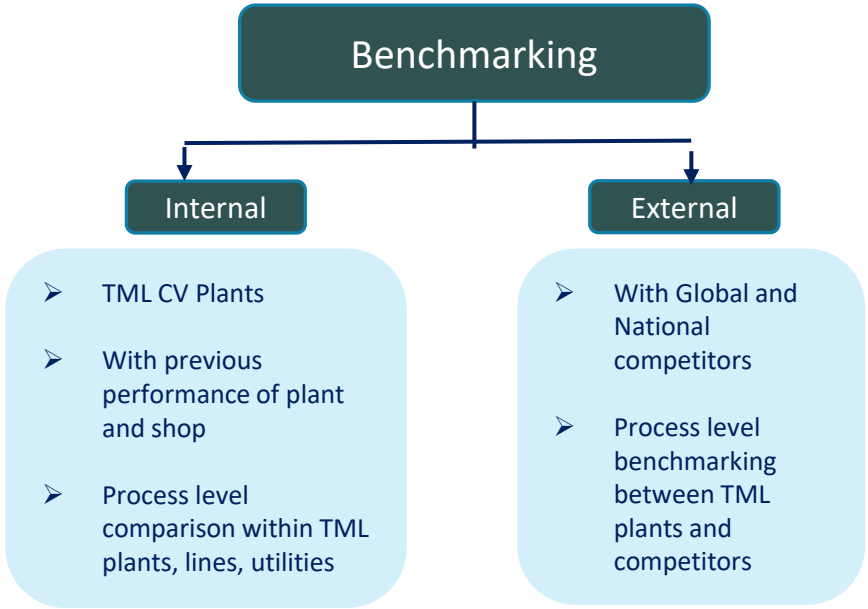
1. Installation of VFDs in man coolers
2. Interlocking of utility loads with conveyor lines
3. Portable compressor used during non working days.

ILCV production impact: 21 kwh/Eq. Veh.

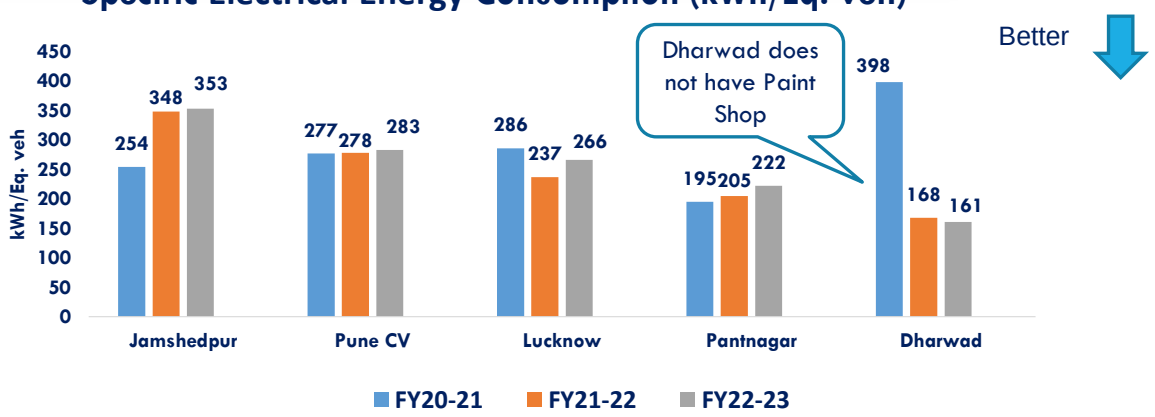
© Copyright, Confidential, Tata Motors Limited

Information on Competitors, National & Global Benchmark

TATA MOTORS
Connecting Aspirations



Benchmarking within Tata Motors CV Plants



National Benchmarking : Production Capacity at various Plants

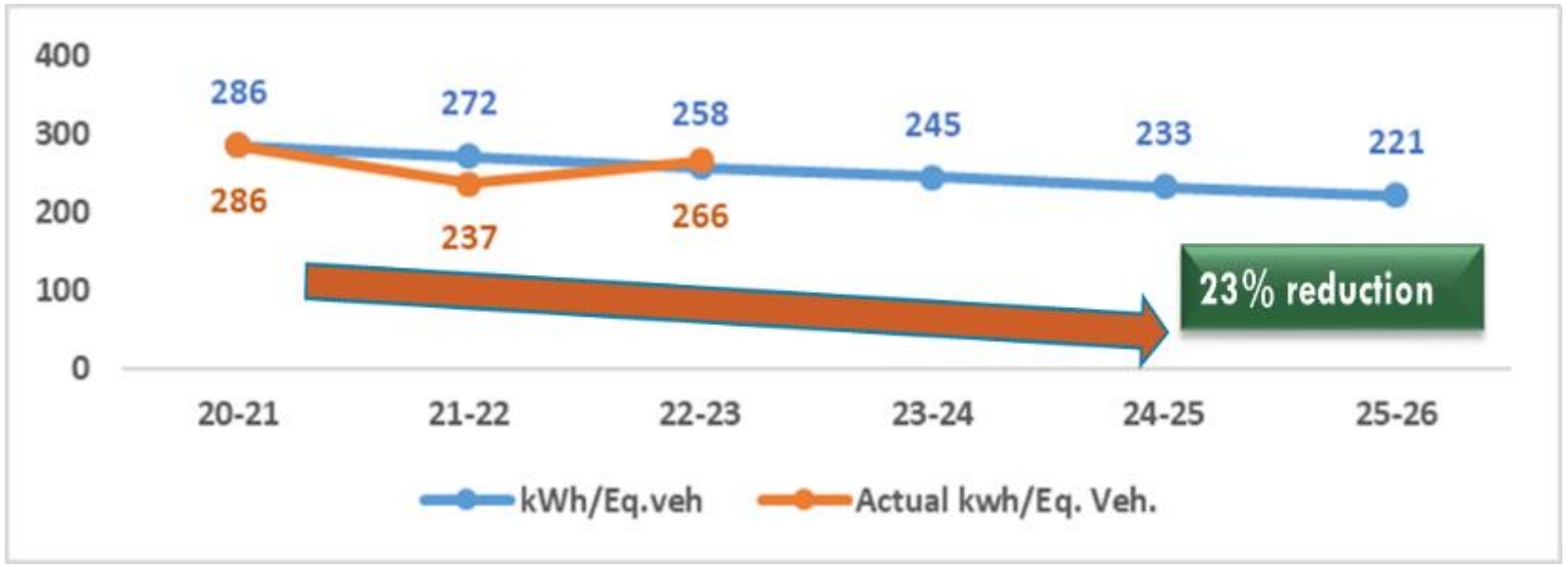
Organization	Production Capacity (No. of Veh. Per annum)
Mahindra & Mahindra -Chakan	300,000
Hyundai Plant-1	680,000
Tata Motors Lucknow plant	123,000
Tata Motors- Pune plants	300,000

Lucknow plant is the 2nd best in Energy-efficiency amongst all Tata Motors CV plants

© Copyright, Confidential, Tata Motors Limited

Roadmap for Achieving Long Term Target of Energy Consumption

TATA MOTORS
Connecting Aspirations



2020-21

- Discussion with Area Owners/Maintenance teams and brainstorming
- Feasibility study and evaluation of Encon ideas from all areas

2021-22

- Implemented quick win Encons and resource planning for others
- CII Energy Excellence Energy Award; PDCA process review

2022-23

- Energy Audit, Review and Suggestion scheme
- Daily Work Management (DWM) Review for energy monitoring

2023-24

- Reduction of plant's fixed energy consumption
- Smart Utilities management system using Industry 4.0

2024-25

- Migration to LED Lighting from 75% to 100% across the plant
- Use of VFD for selected plant load
- Smart control system for load optimization in shop floors

2025-26

- Energy efficient motors
- Workshop on Encon and Energy Audits & Review
- Alternate fuel in paint shop to be used

Planned
In progress
Executed

© Copyright, Confidential, Tata Motors Limited

ENCON Projects Planned FY 2023-24

Total Savings: Rs. 15 million

TATA MOTORS
Connecting Aspirations

Year	Idea Description	Annual Electrical Saving (Million kWh)	Annual Electrical Cost Saving (Rs million)	Annual Thermal Saving (kcal)	Annual Thermal Cost Saving (Rs million)	Total Annual Savings (Rs million)	Investment Made (Rs million)	Payback (yrs)
2023-24	WOW(Wet On Wet) sealer try out & Implementation	0.0	0.0	179.0	0.3	0.3	0.0	0.0
2023-24	ED 250 implementation	0.3	2.1	0.0	0.0	2.1	0.0	0.0
2023-24	Automated compressed air monitoring across the plant - industry 4.0 project	0.1	0.9	0.0	0.0	0.9	1.0	1.2
2023-24	Solar plant installation 2 MWp	2.8	1.4	0.0	0.0	1.4	0.0	0.0
2023-24	Automated energy monitoring in Western Complex	0.3	2.7	0.0	0.0	2.7	0.5	0.2
2023-24	HVLS fans installation at shops where mezzanine & other hoist constraints are not there (R1, R2 area).	0.1	1.0	0.0	0.0	1.0	0.3	0.3
2023-24	PA shop Productivity Improvement from 14 Job/hr to 18 Job/hr	0.3	2.6	270.0	0.5	2.6	1.0	0.4
2023-24	Admin Control for operation of HVAC System Planned/scheduled operation of HVAC system for better control	0.2	1.7	0.0	0.0	1.7	0.0	0.0
2023-24	400W & 250 W high bay lamps, tubelights, floodlights to be converted into 120W LED for IBF,TCF,BIW,Paint shop	0.3	2.6	0.0	0.0	2.6	1.0	0.4
	Total	**4.4**	**14.9**	**449.0**	**0.8**	**15.2**	**3.8**	

MOREWHEN ONE

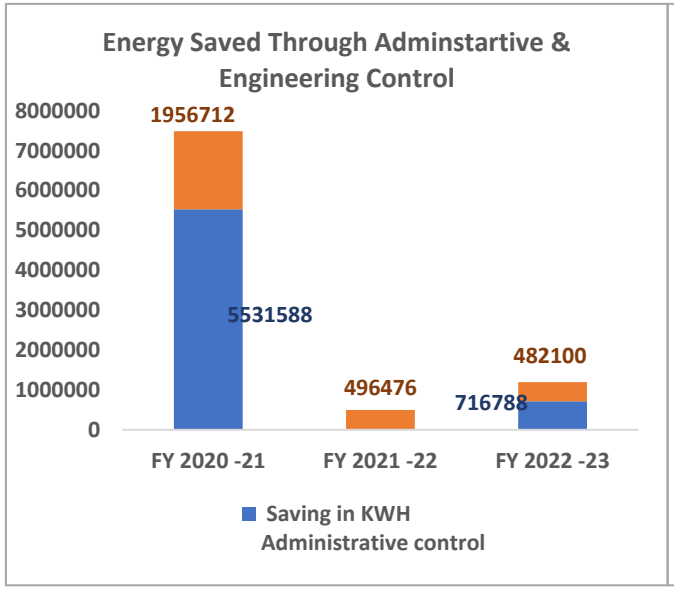
© Copyright, Confidential, Tata Motors Limited

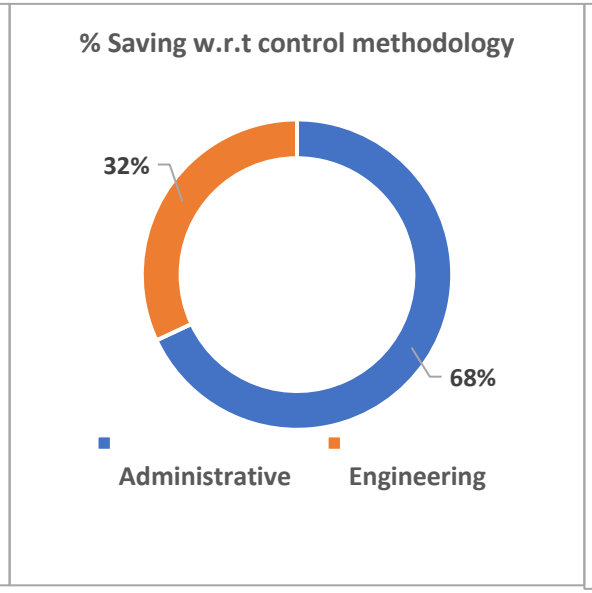
Encon's Summary

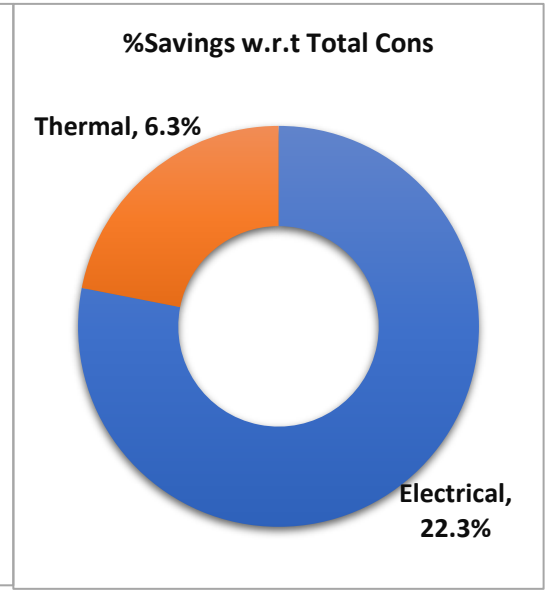
TATA MOTORS
Connecting Aspirations

Year	Consumptions		Electrical Savings / Year		Thermal Saving /Year		Total Savings	Investments	ROI Periods	%Savings w.r.t Total Cons.	
	Electrical (KWh in Lacs)	Thermal (in MT)	In Lacs KWh	Rs in Cr.	In MT	Rs in Cr.	Rs in Cr.	Rs in Cr.	in Months	Electrical	Thermal
2020-21	104.81	648	74.88	6.4	28	0.1	6.5	1.563	2.86	71.4%	4.3%
2021-22	139.6	488	5	0.423	63.4	0.32	0.743	0.23	3.3	3.6%	13.0%
2022-23	166.7	766	12	0.97	28	0.196	1.16	0.12	9.7	7.2%	3.7%
Total	**411.11**	**1902**	**91.88**	**7.793**	**119.4**	**0.616**	**8.403**	**1.913**	**15.86**	**22.3%**	**6.3%**

Major ENCON Projects	
1	Smart control system (Timer logics / occupancy sensor / Light sensor etc) for switching of man coolers and lights across the plants
2	Reduction of ED circulation pump operating frequency from 45Hz to 35Hz
3	Shut off valves for individual lines of compressed air supply and also for main incoming air supply at BIW.
4	Timer based air supply and interlock for Front Wall Manipulator at BIW shop.
5	Interlocking of Utility load with assembly conveyor operation in assembly lines
6	Replacement of Conventional light with LED lights
7	Process specific heating control system of PMR in Paint shop
8	Modification in PLC logic for idle running control in beam Washing machines







MORE WHEN ONE

Total Cumulative Annual Energy saving in last 3 years is Rs. 8.4 Cr

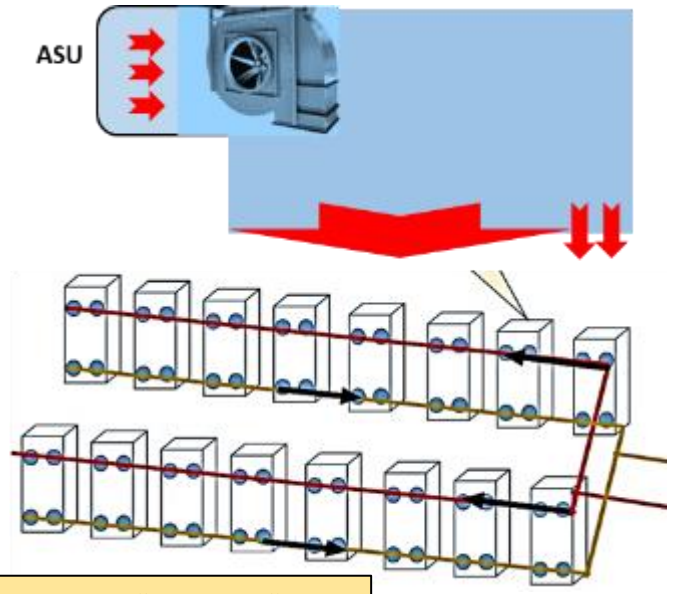
© Copyright, Confidential, Tata Motors Limited

Process Specific Heating System in PMR at Paint Shop

TATA MOTORS
Connecting Aspirations

BEFORE

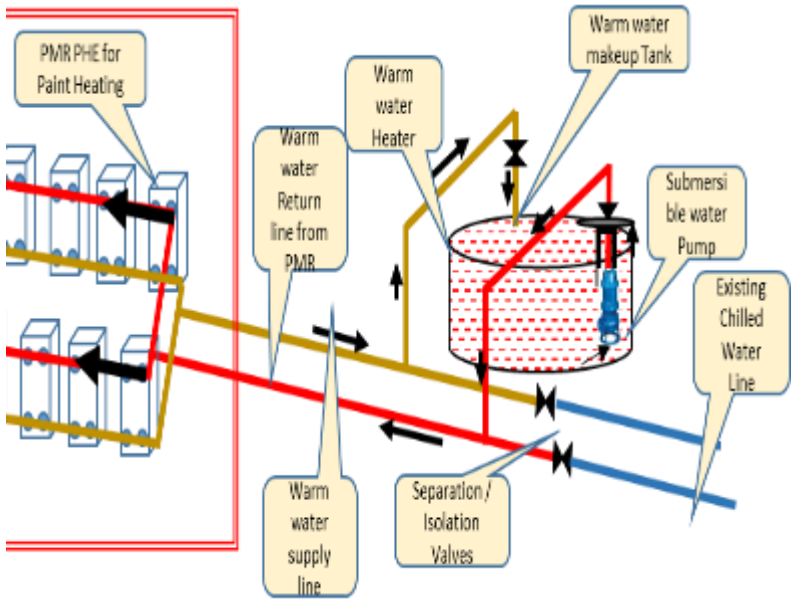
Earlier Only Chilled water lines were connected with existing PHEs of PMR paint Circulation system & Paint Temp range was controlled & maintained by PMR ASU-7 Burner Heating in Winters (4 months), which was very costly because it was heating the entire area & ventilated Air of Paint Mixing Room.



Critical & Major Parameter is "Viscosity"

AFTER

Installed in-house Heating system for PMR paint circulation to maintain the temp. as per required Range (24 to 28 C). This system is connected with existing Heat Exchangers (PHEs) through chilled water Line with separation valves shown in Red & Yellow colours lines & black valves in fig. It will use in Winters 4 months (Nov, Dec, Jan & Feb) only



Implementation Schedule

SR.No.	Activity	Aug'21	Oct'21	Nov'21	REMARKS
1	Feasibility study	50			
2	Action on Challenges		80		
3	Warm water Heating system Utilizing existing PHEs			100	
4					

PMR ASU -7		
Gas flow rate	70	Nm3/h
Heating Capacity	650	KW
consider Avg Heating Capacity (80% load)	520	KW
Burner running Time /day	16	hrs
KW/day = (325X16) =	8320	KW
	7155200	Kcal
Propane Calorific Value	11000	Kcal/kg
Gas consumption/day	650.5	Kg/day
Gas consumption/day (@Rs50/kg)	32523.6	Rs/day
Cost Saving /(4 months)	3382458.2	Rs / 4 Months
Cost Saving /(4 months)	**33.8 Lakh**	

Benefits Achieved
Energy Saving: Propane: 63,423 kg/year
Energy Cost Savings: Rs. 33.8 lakhs

MOREWHEN ONE

© Copyright, Confidential, Tata Motors Limited

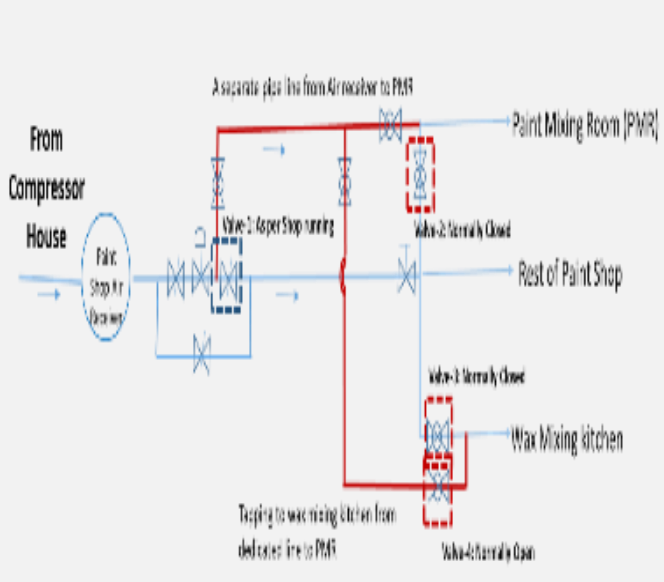
Compressed Air System Modification of PMR in Paint Shop

TATA MOTORS
Connecting Aspirations

BEFORE

Paint shop requires Compressed air in PMR & wax machine on 24X7 basis for which compressed air network of Paint shop need to be charged with compressed air. There was a substantial energy loss due to hidden leakage losses during non production days.

Energy used: 1500 KWH/day



AFTER

A separate pipe line to PMR & Wax mixing machine in Paint Shop had been placed for separate use and reduced unnecessary consumption on partial working days.

Energy used: 450 KWH/day

Implementation Schedule

SR.No.	Activity	Sep'21	Nov'21	Jan'22	REMARKS
1	Feasibility study	50			
2	Material procurement		80		
3	Pipeline modification & Valve placement			100	

Benefits Achieved

Energy Saving: ***1050 kwh/day, 1.16 lac kwh/year***
Energy Cost Savings***: Rs. 9.3 lakhs Recurring Saving every year***

MORE WHEN ONE

© Copyright, Confidential, Tata Motors Limited

Reduction in Power Consumption by Provision Portable Compressor for Partial working Zone

TATA MOTORS
Connecting Aspirations

BEFORE

We were encountering requirement of compressed air supply during non production days for small/non production related activities. It requires charging of complete compressed air network which cause of energy losses due to existing hidden leakages in shop floor in wide range of compressed air network.

4000 CFM

1500 CFM

AFTER

We developed in-house small portable compressor for meeting such requirements rather than supplying compressed air in complete network of shop floor.

Shops using this:

1. TCF Shop
2. PE Shop
3. Logistics center

Ensured use of portable compressor during partial working days.

300 CFM

Implementation Schedule

SR.No.	Activity	Oct'21	Dec'21	Jan'22	Feb'22	REMARKS
1	Feasibility study	25				
2	Supplier selection	40				
3	Purchase indent		50			
4	Purchase order releasing			80		
5	Portable compressor in use				100	During non working or partial working days

Benefits Achieved

Energy Saving: 7500 kwh/year

Energy Cost Savings: Rs. 0.6 lakhs

MOREWHENONE

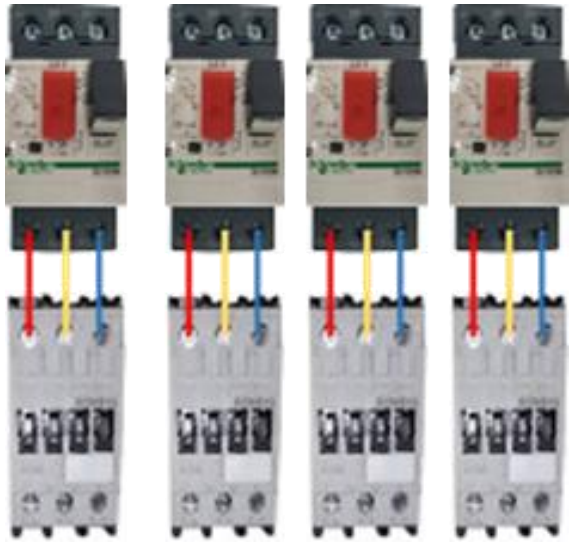
© Copyright, Confidential, Tata Motors Limited

Installation of VFD in Man Coolers at TCF Shop

TATA MOTORS
Connecting Aspirations

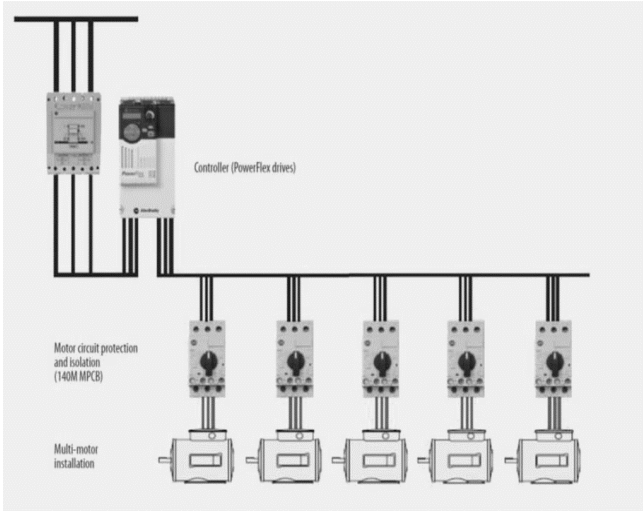
BEFORE

76.5 KW load of 51 man coolers was running at TCF line 2 & Line 3 was running for 14.6Hrs./Day with DOL Starter. Annual Power Consumption for 300 days working was 335070KWH. We were paying 2848095Rs/Annum



AFTER

We have incorporated VFD in 51 Man coolers at running of 90% efficiency. After VFD installation power consumption has been reduced by 30%. Running hours are same as earlier 14 Hrs./Day. Annual Power Consumption for 300 days working is 234549 KWH. We have to pay 1993667 Rs/Annum only.



Implementation Schedule

SR.No.	Activity	Jun'21	Jul'21	Aug'21	Aug'21	REMARKS
1	Feasibility study	20				
2	Supplier selection	40				
3	Purchase indent		50			
4	Purchase order releasing			80		
5	VFD installation				100	

Benefits Achieved

Investment: Rs. 4.95 lakhs
Energy Saving: 1 lakh KWH
Energy Cost Savings: Rs. 8.5 lakhs

MOREWHEN ONE

© Copyright, Confidential, Tata Motors Limited

LED Light Migration Project at TCF Shop

TATA MOTORS
Connecting Aspirations

BEFORE

230 Lights in TCF- R1, R2, DRR4 area with 103.5 KW (100%) Expenses per annum : 2.79 Lac KWH & ₹ 23.89 Lac's

Expenses FY 21-22 (From 12th July): 2.09 Lac KWH & ₹ 17.91 Lac's

Lighting Lux Level: 150-200

AFTER

230 Lights in TCF- R1, R2, DRR4 area with 34.5 KW (33%) Expenses per annum: 0.93 Lac KWH & ₹ 7.96 Lac's

Expenses FY 21-22 (From 12th July): 0.69 Lac KWH & ₹ 5.97 Lac's

Lighting Lux Level: 370-450

Implementation Schedule

SR.No.	Activity	Apr'21	May'21	Jun'21	Jul'21	REMARKS
1	Feasibility study	25				
2	Supplier selection	40				
3	Purchase indent		50			
4	Purchase order releasing			80		
5	LED Light replacement				100	During non working days

MOREWHEN ONE

Benefits Achieved

69 KW (67%) Savings per annum

Savings FY 21-22 (From 12th July): 1.40 Lac KWH & ₹ 11.94 Lac's

Lighting Lux Level: WCQ - Lux Compliance

Investment: Rs. 14.4 lakhs

Energy saving: 1.86 lakh KWH

Energy cost savings: Rs. 15.9 lakhs

© Copyright, Confidential, Tata Motors Limited

Energy Audit Example

TATA MOTORS
Connecting Aspirations

Area	Subarea	Running Time	Activity	Observation
Line-1	Trim Line-1	A & B Shift	• Engine Replacement activity • Maintenance was also carried out	**Issue: Yes** 4-5 people were working but lights were switched ON all over the line.
TCF	Tyre Yard	G-shift	Inventory Audit work was going on	**Issue: Yes** All Overhead lights across Tyre yard was ON even in day time. As lights were not required so switched OFF all lights.
TCF	Forklift Maintenance	G-Shift	Maintenance activity of forklifts was carried out.	**Issue: No** Approx. 14 lights were ON & area was working as normal working day. (No issue found)
Logistics	Engine & Axle storage area	G-Shift	Inventory Audit work was going on	**Issue: Yes** Approx. 11 Nos. overhead lights were ON even in day time so switched OFF the lights.
TCF	Trim Line-3 stores	G & B	Inventory Audit work was going on	**Issue: No** Only required lighting were ON.
BIW	Assembly Conveyor	G-Shift	Maintenance work was carried out.	**Issue: No** All lights were ON as maintenance was carried out all over the line.
TCF	Line-3-CNG Cylinder dropping area, End of Line, R1/R2 Area	B-shift	CNG Cylinder dropping, Fitment activity was going on.	**Issue: No** All required Lights of particular stations, R1/R2 were ON.

Energy Savings: approx. 50 kwh/day
15,000 kwh/yr

Cost Savings: Rs. 1.3 lakhs/ yr

Trim Line-1

Forklift Maintenance

Trim Line-3 Stores

Line-3 End of Line

BIW Assembly Line

Engine/Axle Storage

© Copyright, Confidential, Tata Motors Limited

Major Ideas Stratified & Implemented for reduction of Fixed Energy Consumption

TATA MOTORS
Connecting Aspirations

S/N	Idea Description	Paint Shop	TCF	Cab office	Rest Areas	Status of implementation as on 2023
1	Switching off no-load transformers in MRS and sub-stations.				✓	✓
2	Installation of LT Ring system for transformers of Paint shop-A, Paint shop-B & Paint Shop-C substations to eliminate iron losses of transformers.	✓			✓	✓
3	LED Lights in TCF R1/R2, DRR4 areas		✓		✓	✓
4	Use of portable compressor for fixed air demand wherever feasible.	✓	✓	✓	✓	✓
5	Individual shut-off valves for Front wall, sub-structure and Mainframer lines in BIW.				✓	✓
6	No water extraction on Non-working day results zero energy consumption of Pump house.	✓	✓	✓	✓	✓
7	Installation of LT Ring system for transformers of BIW Shop substation to eliminate iron losses of transformers.				✓	✓
8	Hourly energy report analysis and deriving corrective actions.	✓	✓	✓	✓	✓
9	Compressed air system optimization	✓	✓		✓	✓
10	Installation of Shut off valves for isolate the pneumatic supply of particular area based on requirement.	✓	✓	✓	✓	✓
11	Bare minimum lighting in shops through low wattage Emergency Lighting system after working hours.	✓	✓	✓	✓	✓
12	Operation of R2 area in co-ordination with Line operation		✓		✓	✓

Various other initiatives creating major impact on energy consumption:

- Stringent Daily Monitoring of consumption shop wise
- Industry 4.0- Energy Dashboard with Power BI
- Digital transformation- Energy Dashboard with equipment wise monitoring in Paint Shop.
- Currently, horizontally deploying to all the shops.
- Trainings and awareness sessions on energy management for all employees.
- Activities during Energy Conservation Month Celebration.

MORE WHEN ONE

Projects status monitoring at regular interval

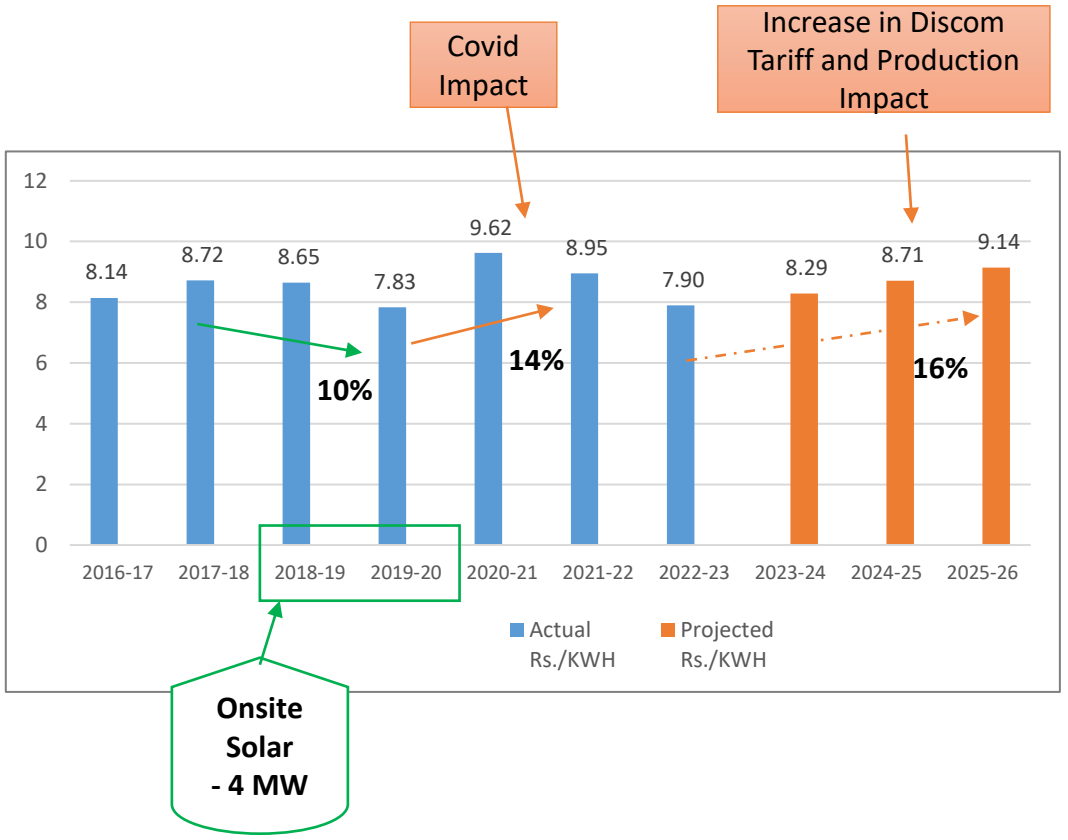
© Copyright, Confidential, Tata Motors Limited

Innovative Project Implemented- Open Access Power Purchase Scheme

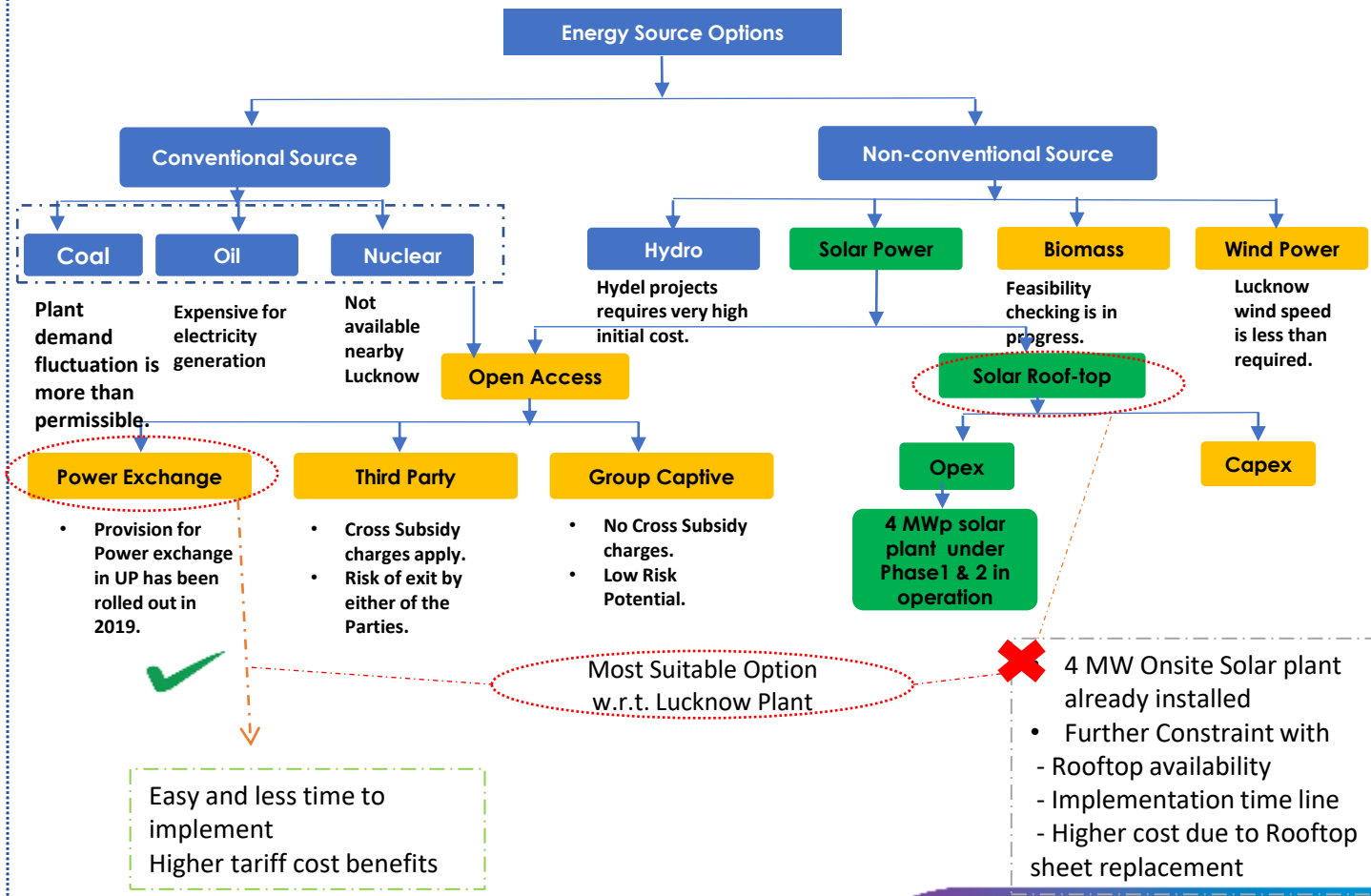
TATA MOTORS
Connecting Aspirations

Analysis of Power Tariff YoY and Energy Source Feasibility Study w.r.t. Lucknow Plant

Power Tariff Trend YoY



Energy Source Feasibility



© Copyright, Confidential, Tata Motors Limited

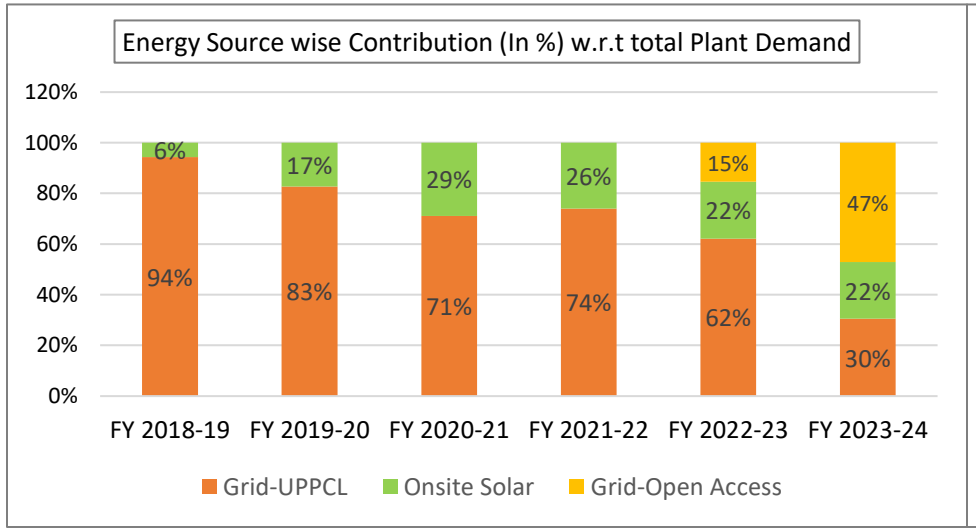
Open Access Implementation Steps and Cost Benefits

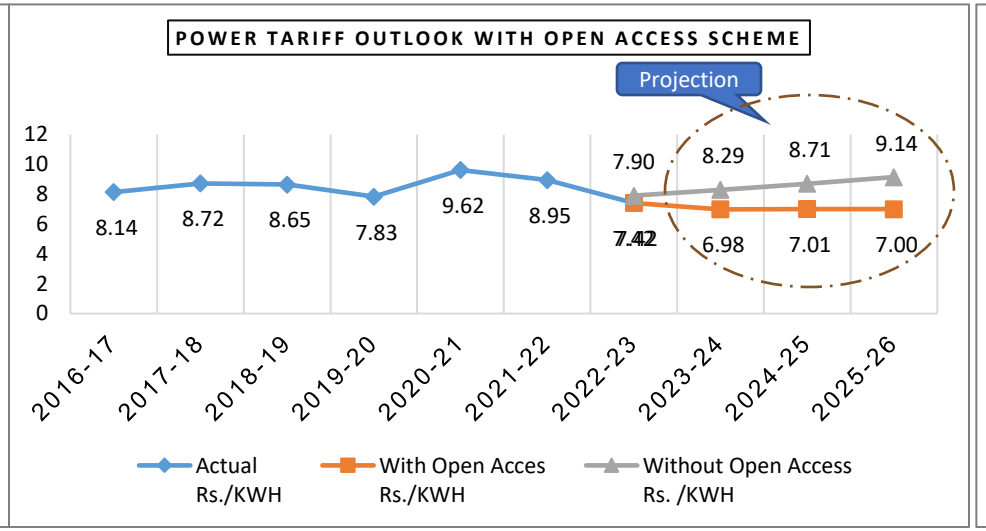
TATA MOTORS
Connecting Aspirations

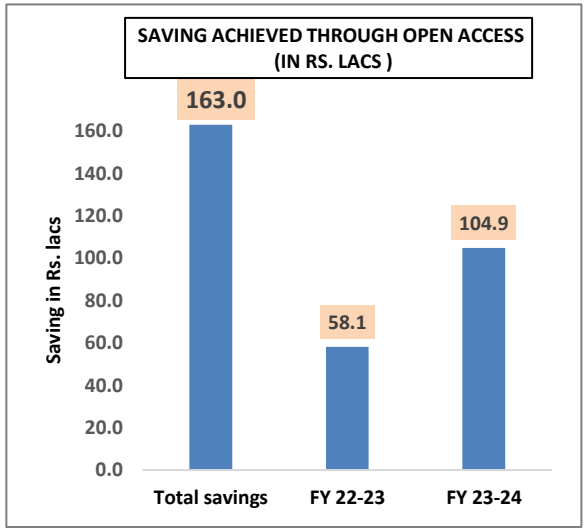
Open Access Implementation Steps

1. Related Party Transaction' and Management approval (**Year 2020-21**)
2. PPA Signup with TPTCL
3. ABT Meter and CT - PT installation **(Jun'22)**
4. NOC / Standing Clearance from UP SLDC
5. RLDC/SLDC registration as per CERC/UPERC Regulations
6. Start of Open Access Trading **(29th Sep'22)**

Features of Open Access Scheme	
Nature of Contract	Medium Term - 5 years
PPA Signed with	Tata power
Exchange	IEX / PXIL
Energy Type	Conventional and Renewable power
Market type	DAM / RTM / GDAM
Bid Pattern	* **DAM / GDAM** - Quantum of Power can be Planned 1 Day Ahead * **RTM** - Quantum of Power can be planned 1.5 hrs before







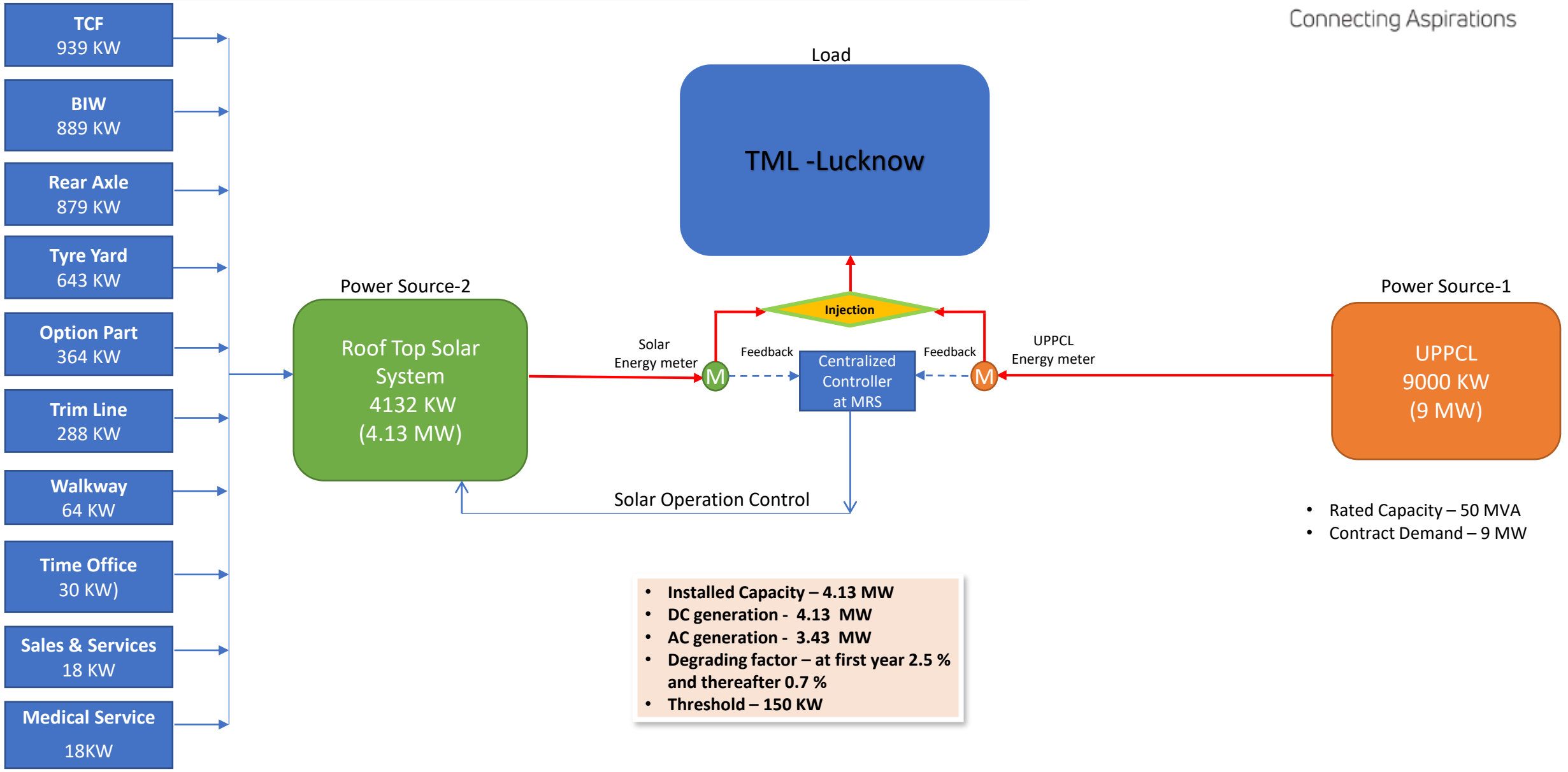
Replication Potential in other plants and industries – All Group Companies as per their State Regulation and suitability of load connectivity and demand pattern

MOREWHEN ONE

© Copyright, Confidential, Tata Motors Limited

Roof Top –Solar and UPPCL Power Grid Scheme at TML (Existing Solar)

TATA MOTORS
Connecting Aspirations



- **Installed Capacity – 4.13 MW**
- **DC generation - 4.13 MW**
- **AC generation - 3.43 MW**
- **Degrading factor – at first year 2.5 % and thereafter 0.7 %**
- **Threshold – 150 KW**

- Rated Capacity – 50 MVA
- Contract Demand – 9 MW

MOREWHENONE

© Copyright, Confidential, Tata Motors Limited

Lucknow Rooftop Solar Power Plant of 4.13 MWp

TATA MOTORS
Connecting Aspirations

Roof-Top Solar Phase- I (2.13 MWp) Phase-II (2.0 MWp)

- **Installation By – M/s BECIS ,Year 2018 (Phase-I) , Year 2019 (Phase-II)**
- **PPA Term – 20 Years (Opex Model)**

Solar Plant Locations completed in **Phase-I**: BIW, Paint Shop and TCF Line-2&3

Solar Plant Locations completed in **Phase-II**: Tyre Yard, Rear Axle shop, TCF-2&3 (south roof) and Trim Line-2&3

Technology Source	Year	Installed Capacity (in MW)	Generation (in Million kWh)	Consumption (in Million kWh)	Share %
SOLAR	**2020-21**	4.072	3.48	3.48	**28.34**
SOLAR	**2021-22**	4.13	4.16	4.16	**24.2**
SOLAR	**2022-23**	4.13	4.86	4.86	**22.5**

MOREWHEN ONE

© Copyright, Confidential, Tata Motors Limited

Waste Utilization and Management

TATA MOTORS
Connecting Aspirations

Type of Waste Material

Carton | Wood | Waste Thinner | Plastic | Used Oil

Utilization of Waste as Fuel (Alternative Fuel Utilization)

2020-2021			2021-2022			2022-2023			
Type of waste generated	Quantity of waste generated (MT/year)	Disposal method	Type of waste generated	Quantity of waste generated (MT/year)	Disposal method	Type of waste generated	Quantity of waste generated (MT/year)	Disposal method	Waste fuel as % of total Fuel
Carton	556	Disposed to waste collection agency	Carton	846	Disposed to waste collection agency	Carton	752	Disposed to waste collection agency	25.42
Wood	335	Disposed to waste collection agency	Wood	857	Disposed to waste collection agency	Wood	1203	Disposed to waste collection agency	15.31
Plastic	33	Disposed to plastic waste management party authorized by UP Pollution Control Board	Plastic	75	Disposed to plastic waste management party authorized by UP Pollution Control Board	Plastic	98	Disposed to plastic waste management party authorized by UP Pollution Control Board	4.58
Waste thinner	1.6	Disposed to vendor authorized by UP Pollution Control Board	Waste thinner	2	Co-processing (Dalmia Cements)	Waste thinner	4	Co-processing (Dalmia Cements)	0.13
Used Oil	21.22	Disposed to vendor authorized by UP Pollution Control Board	Used Oil	27	Co-processing (Dalmia Cements)	Used Oil	85	Co-processing (Dalmia Cements)	2.36
	946.82			**1807**			**2142**		**48.95**

Initiatives taken by the plant management for enhancing solid and liquid waste management are given below:

1. ETP sludge was reused to make 50000 nos. bricks which were used in construction project work
2. Scrap batteries were recycled through authorized vendor/agency
3. Waste oil and thinner were recycled through authorized vendor/agency
4. Flushing thinner generated as a waste from Paint Shop was reused as black paint
5. Small packaging replaced with bulk storage tanks near filling station to reduce Hazardous Waste and eliminate Plastic
6. Waste reduction through eliminate the moisture content from Phosphate sludge and ETP sludge
7. ETP, Phosphate & Paint sludge sent to Authorized recycler for Coprocessing.

COVID pandemic impact, very low production.

Mutilation process for conversion from BS3 to BS4 generated lot of Plastic , wood & carton for packaging of new parts that increase the Waste generation

MORE WHEN ONE

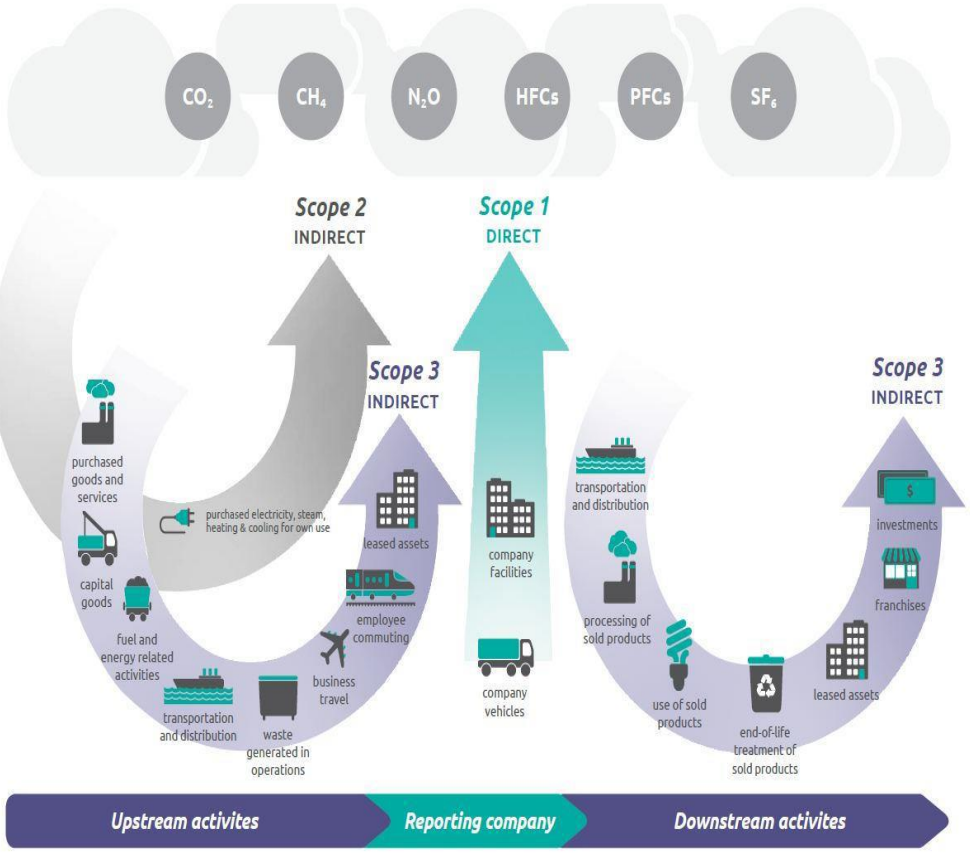
Waste Utilized as Fuel in 22-23 is 49% of total fuel consumption

© Copyright, Confidential, Tata Motors Limited

Carbon Footprint - GHG Emission and Scope

TATA MOTORS
Connecting Aspirations

GHG Protocol further categorizes the direct and indirect emissions into 3 parts:



Greenhouse Gases (GHG)

GHG Emission Scopes

Sources of Scope-1 & 2 Emissions at Lucknow

- DG Set (Diesel)
- Company Owned Vehicles (Diesel)
- Company Owned Vehicles (Petrol)
- Canteen (LPG)
- Engine Testing in ERC (Diesel)
- Process Heat Generation in Paint Shop (Propane)

→ Scope-1 Emission

- Grid Electricity (Total Plant excl. Marcopolo)

→ Scope-2 Emission

→ Total GHG Emission

MOREWHEN ONE

Presently we are considering only Scope-1 and Scope-2 emissions for our reporting

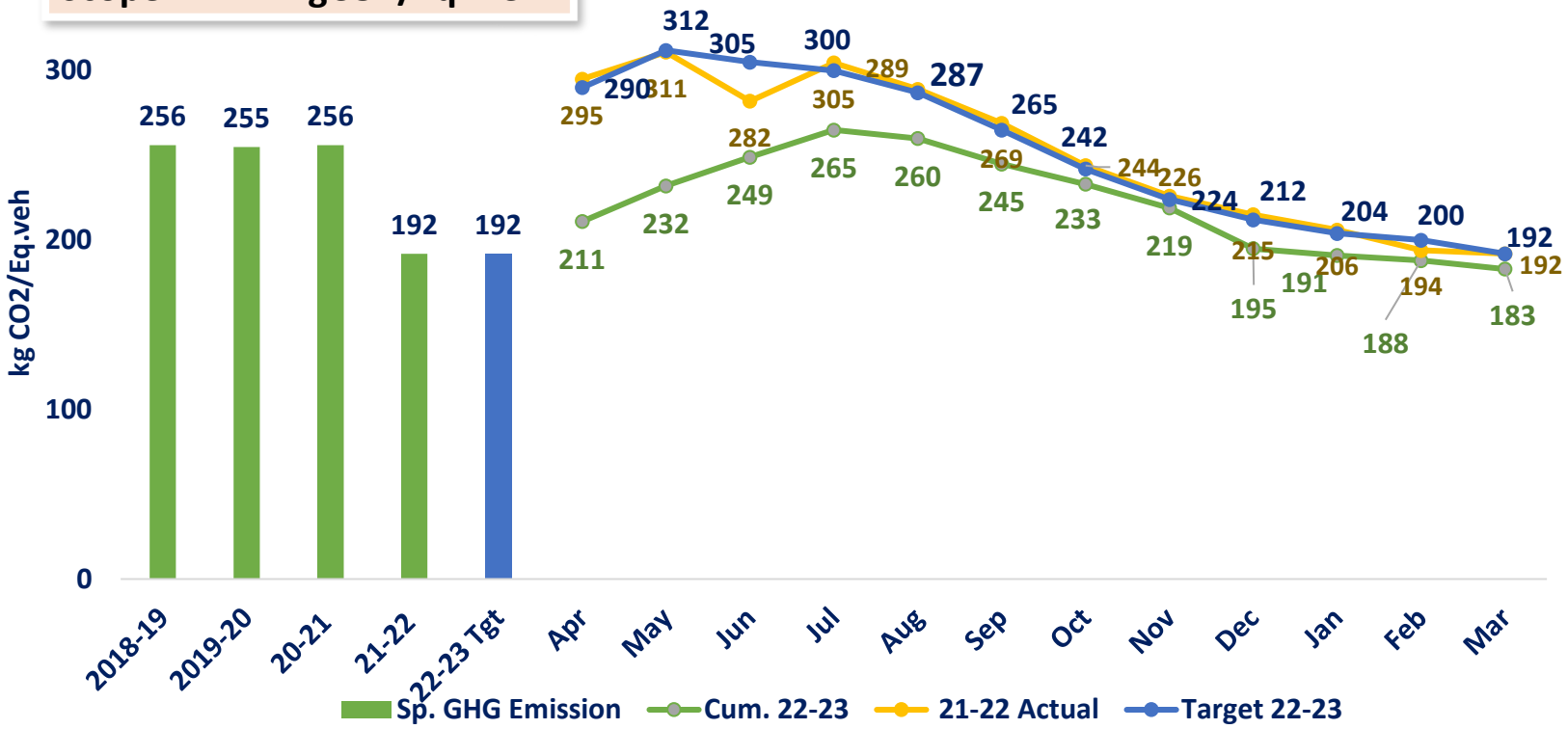
© Copyright, Confidential, Tata Motors Limited

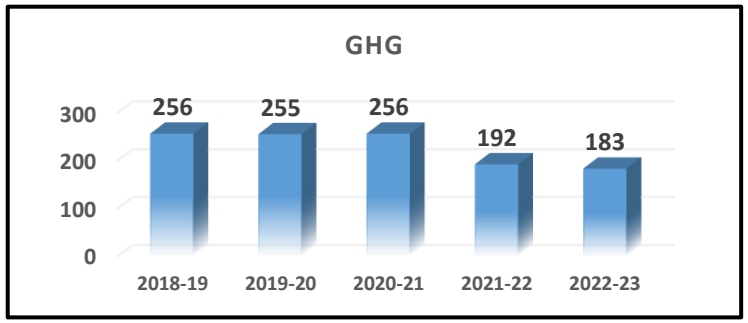
GHG (Green House Gases) Emission

TATA MOTORS
Connecting Aspirations

Scope-1: 41 kgCO2/Eq. Veh.
Scope-2: 142 kgCO2/Eq. Veh.

GHG Emission Trend (kg CO2/Eq. Veh)





Major Actions taken	Savings (kg CO2/Eq Veh)	Status
Reduction of Power distribution loss. -Roll out Kaizen, **Completed Kaizens.** **Improving power factor.**	5	SDCA
Interlocking Task lights, Pit lights & Mancoolers with Assembly line conveyor.- **Completed**	6.0	SDCA
Compressed Air requirement during Non Production day (NPD)-Use of portable compressor.**–Continuous**	3.3	SDCA
Replacement of less efficient Inverter with high efficient Inverter to enhance contribution Solar power- **Completed**	6.0	SDCA
High compressed air leakage in shops-Weekly audit and arresting leakage audit. Setting target of 5% leakage target.-**Continuous**	1.6	SDCA
Heating system in PMR at paint shop	3	SDCA

MOREWHEN ONE

25% reduction (256 to 183 kgCO2/Eq. Veh.) in GHG over the last 5 years

© Copyright, Confidential, Tata Motors Limited

Green Supply Chain Management

TATA MOTORS
Connecting Aspirations

Green Supply Chain Policies

Environmental Policy

Climate Change Policy

Green Supply Chain Policy

Road Map For Polythene Elimination in SCM

- Compilation of Single use plastic Packaging Disposal data
- Mapping the Procurement data of the plastic Packaging for interplant transfers & SPD

Formation of the Plant wise CFT April 2019

- Parts involved in the Plastic film Packaging
- Packaging Critical Requirement mapping

- B/O Part Family wise Mapping of Packaging Condition
- Part Family Wise Packaging for interplant / SPD

Plant Wise Data Analysis & Plastic Elimination Plan

- Mapping of the Major Suppliers Involved
- Parts in finished vehicle Protected with Plastic Films
- Idea Generation workshop for Plastic elimination

- Part Family wise Alternate Solution mapping for B/O, SPD, interplant transfer

Alternate Packaging development & Implementation

- Elimination of the plastics film in low hanging Parts
- Ensuring the Use of 50 Micron thk plastics for unavoidable parts
- Adopting the benchmark best practices

- Elimination of the Plastics packaging in the B/O Parts, Interplant transfers & in SPD.

Elimination of the plastic Packaging

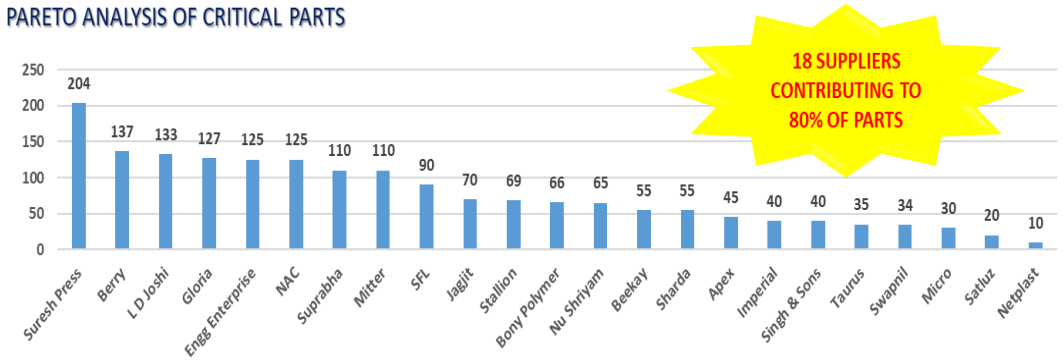
- Purchase & Logistics team Intervention
- Introduction of the Recyclable / Returnable packaging
- Ensure compliance of the statuary requirement wherever unavoidable

- Reduction in the Plastic Disposal waste

Plastics Film free Packaging

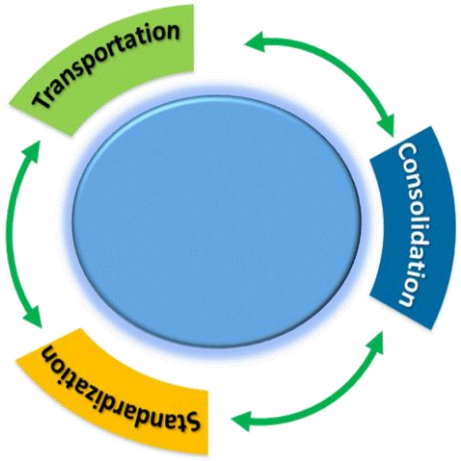
- Recycling of the 50 mic thk plastic films
- Packaging standard for part family
- Sustenance thru dock audit
- Refurbishing check and standards for the Returnable / recyclable packaging

PARETO ANALYSIS OF VEHICLE CRITICAL PARTS CONTRIBUTING TO POLYTHENE PACKAGING



Contribution of packaging include maximum part of plastic, wood and carton. By elimination or reuse of these material can save lot of energy. We had segregated the supplier in on basis of contribution of Parts

Expansion Plan of Green Supply Chain through Transportation, Consolidation and Standardisation (TCS) Initiative



TCS is a cost reduction initiative to improve operational efficiency from below levers:

Transportation [T] - Optimisation of inbound transportation cost
Consolidation [C] – Consolidation of suppliers/part combinations
Standardisation [S] – Standardisation of parts/process

Initiative under Transportation aims to
- Optimize logistic cost
- Encourage supplier to establish set-up near TML locations, thereby saving logistic fuel consumption
- Reduction in packaging scrap through returnable packaging

Initiative under Consolidation aims to
- Build Strategic Supplier Base through consolidation of suppliers
- Reduce operational costs and improve efficiency & productivity through consolidation of parts such as higher assembly procurement & MASOP elimination

Initiative under Standardization aims to
- Reduce complexity and achieve modularity for quick response to the market
- Part Commonization across models (No VAVE) to enhance productivity
- Standardization of best process across plants

Logistics Suppliers identified for Elimination of Polythene Packaging materials

© Copyright, Confidential, Tata Motors Limited

Green Supply Chain Management

TATA MOTORS
Connecting Aspirations

Projects implemented in Supply Chain for Eliminating Polythene, Wooden & Cartons Packaging

1. Project	Evaluation by	Benefits
Part Description : HEADLAMP & BLINKR MTG ASSY Vendor : LUMAX INDUSTRIES LTD, PUNE	Shadow board packaging accommodating more items in single box	2.36T of Annual Polythene waste generation eliminated

Before

After

2. Project	After	Benefits
Primary Packing – carton package Secondary - paper / thermocol	Primary Packing – better PP box Secondary Packing – shadow board	3.5 T of Annual Polythene waste generation eliminated

Before

After

3. Project	After	Benefits
Primary Packing – wooden carton package	Primary Packing – better PP box Secondary Packing – shadow board	Wooden carton eliminated

Before

After

4. Project	Evaluation	Benefits
Primary Packing - 1/ Polypack Secondary - Trolley Polythene weight :62 g	Primary Packing – better PP box Secondary Packing – shadow board	3.1 T of Annual Polythene waste generation eliminated

Before

After

5. Project	Evaluation	Benefits
Primary Packing - 1/ Polybag Secondary - Corrugated Box	Packing – PP box, Inside- shadow board packing	Annual Saving of 50 lacs

Before

After

6. Project	After	Benefits
Primary Packing – wooden carton package	Primary Packing – better PP box Secondary Packing – shadow board	Wooden carton eliminated

Before

After

Approx. 50 T of Polythene and 60 T of Carton and Wood eliminated resulting in reduction of 242 TCO2
Saved: 4.5 kgCO2/Eq. Veh. For FY 22-23

Learning from past CII Award Programs

TATA MOTORS
Connecting Aspirations

- Greenco Certified
- ISO 50001 Certified

Canfan Private Limited

Single phase Man cooler

S No.	Name of Company	Business Profile
1	DCL	Dust control and loading systems
2	Oorja energy engineering	The Cleantech Heating & Cooling Co.
3	Thermax	Energy and Environment Solutions for Sustainable Growth
4	AAD TECH (INDIA) PVT. LTD.	Intelligent Air handling
5	Turbotech Energy	Global Energy Solution Provider
6	Emerich Energy Pvt Ltd	Advanced PQ Solutions
7	E-view Global Pvt. Ltd	Energy Conservation thru Daylight harvesting
8	Forbes Marshall	Solutions to Conserve Energy
9	InPhase Power Technologies Pvt Ltd	harmonic-Reactive power - Unbalance
10	Danfoss	Danfoss Drives - for your applications
11	Bridge Things	Building Energy Management & Information Systems
12	AIRTRON	Energy Saving
13	Yaskawa	Electric motors and their applications
14	Thermin Power Systems Pvt Ltd	Energy And Power
15	Greenovative	Energy Management
16	Emerson	Emerson Heat pump Series
17	NOVENCO Schako Group And Xero Energy	Energy Saving
18	AIRpipe	
19	Systel	Complete Solutions For Compreesed Air Management
20	Skyshade	Energy Monitoring System and Electric Lighting Control
21	My Green Bin	Seggregate, Compost, Convert your Kitchen waste into Organic Manure
22	TEIKNOCRAT'S partner with Green Magic	Energy Saving in Air Conditioning Audits
23	ECOGREEN	Automatic Tube Cleaning System
24	AIRZON	Energy efficient Fans

MORE WHEN ONE

Several energy-efficient technologies/equipment learnt from CII Award forum

Targets taken up by TML Group – Net Zero, RE 100

TATA MOTORS
Connecting Aspirations

DRIVING NET ZERO

PIONEERING CIRCULAR ECONOMIES

PRESERVING NATURE AND BIODIVERSITY

Targets taken up by TML - Lucknow

- ✓ **[2026]: RE 100**.
- ✓ **[2035]: Net zero emissions across the plant for Scope 1 and 2**

- ✓ **[2023]: Water Positivity certification**
- ✓ **[2024]: Zero Waste to Land Fill certification**

- ✓ **[2023]: Action plan for Net Positive Impact / Nature Based solution**
- ✓ **[2028]: Tata is an NBS leader and has supported development of a thriving NBS market in India**

Targets taken up by TML

- ~~**[2020]:** Cap Group-level scope 1 and 2 emissions, with any growth in emissions offset.~~
- ✓ **[2030]:** [25%] reduction in absolute CO_2e emissions from [2020] baseline (Scope 1+2) from 2020 baseline, excluding Tata Steel India. Tata Steel India to reduce emissions intensity by 30% from 2020 baseline.
- ✓ **[2045]:** Net zero emissions across the Group for Scope 1 and 2 all companies (and Scope 3 for JLR, TML, TCS TCPL) .

THE TATA GROUP WILL BE A GLOBAL MODEL FOR BEST PRACTICE CIRCULARITY

- ✓ **[2023]**: Launch Group model for circular economy
- ✓ **[2025]**: More than double the content of renewable or recycled resources in products by 2025 (from 2020). The Group will set revenue-based KPIs from 2025 onwards
- ✓ **[2030]**: Replenish fresh water used across Group operations in India and zero waste to landfill across Group companies
- ✓ **[2040]**: Tata Group will replenish more fresh water than it consumes.

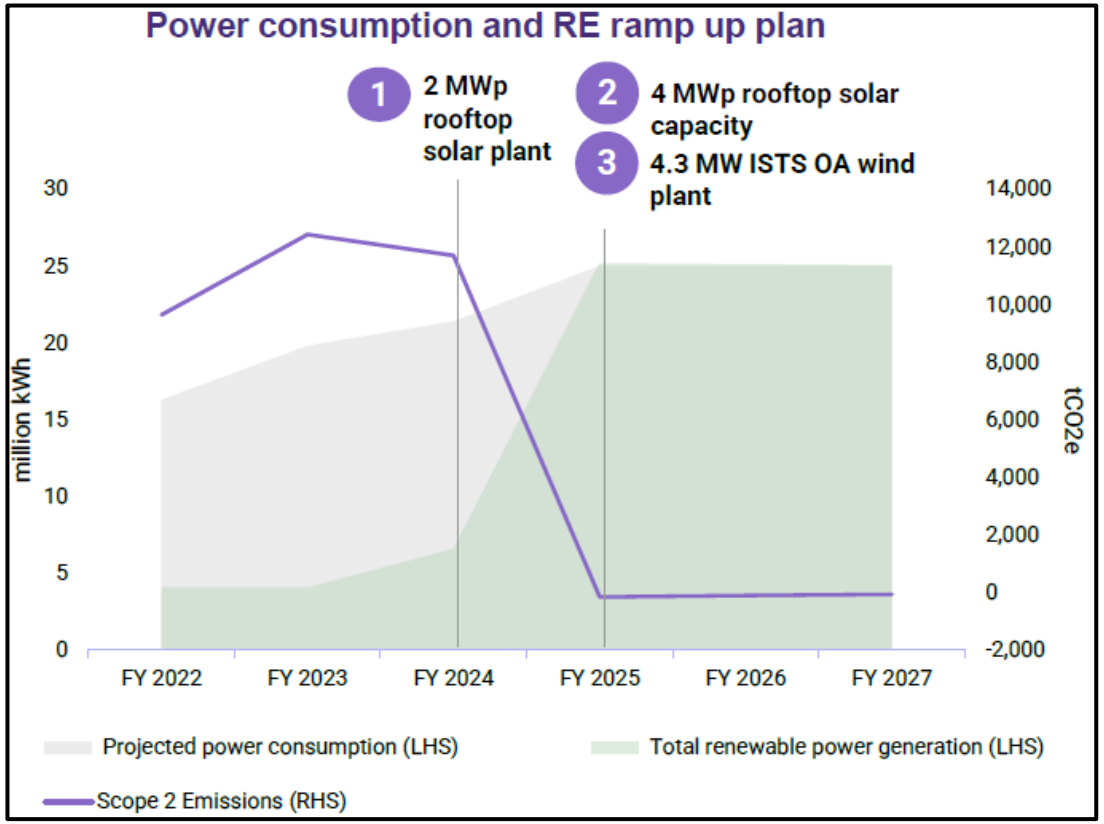
THE TATA GROUP WILL STRIVE TO HAVE A POSITIVE IMPACT ON NATURE

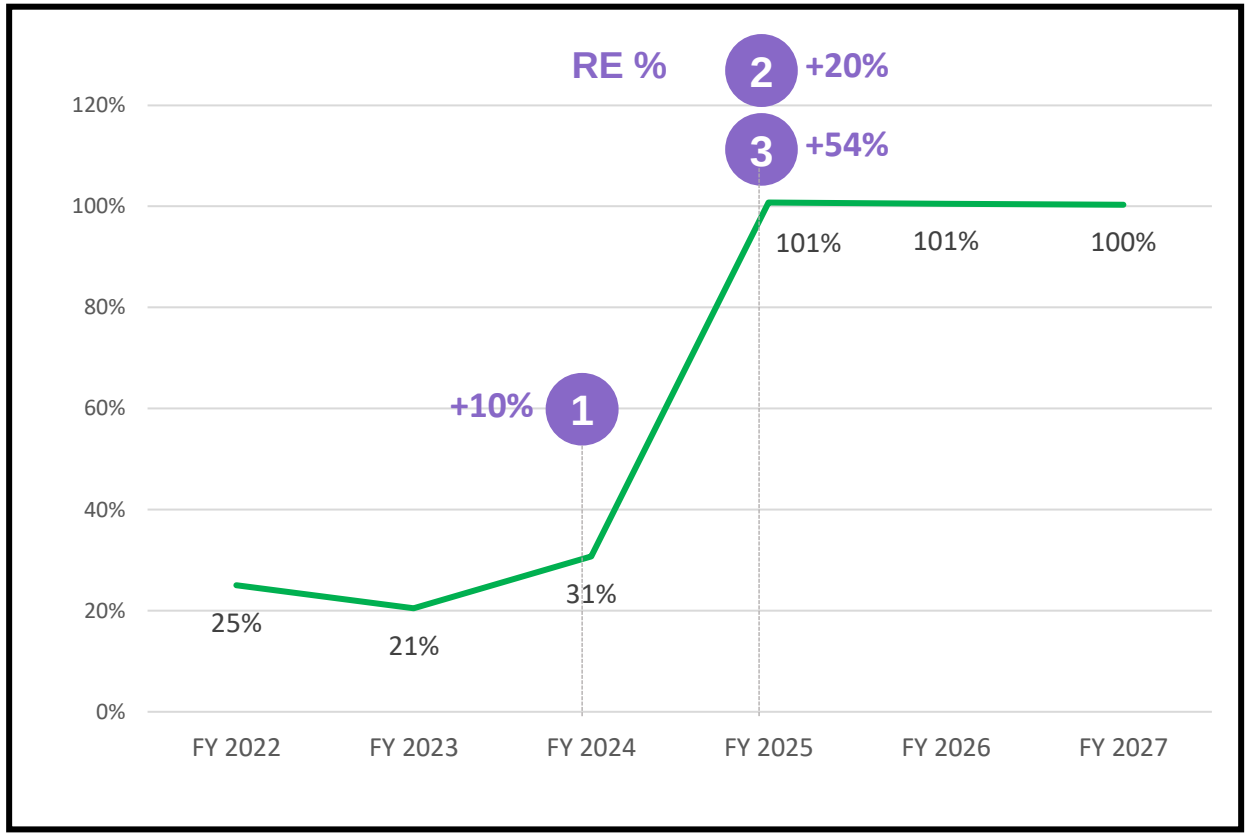
- ✓ **[2024]:** Action plan for net positive impact will be implemented across Tata Group companies
- ✓ **[2025]:** Invest in 10 NBS projects in India, which deliver biodiversity and community co-benefits.
- ✓ **[2030]:** Tata is an NBS leader and has supported development of a thriving NBS market in India.

MOREWHEN ONE

© Copyright, Confidential, Tata Motors Limited

TML Lucknow – RE Roadmap





Plant	FY2023	FY2024	FY2025	FY2026	FY2027
Lucknow		[1] 2 MWp Rooftop Solar	[2] 4 MWp Rooftop Solar [3] 4.3 MW ISTS OA Wind		

Existing Capacity: ***Onsite Solar 4.1 MW***

© Copyright, Confidential, Tata Motors Limited

Major Achievements

TATA MOTORS
Connecting Aspirations

Energy Management

- ISO 50001:2018 Re-Certification audit completed and received Certificate

Rewards & Recognition

- Bagged 2nd Prize in the most prestigious "National Energy Conservation Award" – NECA 2020 from Bureau of Energy Efficiency, Ministry of Power, Govt. of India

- Bagged 1st Prize in the "U.P. State Energy Conservation Award" (UP SECA 2020 and UP SECA 2021) from Govt. of UP.

UPSECA-2020

UPSECA-2021

- Won "Energy Efficient Unit Award" from CII-2020
- Won "Excellence in Energy Efficient Unit Award" from CII-2021
- Water Positive Plant-2022

CII Award-2020

Awarded in CII-Digital Transformation meet

MORE WHEN ONE

© Copyright, Confidential, Tata Motors Limited

TML, Lucknow Plant

THANK YOU

Q&A

MORE WHEN ONE

© Copyright, Confidential, Tata Motors Limited