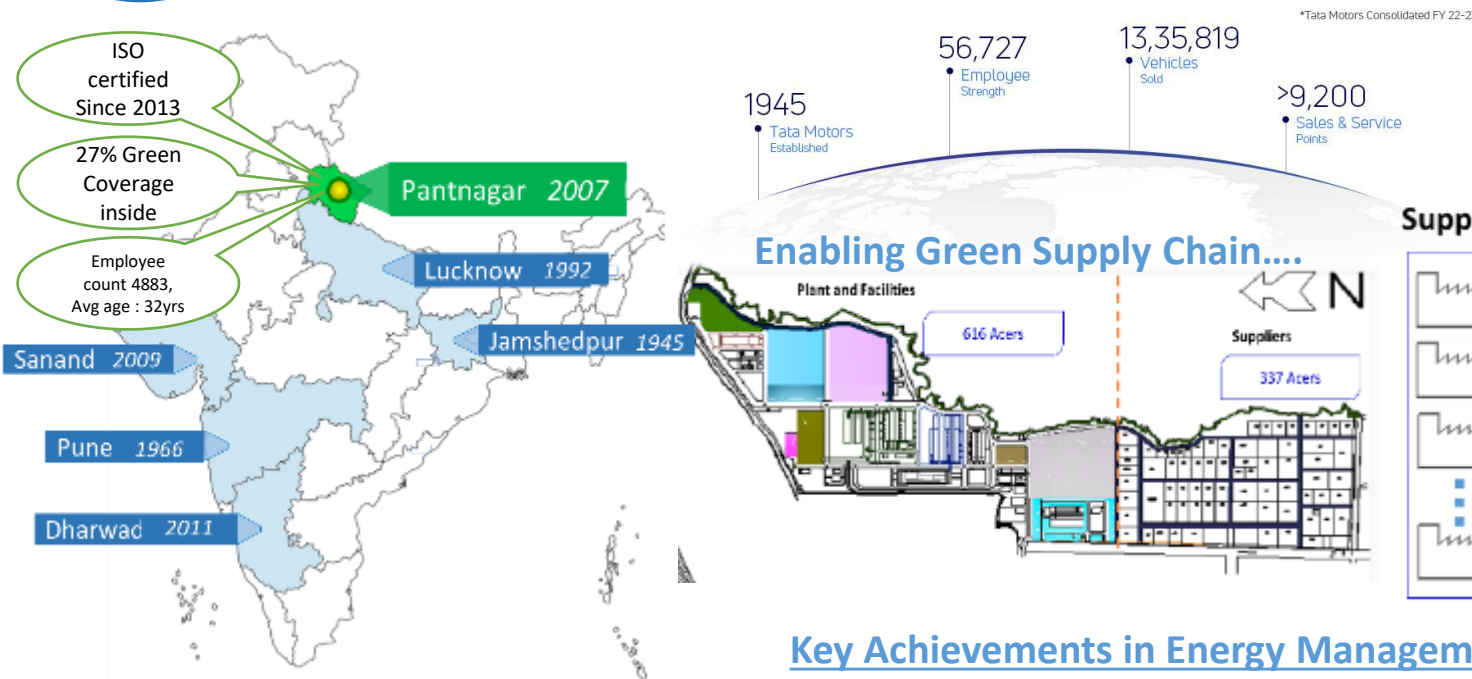




CII National Award in Excellence in Energy Management 2023

Tata Motors Limited, Pantnagar

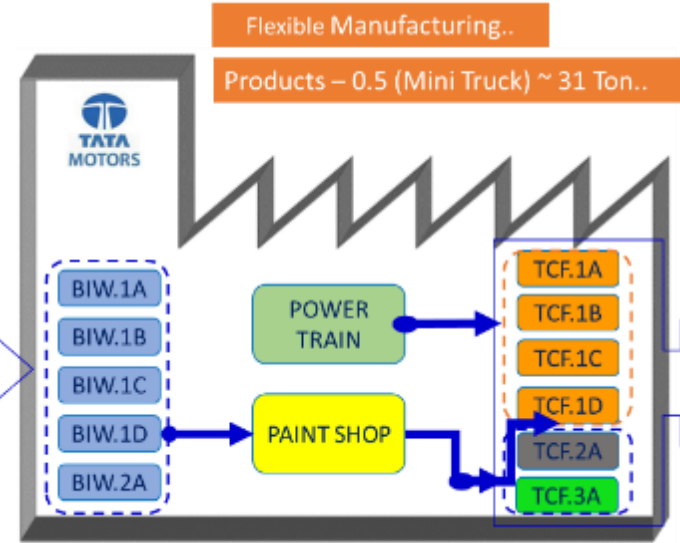
Team Members :
Mr. Mohammed Iliyas Ahmed, General Manager
Mr. Manjit Singh, Deputy General Manager
Mr. Samarendra Patro, Energy Cell



*Tata Motors Consolidated FY 22-23

Enabling Green Supply Chain...

Suppliers



Key Achievements in Energy Management

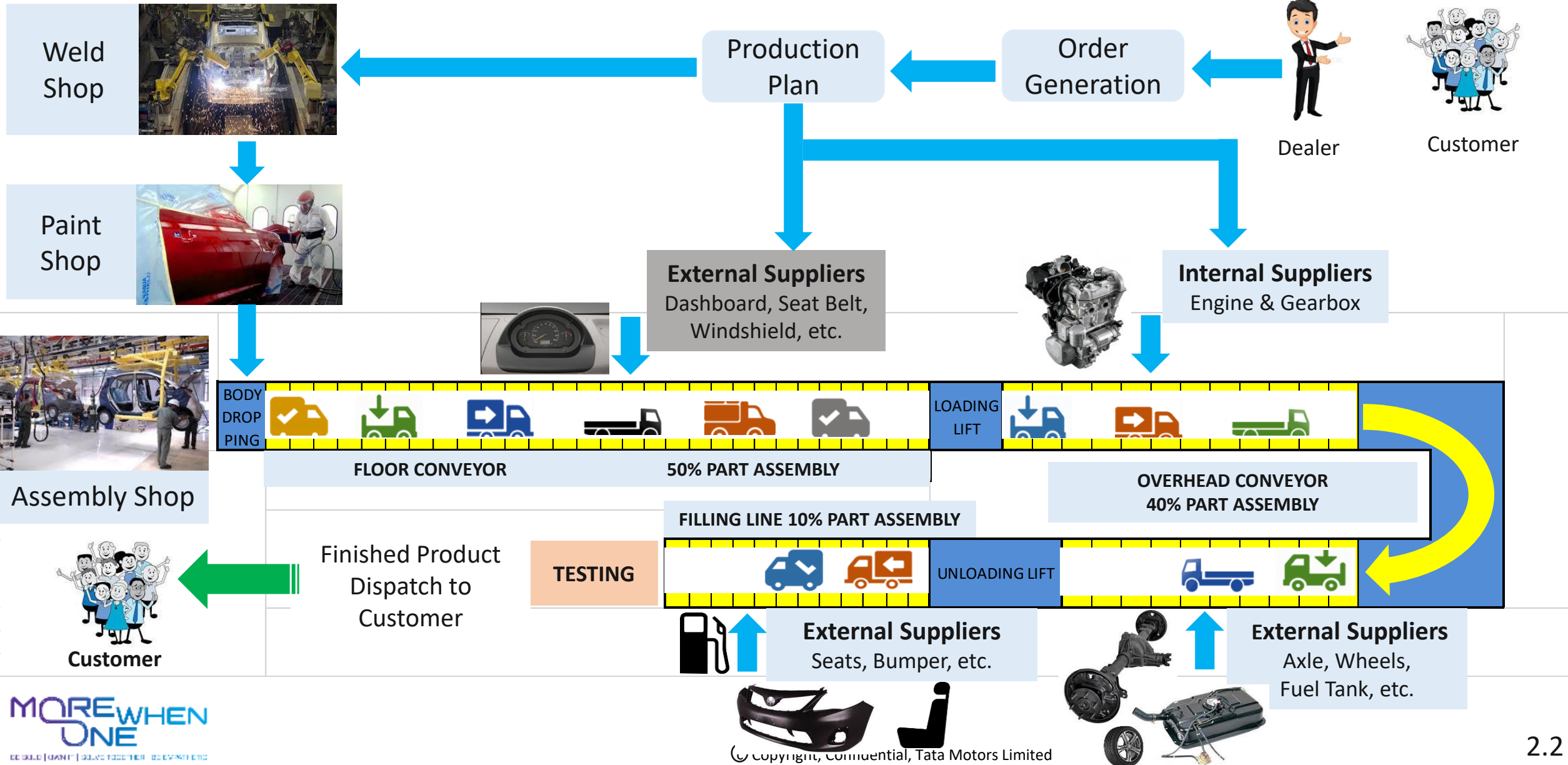
Green Co Gold Rating 2015	Golden Peacock Environment Management Award 2015	CII National Energy Management Award 2016	Golden Peacock Environment Management Award 2016	CII National Energy Management Award 2017	CII Energy Efficiency Circle competition Winner 17-18	CII National Energy Management Award 2018	Golden Peacock Award for Energy Efficiency 2018	Green CO Platinum Rating 2018	Winner of overall SHE performance	CII National Award for Excellence in Energy Management 2019	Green Co Star Performer Award 2020	CII National Award for Excellence in Energy Management 2020	Winner of 8th CII Northern Region Inter Industry Competition on EHS	CII National Award for Excellence in Energy Management 2021	CII National Award for Excellence in Energy Management 2022
2015	2015	2016	2016	2017	2017	2018	2018	2018	2019	2019	2020	2020	2021	2022	

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

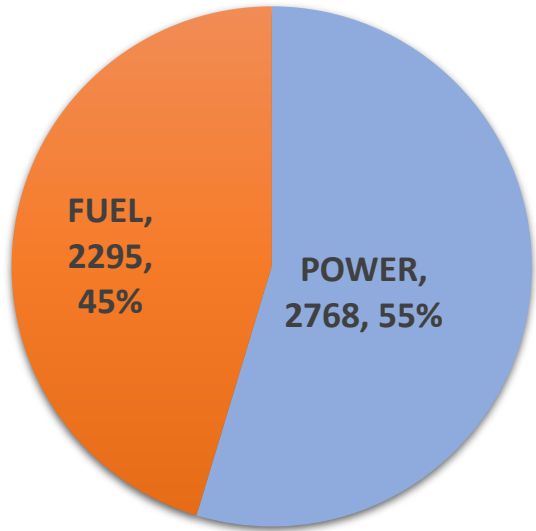


Engine	275 IDI	694cc Petrol/CNG	700cc	800cc DICOR	1.2 L	1.4 DICOR	1.5 L
Payload	0.65 Ton	0.75 Ton	0.9 Ton	1.0 Ton	1.3 Ton	1.5 Ton	
Drive	LHD	RHD					
Fuel Type	Petrol	Diesel	CNG	Bi-fuel	Electric	Migration towards Greener Fuel	
Emission	BS-II	BS-III	BS-IV	BS-VI	EURO-II	EURO-IV	
Transmission	4-Speed	5-Speed	6-Speed				
Axles	2-Axle						
Suspension	Independent		Rigid Axle				
Seating Capacity	2	7	9				
Climate Control	Blower	Heater	Air Conditioned	Natural Ventilation			
Load Body	Low Deck	High Deck	P.T.O.	Flat Bed			
Brakes	ABS	Non-ABS					

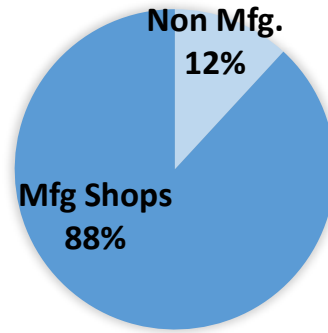
More than 100+ Variants in Production



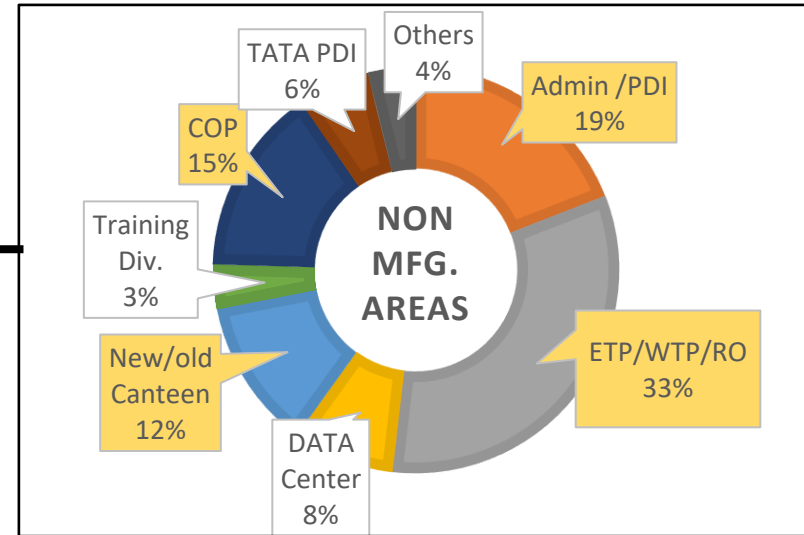
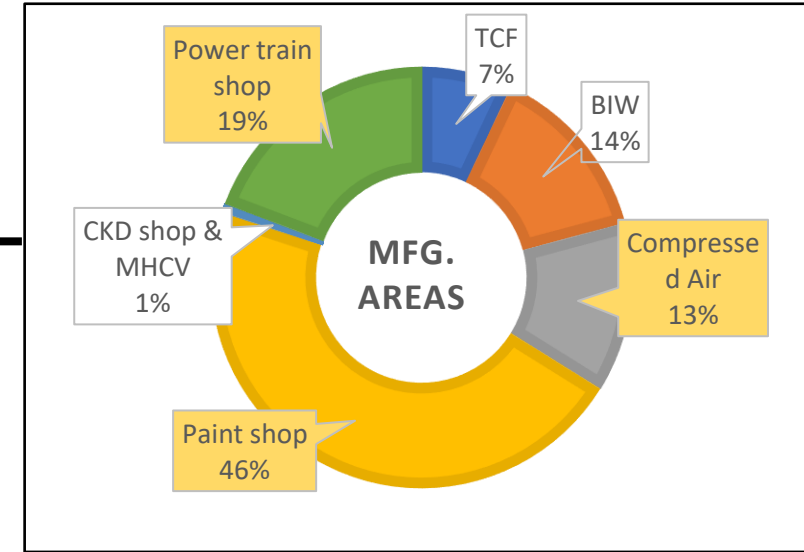
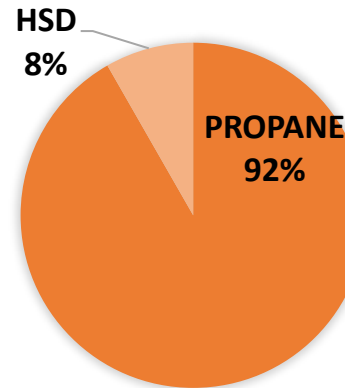
Energy Consumption 5063 TOE

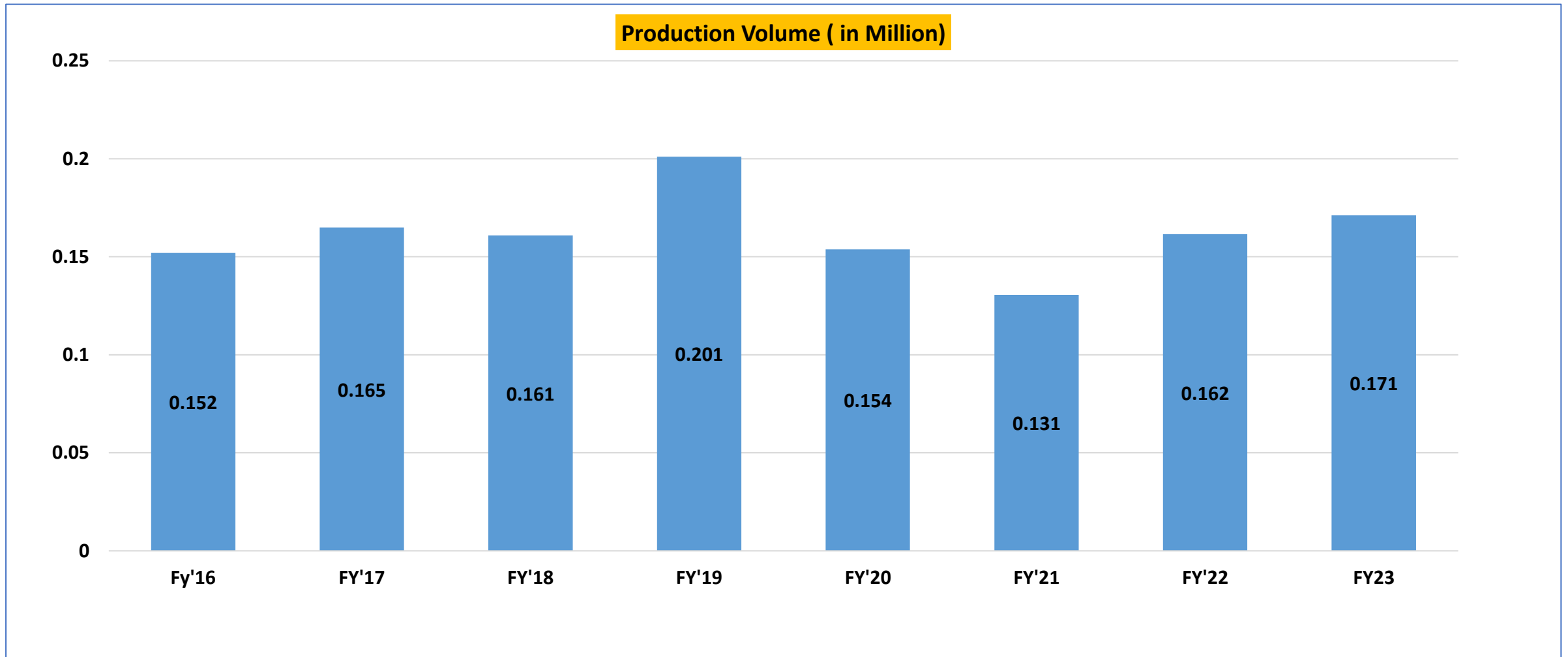


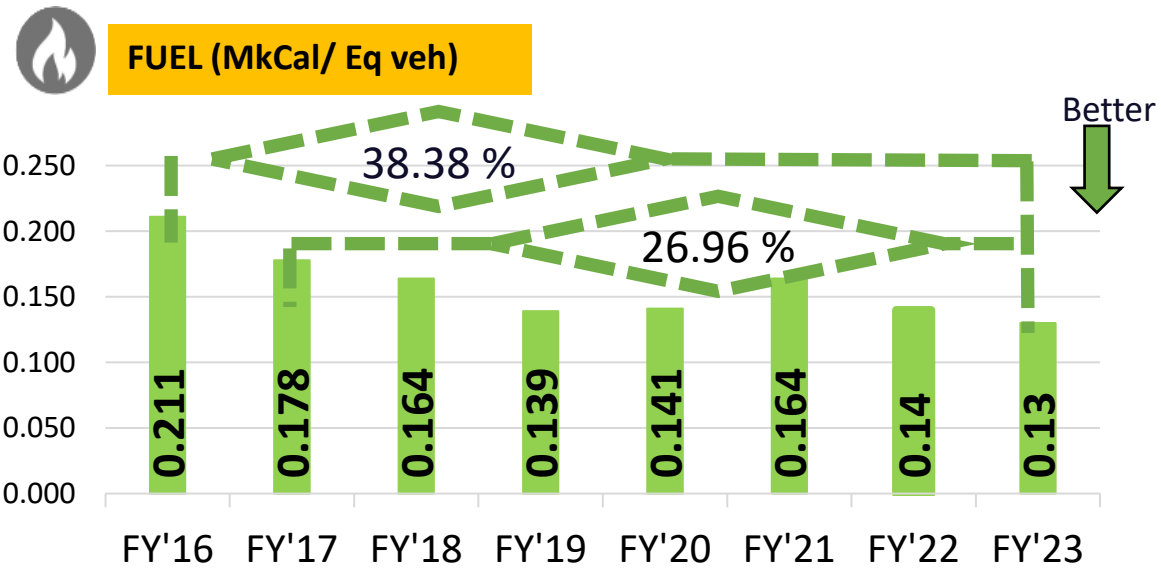
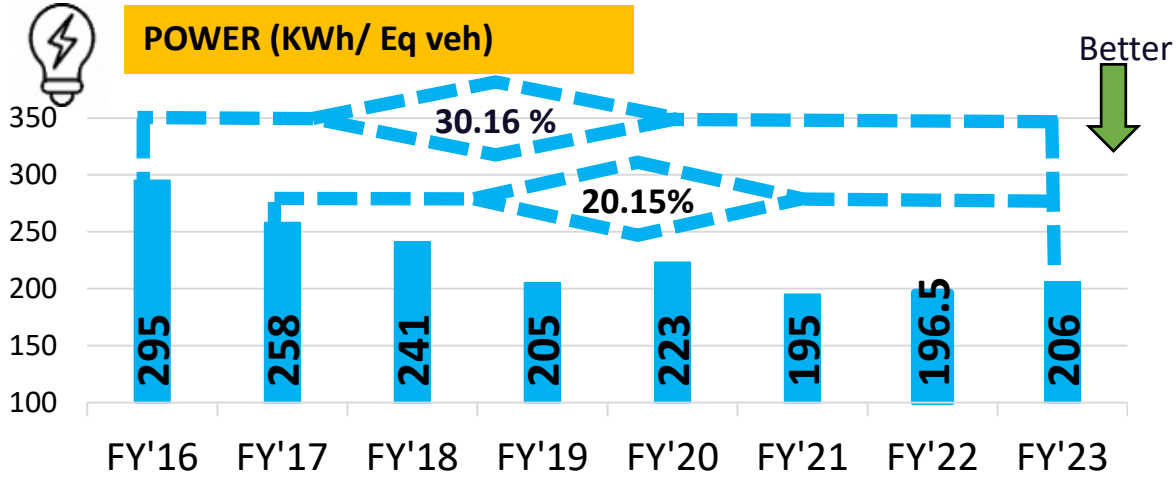
**Power Consumption: 2768 TOE
(32.19 Million Kwh)**



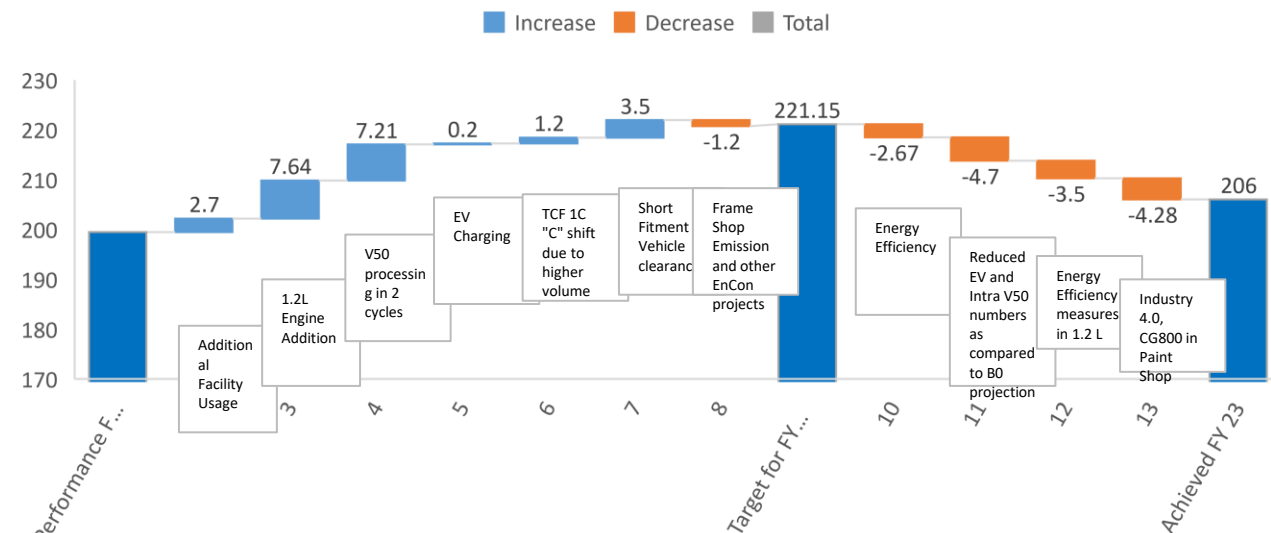
Fuel Consumption: 2295 TOE







Target kWh/Eq.Veh.	Justification
221.15	1. 2.7 KWH/EQ Veh. due to addition of fix consumption due to V50, Ace EV and magic ambulance manufactured at additional facilities(TCF.1D,TCF1E & MHCV area)
	2. Power train additional facility for 1.2L, Net impact of 7.64 Kwh/Eq.Veh.
	3. Paint shop V50 Production in with two cycles due to load body big size. for volume of 16,550,Additional consumption impact (13.99L KWH) -> 7.21 KWH/eq. Veh.
	4. EV charging facility consumption: 30,000 KWH -->0.2 Kwh/Eq.Veh.
	5. Estimated 3rd shift at TCF.1C in Q4 due to higher volume, impact of 1.2KWH/Eq.Veh (Estimate).
	6. Deletion in of Frame shop: reduction of consumption-> impact -1.20 Kwh/Eq.Veh.
	7. Saving through EnCon Project + Industry 4.0; Estimate saving of 200,000 KWH Considered
	8. Increase in Air and power consumption due to short fitment vehicles clearance, impact of 3.5 KWH/Eq.Veh.
	9. Net increase 22.45, Net Decrease (Estimated):2.3KWH. Impact 20.15 KWH



TML Pantnagar has achieved a SEC of 206 kWh/Eq.Veh against a target of 221 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 7% from last year despite the additional heat requirement because of product mix.

BENCHMARKING

INTERNAL

TML

With past best performance of plant, factory or machine

Performance comparison : shop to shop, equip. to equip.

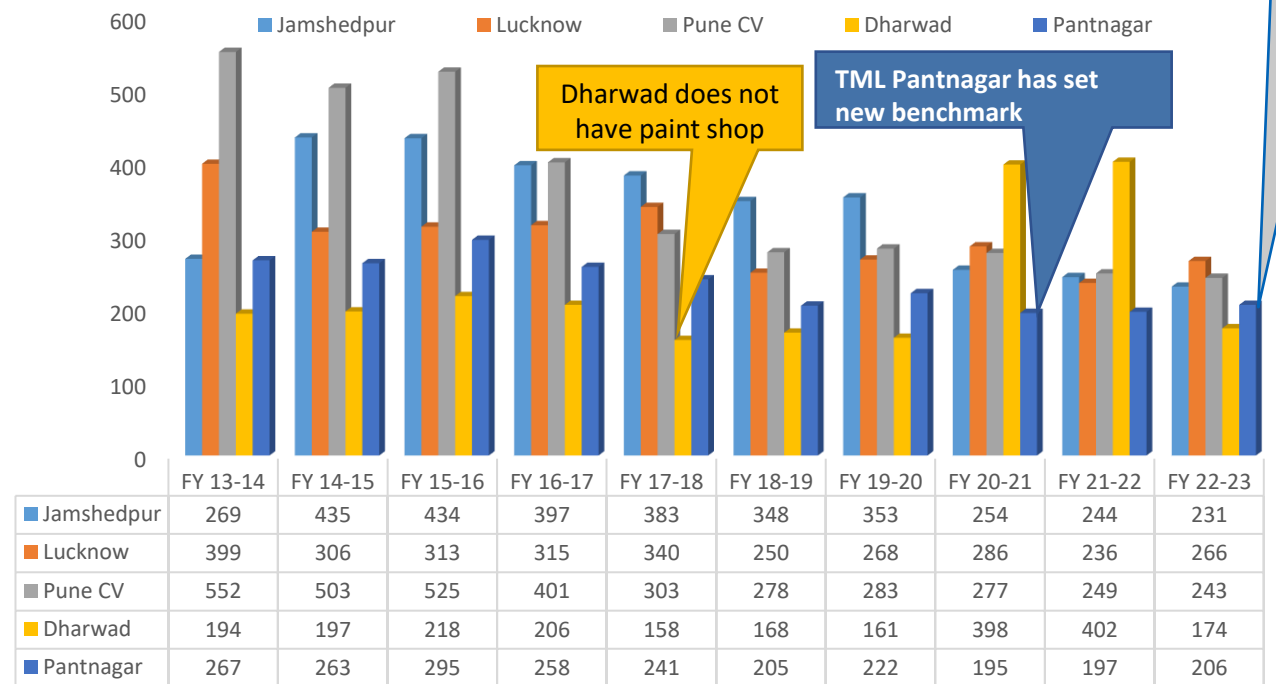
For non production days

EXTERNAL

With Competitor National & Global

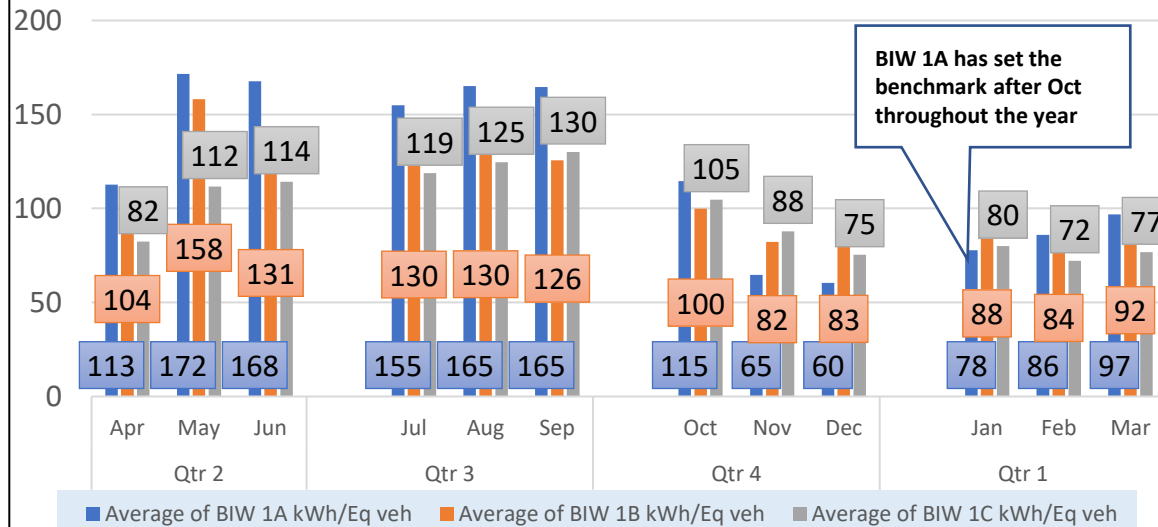
Benchmarking within TML (KWH/Eq Veh)

Within TATA MOTORS GROUP (KWH/Eq Veh)

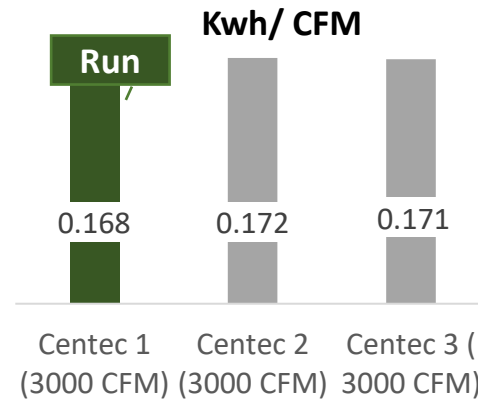


TML Pantnagar has performed best among TML companies who have in-house painting process.

Shop to Shop Benchmarking



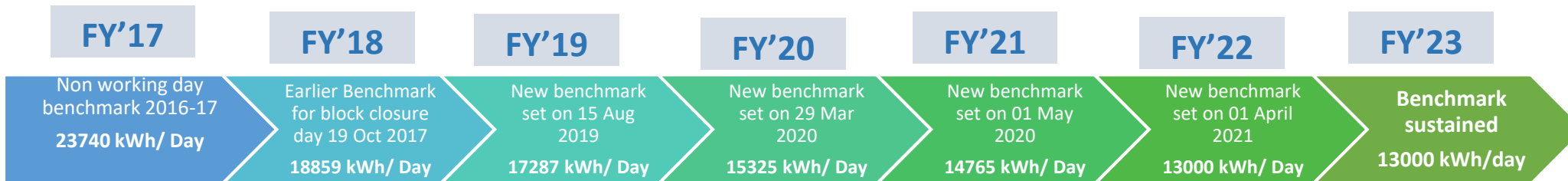
Machine to Machine Benchmarking



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

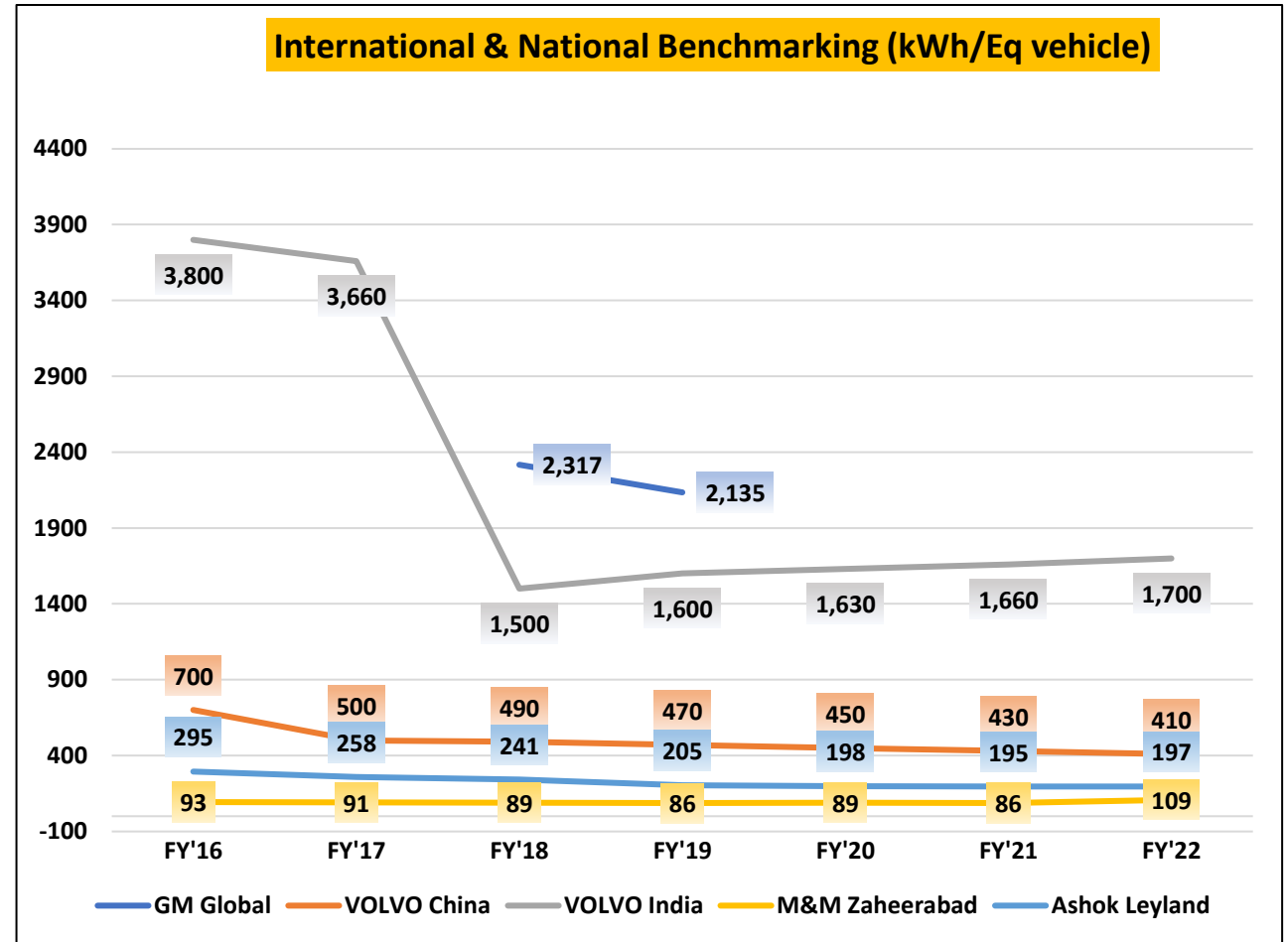
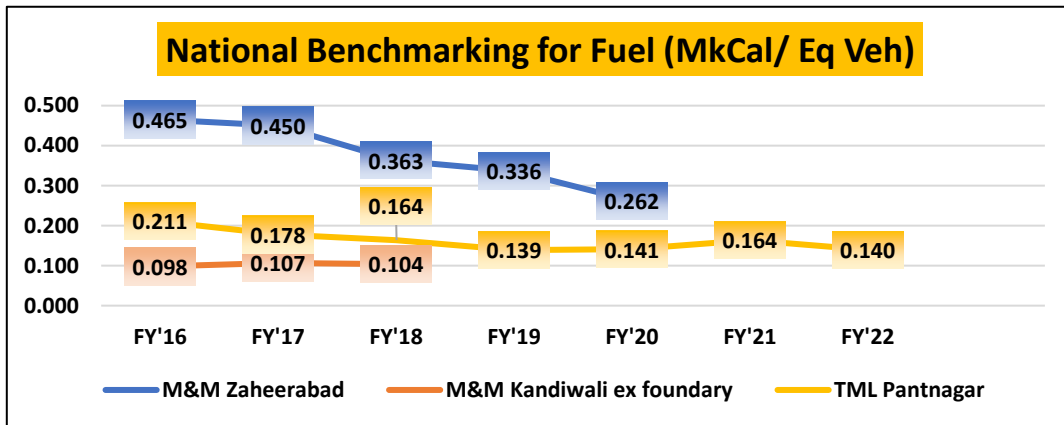
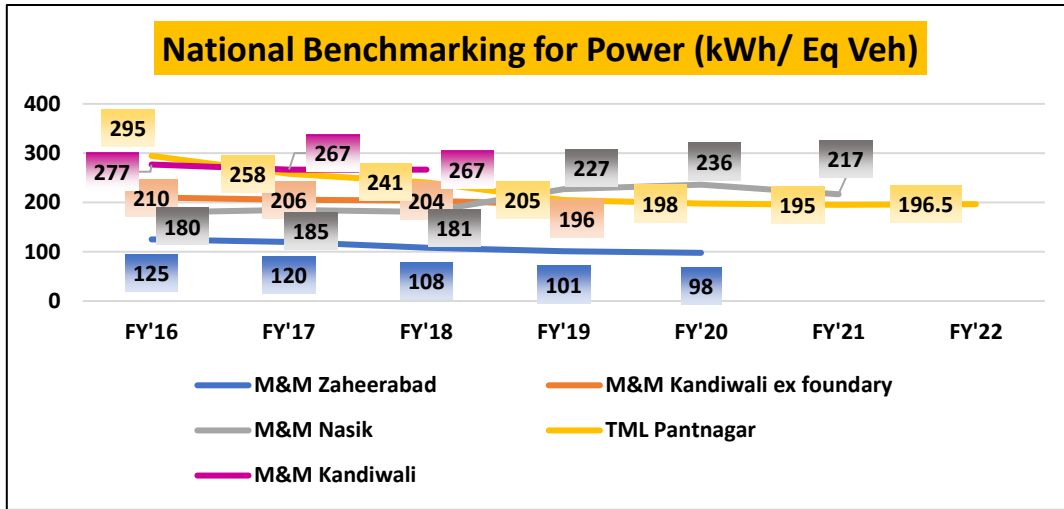
Benchmarking for Non working days: with no maintenance activity



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

FY'23 : 34000 kwh

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



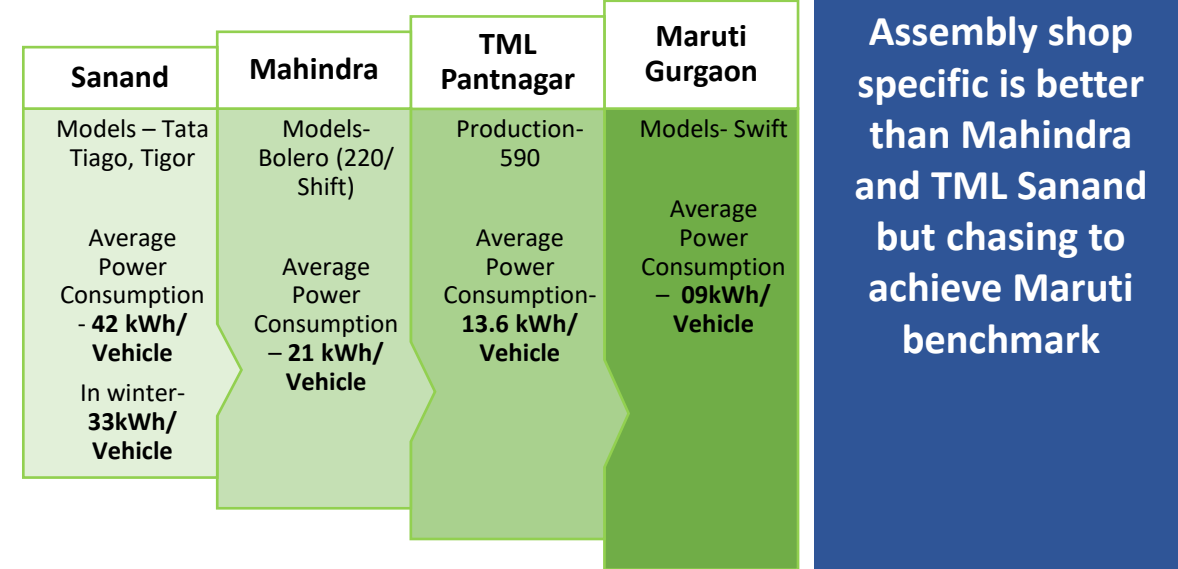
TML Pantnagar is Second best industry benchmark with fastest improving SEC year on year better than its competitors, however, accurate benchmarking can't be done due to different processes & size of product (UVs).

Process Level Benchmarking: Painting (Significant process)

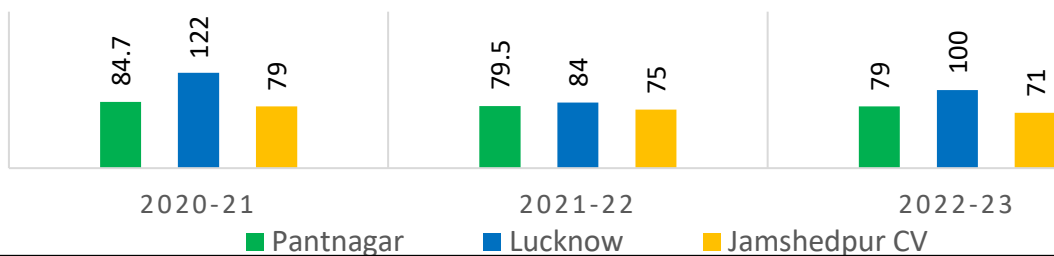
Organization	Power (kWh/ Veh)	Production / day	Painting technology / Process
Maruti - Manesar new plant	68	1400	3C1B (03 coat 1 base)
Mahindra & Mahindra - Chakan	200	500	3C2B & 3C1B
Hyundai Plant 1	140	600	NA
Hyundai Plant 2	170	400	NA
TML – K block Pune	160	250	3C2B
TML Pantnagar	83.9 (70.4 best achieved)	550 (800 nos)	3C1B

TML Pantnagar achieved benchmark level of 70.4kWh/ Veh. at production level of 800 nos/day.

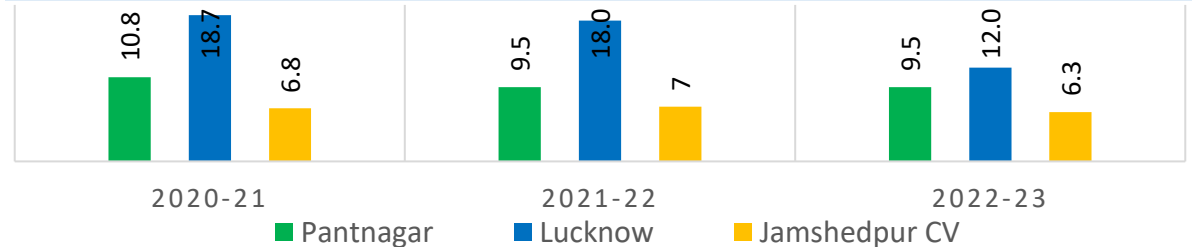
Process Level Benchmarking: Assembly process (National)



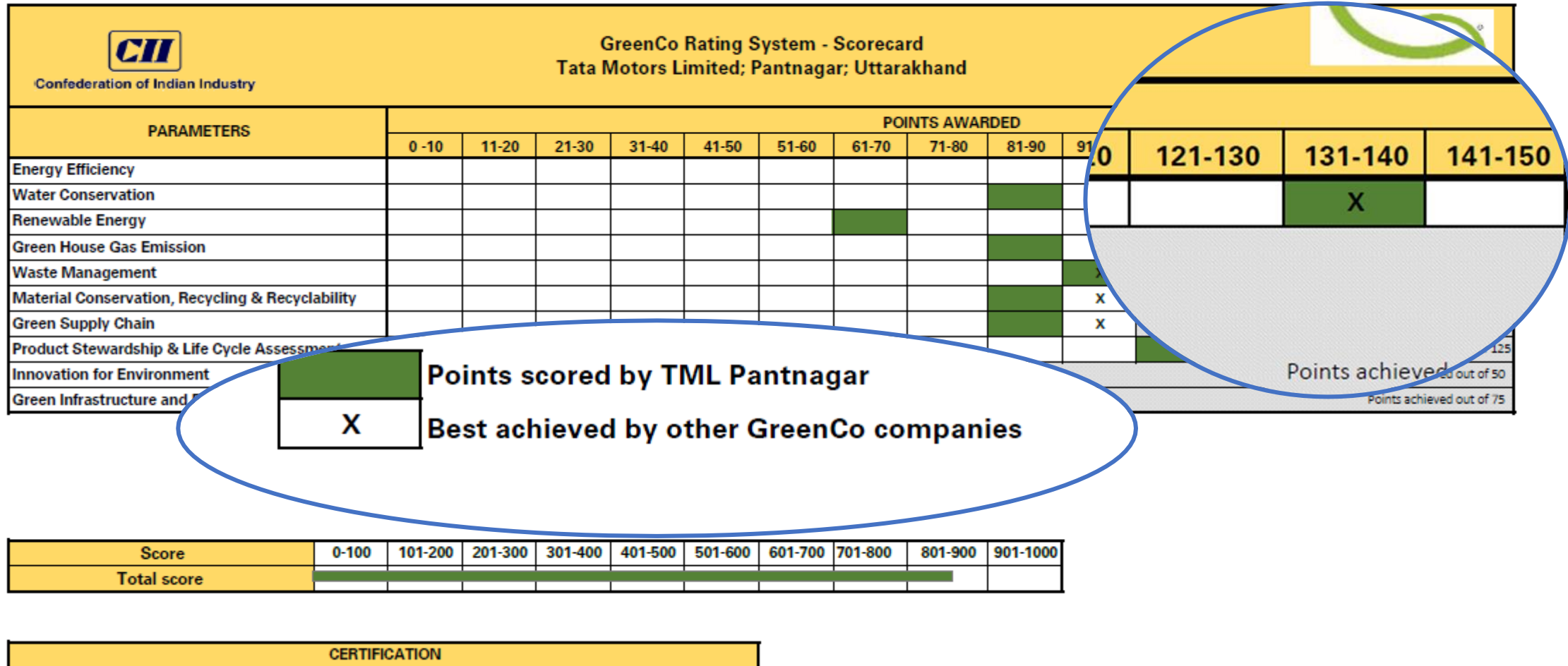
Paint Shop Benchmarking With TML Companies (Kwh/ Eq. Painted Body)



Paint Shop Benchmarking With TML Companies (kG / Eq. Paint Body)



TML Pantnagar achieved National Benchmark level in power and is the best performing plant among TML plants.



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.

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

1

Digitization Drive: Industry 4.0 for real time monitoring of Power , Fuel, Compressed Air and water consumption in all plant areas except Paint Shop (Paint Shop already covered in FY 23)

2

Finch fuel Catalyst in Paint Shop Fuel Lines for efficiency improvement

3

Sealer Oven complete elimination from Paint Shop Process (Introduction of ambient temperature baking sealer)

4

Heat Pump utilization for both Hot Water Generation and ASU in Paint Shop (Scope-1 reduction)

5

Usage of Thin Film, Sludge free Phosphating technology in PT tank (Reduction in both power and Fuel)

6

Hydroxy Generator for Propane burning optimization

7



Usage of Green H2 in place of Propane for Scope-1 reduction

Key EnCon Projects FY 2022-23

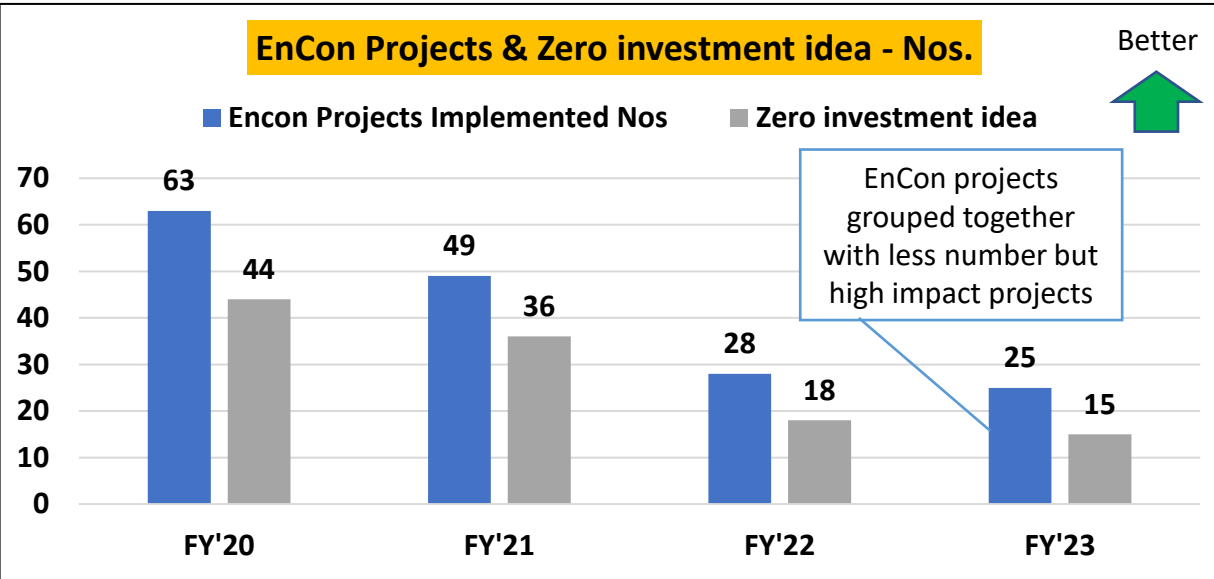
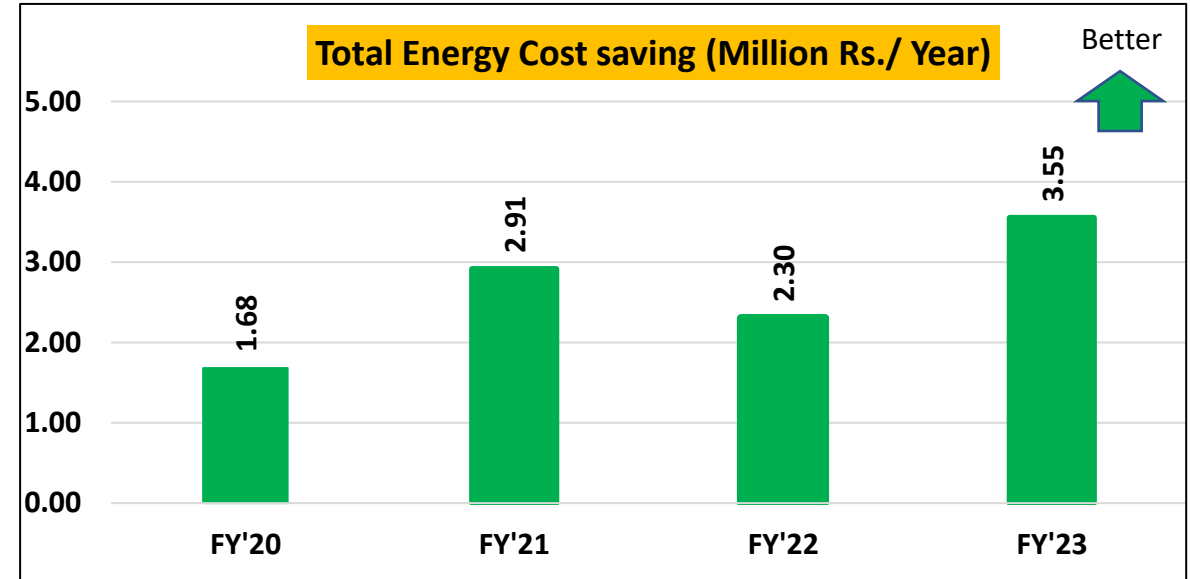
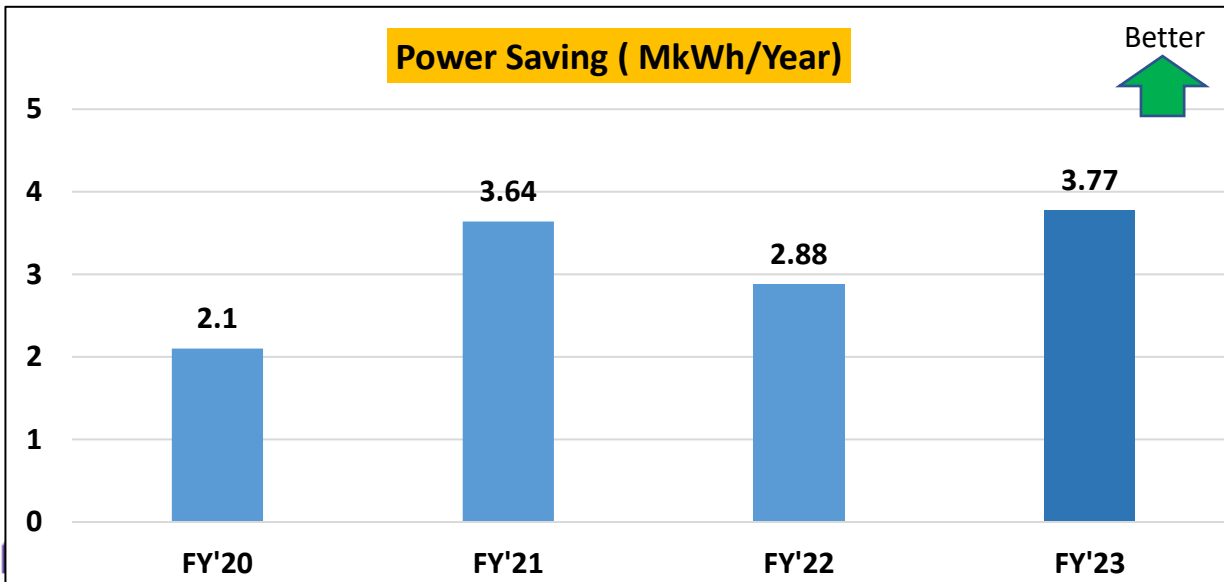
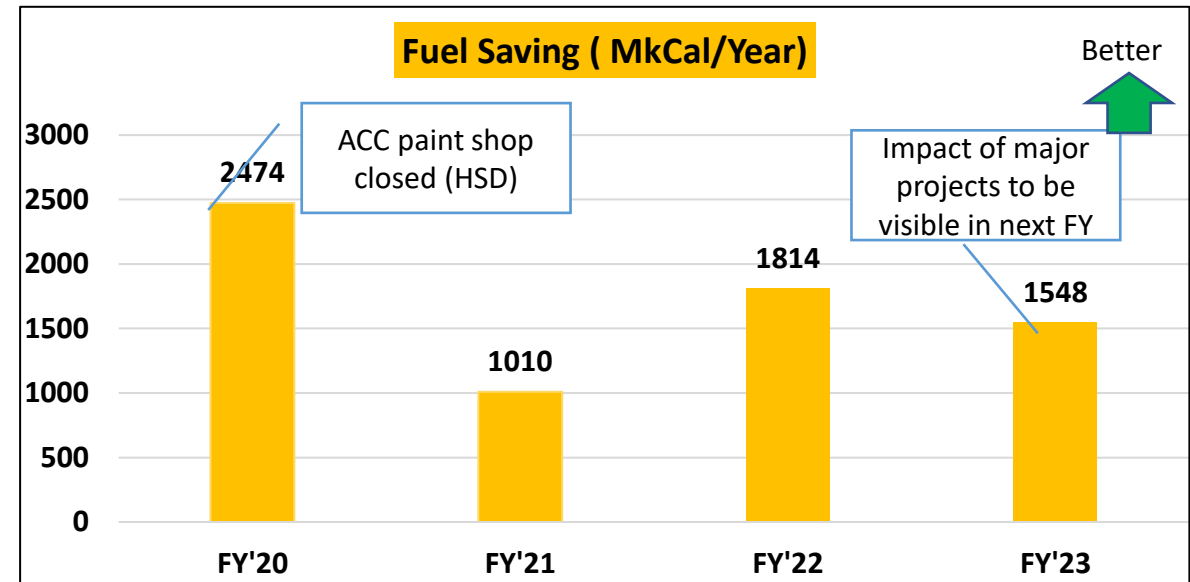
Sr. No.	Title of Project	Year	Annual Electrical Saving in Million KWh	Annual savings in Million kCal due to fuel savings	Annual CO ₂ Reduction in tCO ₂ e
1	Reduction of fire hydrant pump start per day from 48 times to 4 times.	2022-23	0.010		0.7
2	Replacement of Conventional lights by LED lights		Idea given by Supervisor		0.9
3	Pressure scheduling in Paint Shop by installing IFC unit		Idea given by Operator		2.2
4	Dampers in duct of BIW 1B,1C	2022-23	0.005		0.4
5	Reduction of Booster Compressor running by PLC upgradation	2022-23	0.010		0.68
6	Use of occupational sensor for Sub-station lighting	2022-23	0.001		0.04
7	Replacement of Conventional lights by LED lights in Non-manufacturing areas	2022-23	0.014		1.01
8	DO based aeration system in ETP	2022-23	0.002		0.11
9	Paint Shop : VFD installation in Paint Shop for Preparation Exhaust blower	2022-23	0.003	7.3375	1.75
10	Paint Shop: Auto isolation valve installation in pneumatic air line	2022-23	0.030		2.13
11	Paint Shop: Oven 2 Temperature reduction by Oven 2 JPH optimization and	2022-23	0.000	155	38.40
12	Paint Shop: Conversion of 2X28 W LED tube light with energy efficient single 30 watt lights - From Aril to till date 765 tube lights replaced (Horizontal deployment)	2022-23	0.045		3.17
13	Power Train : PID temperature controller in Balancer Gear Pressing	2022-23	0.035		2.49
14	Power Train : Heating Temperature Reduction in Washing Machines	2022-23	0.087		6.19
15	Power Train:VFD for spray pumps in washing machines *2	2022-23	0.035		2.49
16	Power Train:694cc Petrol Engine Stop at any RPM issue resolution	2022-23	0.015		1.07
17	Power Train : Auto shut off valves in Machines	2022-23	0.019		1.35
18	TCF :10 nos 400w high bay lamps to be converted into 70 W LED.	2022-23	0.008		0.60
19	TCF :Gangway side high bay lamps optimization.		0.02		
20	TCF: Replacement of faulty Tube lights 2X28 W with 30 W LED lights				
21	TCF :Dock light and gate light will be converted to LED.				
22	TCF :The High bay lamps on the Rework side are to be converted into LEDs.(Col 6S-9S).				
23	TCF : kitting 2 area 4nos 120W light to be converted into 70W LED light.				0.10
24	TCF :PBS tunnel area lights to be optimization.		0.004		0.31
25	Paint Shop: Low temperature baking by conversion of EF paint from CG500 to CG800	2022-23	0.000	81.6	20.26

8699
tCO₂
reduction

No of Projects=25 Nos
Zero Investment Ideas= 15

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'21	49	7.17	3.64	1010	9.12	28 kWh/Eq. Veh.	776.9 kCal/Eq. Veh.
FY'22	28	9.34 (30% )	2.88	1814	3.04	18 kWh/Eq. Veh.	1133 kCal/Eq. Veh.
FY'23	25	16.46 (76% )	2.62	1548	3.55	15 kWh/Eq.Veh.	2211 kCal/Eq.Veh.

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

EnCon Projects & Zero investment idea - Nos.

Total Energy Cost saving (Million Rs./ Year)

Power Saving (MkWh/Year)

Fuel Saving (MkCal/Year)




Innovation promotion mechanisms

Innovation in Energy Management Process

Innovation in Operations management

Innovative EnCon projects

- Innovista, Innovision, Innoengine and Hackathon challenge
- Leader's workshop
- Suggestions and Kaizens promotion
- Energy conservation month- Best Innovative project award
- In-house Energy Expo (Technology day) & Trainings

EXISTING SYSTEMS/ ACTIVITIES

FY 19-20: New innovative initiatives

- Six Sigma project for power cost reduction
- Dynamic target setting through statistical analyses
- IT based manpower deployment for energy saving in first Hour output

FY 21 & FY 22: New Innovative Approaches

- SIX SIGMA project for energy performance improvement
- Under strategic & approach related interventions - two new levers were added
- Process standardization and horizontal deployment in other business units/ plants through TMOS Portal
- SDCA (Standardize- Do- Check and Act) standard development to sustain the gains of last 3 years EnCon projects

FY'22 & FY 23

- Industry 4.0 to improve energy monitoring in energy intensive Shops
- Adoption of new technologies such as smart meters & smart sensors to keep set of energy guzzler equipment in check.
- Adoption of 4-layer architecture for real-time equipment energy monitoring in shops
- As the real-time monitoring project takes off, and we gather enough data, we plan to migrate to an enhanced IOT platform with AI-ML usage for more accurate predictive analysis for energy trends.
- AI-ML and big data analyses for energy saving.

FY 24 & 25

- Industry 4.0 to improve energy monitoring across plant facilities and all energy sources. Usage of AI/ML with existing infrastructure and correlating the energy data with variables will do wonders in Energy Efficiency
- Renewed focus on Net-Zero target by formation of Cross Location teams for Scope-1 and Scope-2 emission reduction as per target
- Adoption of latest products in market such as Heat Pumps, CST etc. to reduce Scope-1 emissions.

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!**

Harnessing Industry 4.0 capabilities to reduce Hot Water Generator Propane Consumption by 125 Kg/day

BE BOLD

Taking calculated **risk** is key to making progress. We act with confidence and **agility** to accomplish our goals

OWN IT

Feeling and acting **empowered** is critical to drive results. We have an **Owner's Mind-set** and each of us takes full responsibility for the outcomes

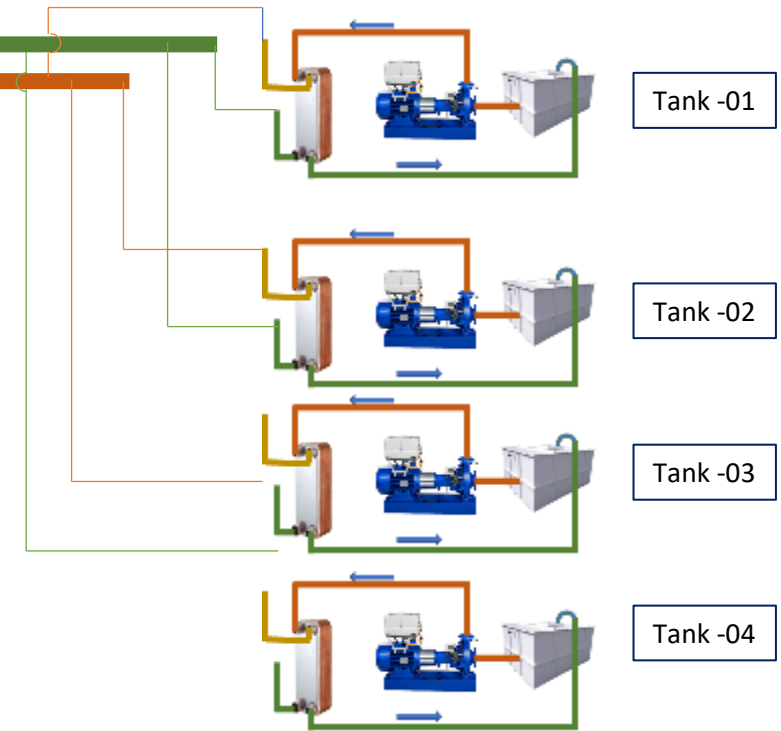
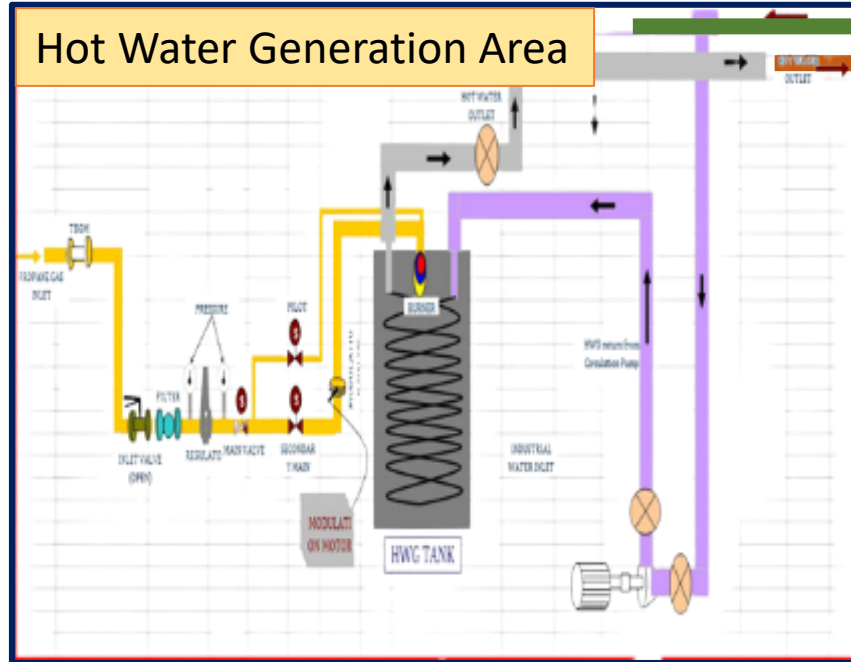
SOLVE TOGETHER

Leveraging our collective genius while holding each other **accountable** helps us deliver the best. We **collaborate** proactively and transparently to achieve innovative solutions

BE EMPATHETIC

Embracing diversity makes us stronger for differences are opportunities to learn. We work with **passion to delight customers** and deliver greater success to our stakeholders

Hot Water Generator- Paint Shop

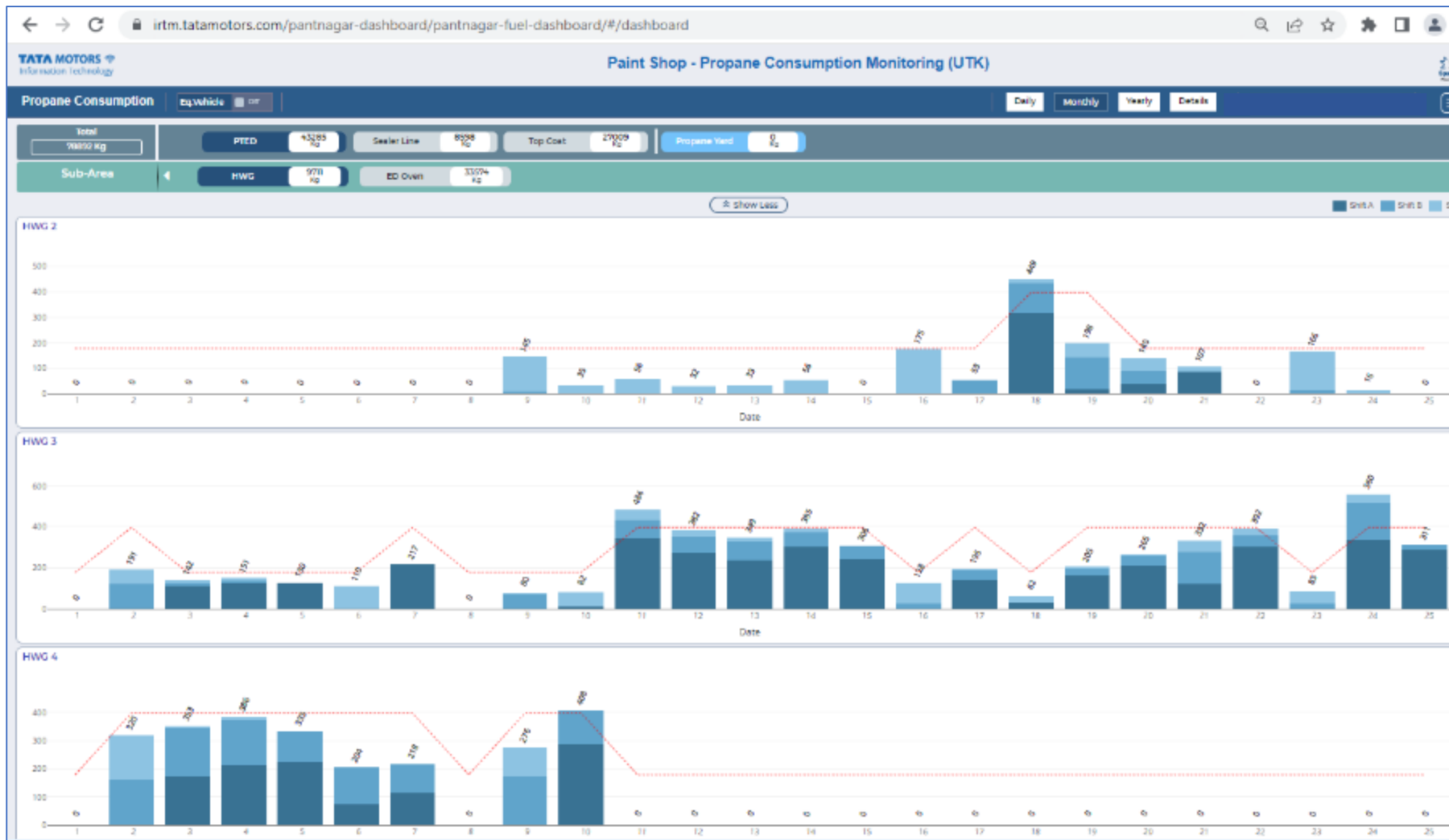


Before Condition: Propane consumption of HWG



Average Daily Propane consumption more than 500 Kg/ day before modification

After Condition: HWG 02,03 & 04 day wise consumption



HWG 02 – Set Point 85

HWG 03 – Set Point 75

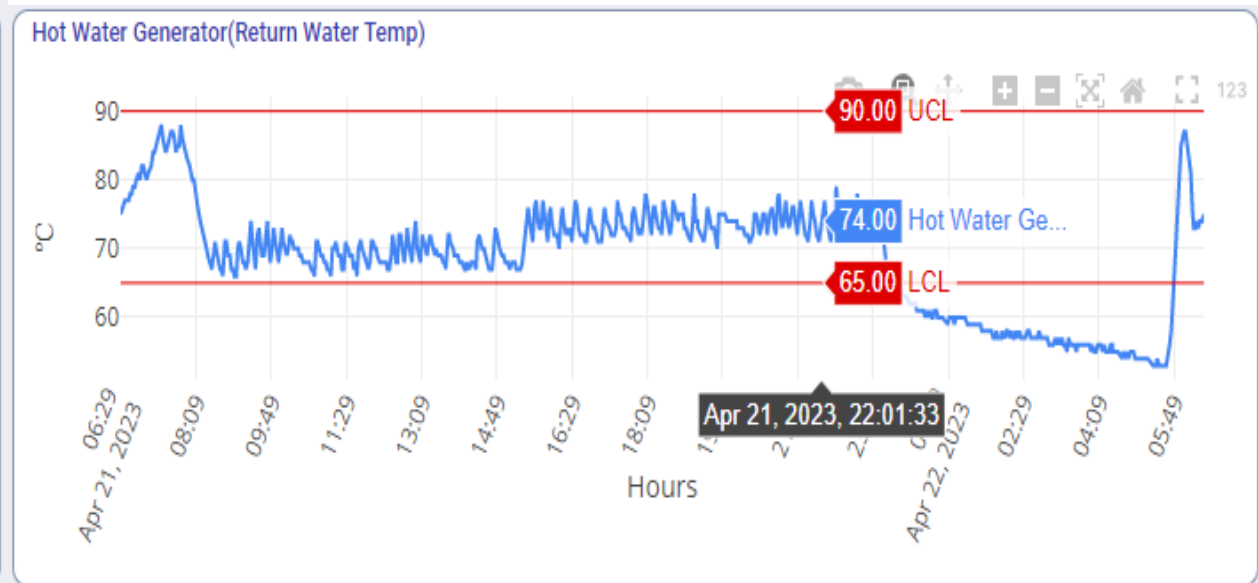
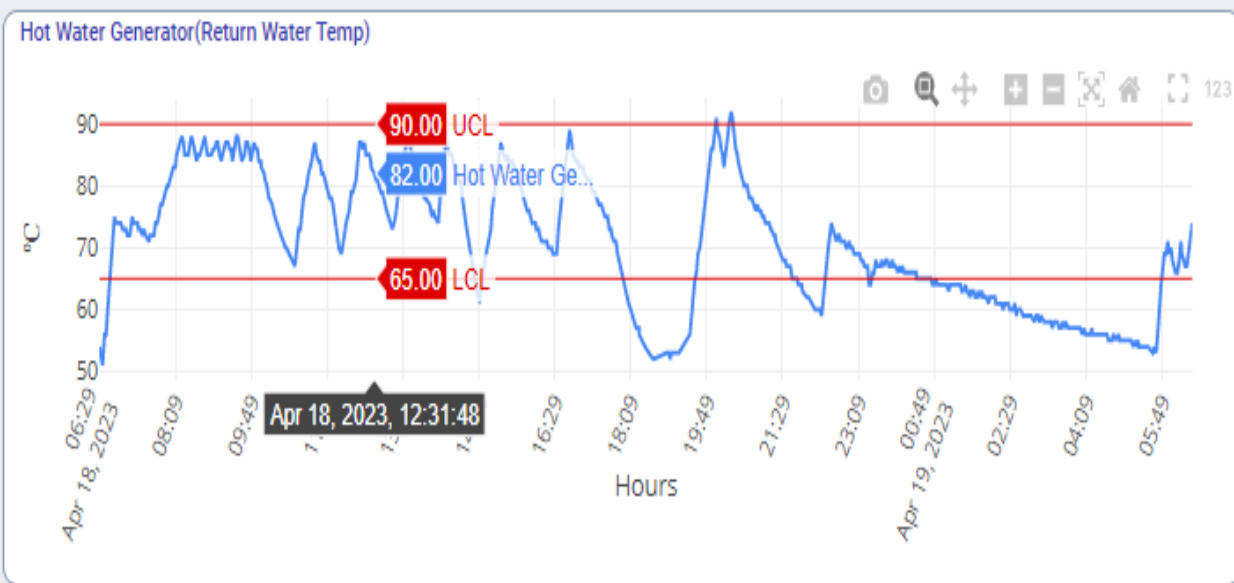
HWG 04 – Set Point 85

Action Taken: Hot water Generator temperature set point reduced to 75°C from 85°C.

Industry 4.0 and Propane consumption optimization in PTED Line

Before HWG Temperature setting at 85 Deg C

After HWG Temperature 75 Deg C



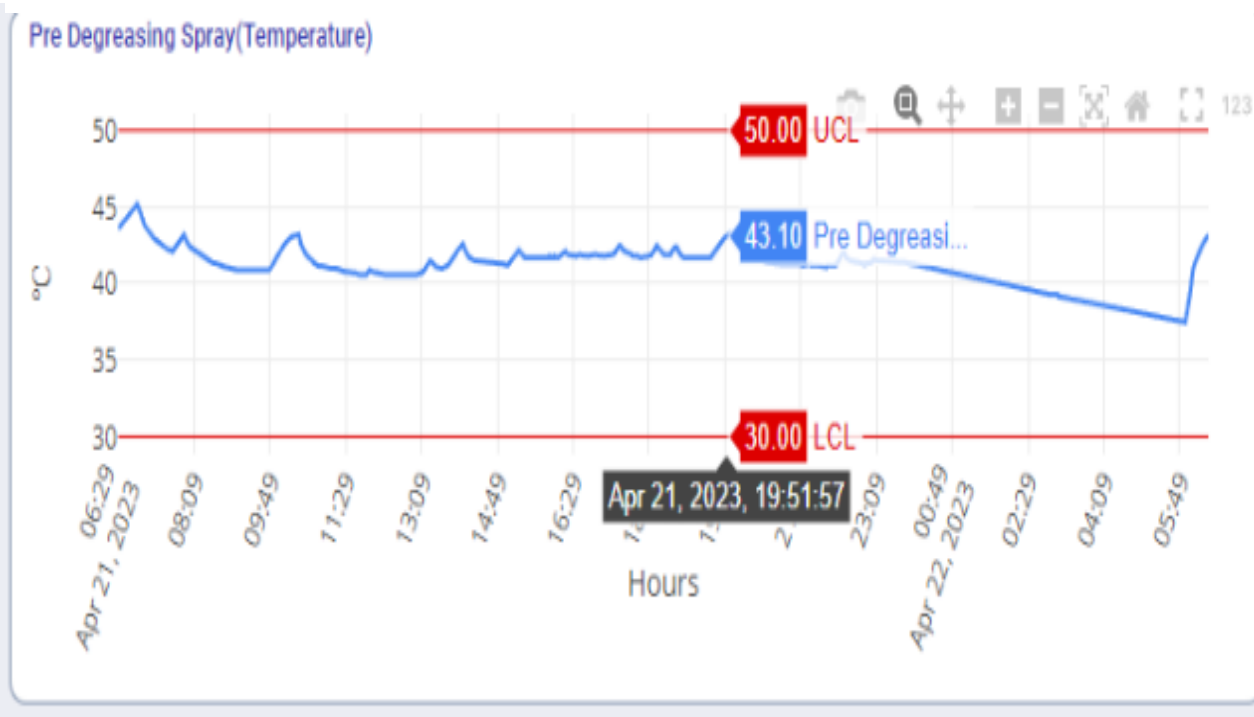
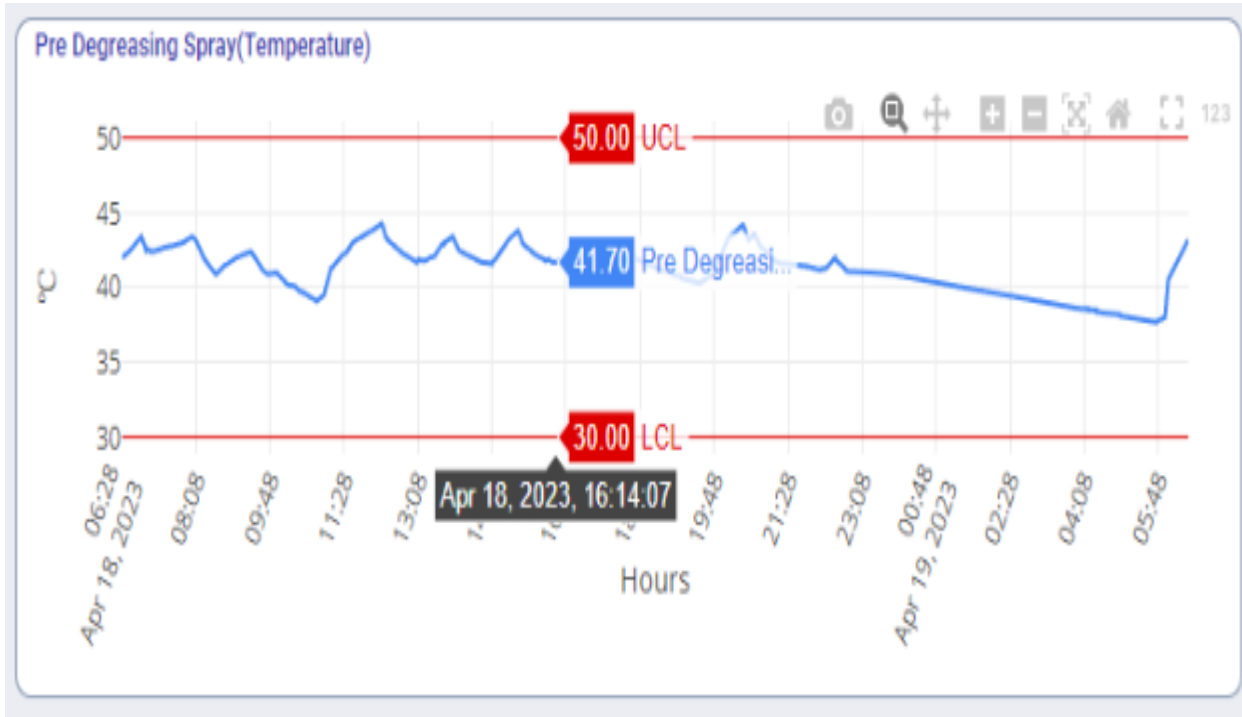
HWG Return Water temperature before improvement

HWG Return Water temperature after improvement

PT line temperature

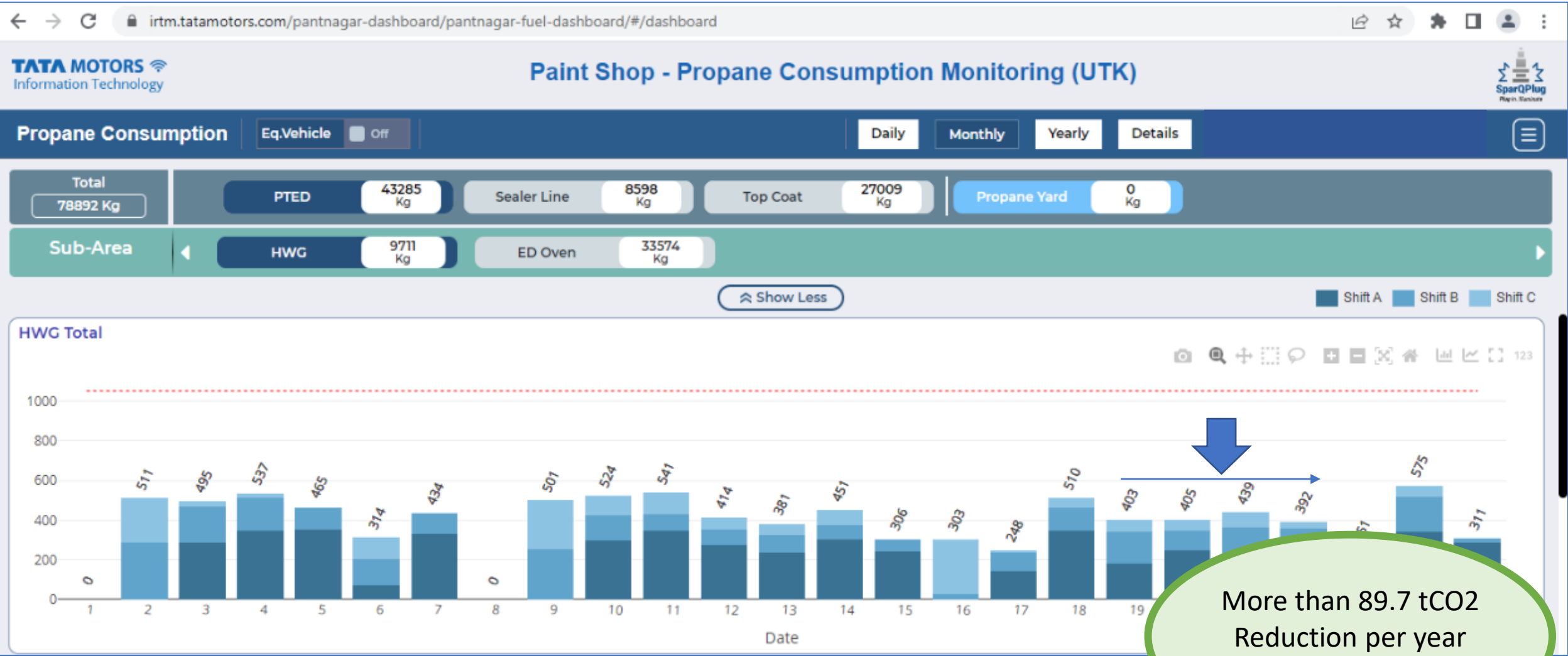
Process Value before improvement

Process Value after improvement



There is no impact on PT line process tank temperatures.

After Condition: Propane consumption of HWG



More than 89.7 tCO2 Reduction per year in Scope-1

Average Daily Propane consumption reduction by 125 Kg/day

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.

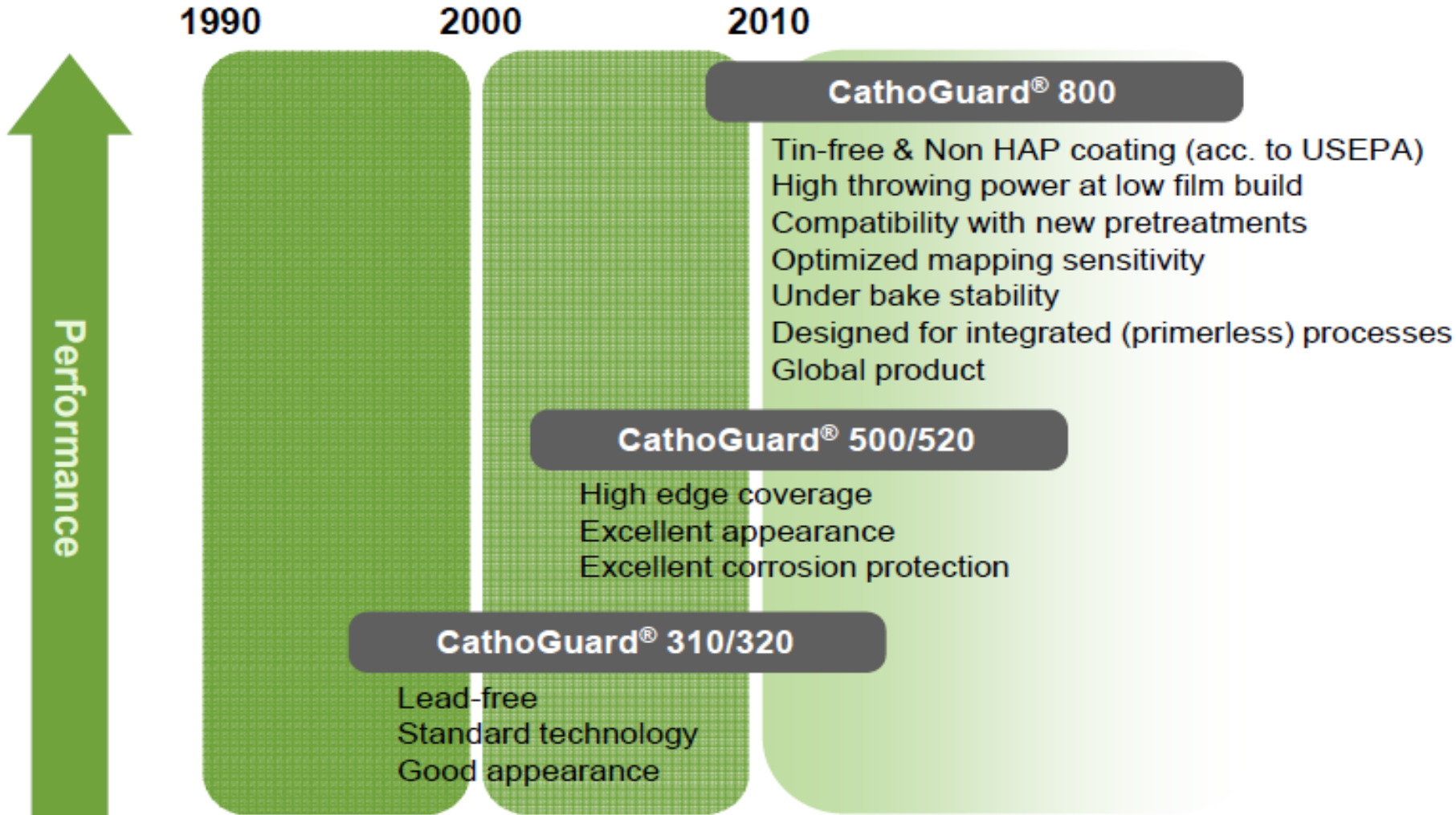
We are **MORE WHEN ONE!**

New Technology: Low temperature baking by conversion of ED paint from CG500 to CG800



Evolution of CathoGuard® Technology

Continuous innovation



Initially this technology developed for small surface area.

From 2014-2018 it has been evolved for higher surface area vehicles

Advantages of New Technology CG 800

- **CathoGuard®800** The advanced E-coat for corrosion protection benefits with respect to

Economy

CathoGuard®800 has **Hyper Throw power**, which minimizes **film build distribution** maintaining **box section film thicknesses** resulting in reduced operating costs

Ecology

CathoGuard®800 is **tin-free, lead-free, non-HAP coating** (acc. USEPA) and has a low solvent content (**low VOC**)

Technology

CathoGuard®800 provides **improved mapping/chipping performance** and compatibility with new “nano” pretreatments

CathoGuard® 800 is the **break-through technology** achieving a **smooth surface** with **excellent edge protection** –ideal for integrated processes

CathoGuard® 800 series

- ✓ High throwing power
- ✓ Low consumption
- ✓ High reactivity
- ✓ Tin/HAPs-free
- ✓ Low solvent content
- ✓ Suitable for integrated processes
- ✓ Compatible with new thin-film pretreatments



CathoGuard®800 Product Data : Operating Parameters

		CathoGuard 500	CathoGuard 800	Remark
Mix NV (180°C/30min)		41.1	42.1	↑ Better
Baking Schedule- EMT	°C	160°C/15min.	160°C/10min	↓ Time = ↓ fuel consumption ↑ Productivity. 5min lower baking time.
Application Voltage For Ace	V	170-220 190-240 280-320	150-200 170-210 260-300	↓ Voltage = ↓ electrical energy consumption.
Throw power Nagoya Test(4 box)	%	60	67	↑ Throw power = ↓ outer DFT, ↓ consumption. Faster coating Kinetics.
Average Dry Film thickness	µm	17.5	14.6	↓ DFT = ↓ consumption.
Average DFT Calculation	µm	Ext-20µ, Cabin.- 17µ, Box-10µ	Ext-17µ, Cabin.- 13µ, Box-10µ	Exterior DFT can be reduced by maintaining same DFT in Box section, as CG800 is High Throw Ecoat.

CathoGuard® 800

Benefit : Consumption

CG800 is a Hyper Throw Power Ecoat, having Faster Coating Kinetics, which enables it to reduce External DFT without compromising the Box section DFT

	CG500	CG800
Present DFT	~17.5 µ	
Proposed DFT for CG800		14.6 µ
Consumption Kg/100m ² (Binder + Paste)	5.69 @ 17.6µ	4.72 @ 14.6µ

~15% Reduction in Paint Consumption due to ~15% reduction in Ecoat Average DFT.

CathoGuard® 800

Benefit : Process

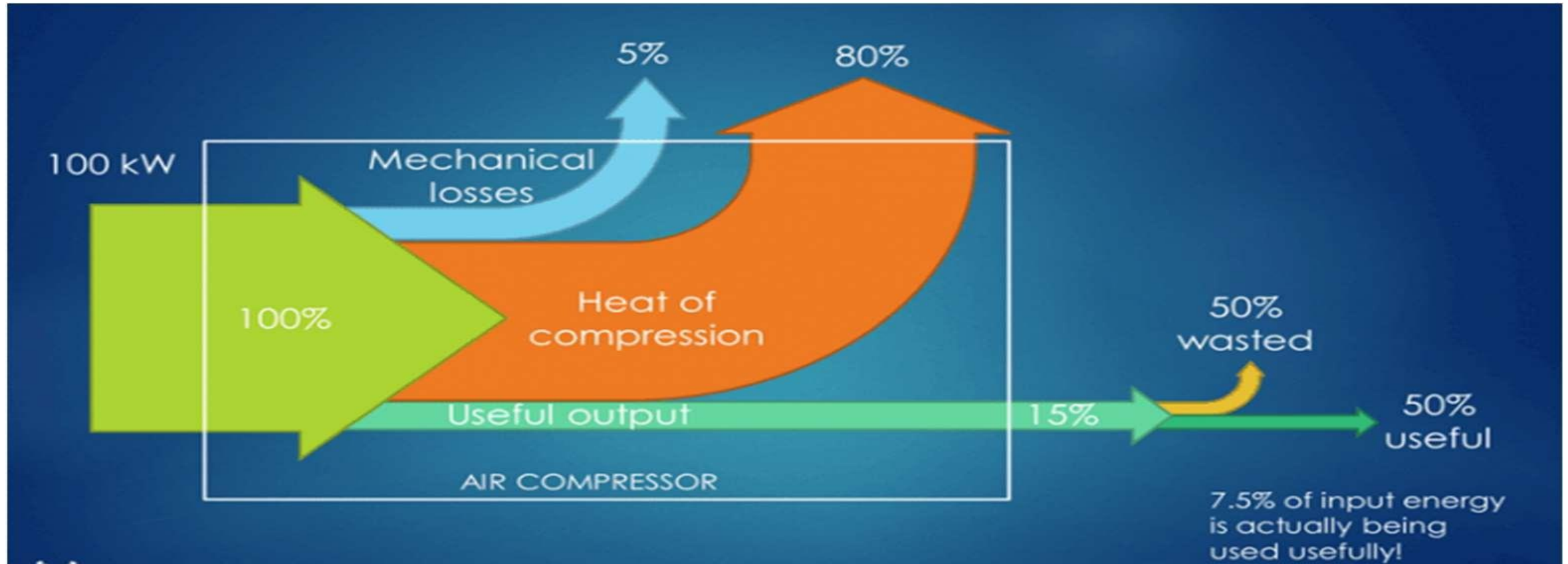
		CathoGuard 500	CathoGuard 800	Remark
Baking Temp. EMT	°C / min	160°C/15"	160°/10"	Reduced Baking Time - reduced Fuel consumption & Improved Productivity.
Application Voltages- Ace	V	190-200-300	160-180-280	Reduced Application Voltages - reduced Electrical Energy consumption.
Filter Bags Consumption	Qty	120	108	Data from other lines shows 10% reduction in filter bags consumption due to good resistance against Bacteria. Depends upon line condition & maintenance.
Anolyte Conductivity settings	µS	1200-1800	400-4000	Wider Anolyte Conductivity window to maintain Bath pH. • Reduced acid consumption by~ 50%. • Reduced DI water consumption by 5liters / 100m ² . Experience from other customer lines.
VOC	Lbs./gal	0.58	0.55	Both the Products have VOC <0.6 lbs/gallon.

Upgradation of Flow Control Unit in Compressed Air System



Power Consumption Distribution in Compressed Air System

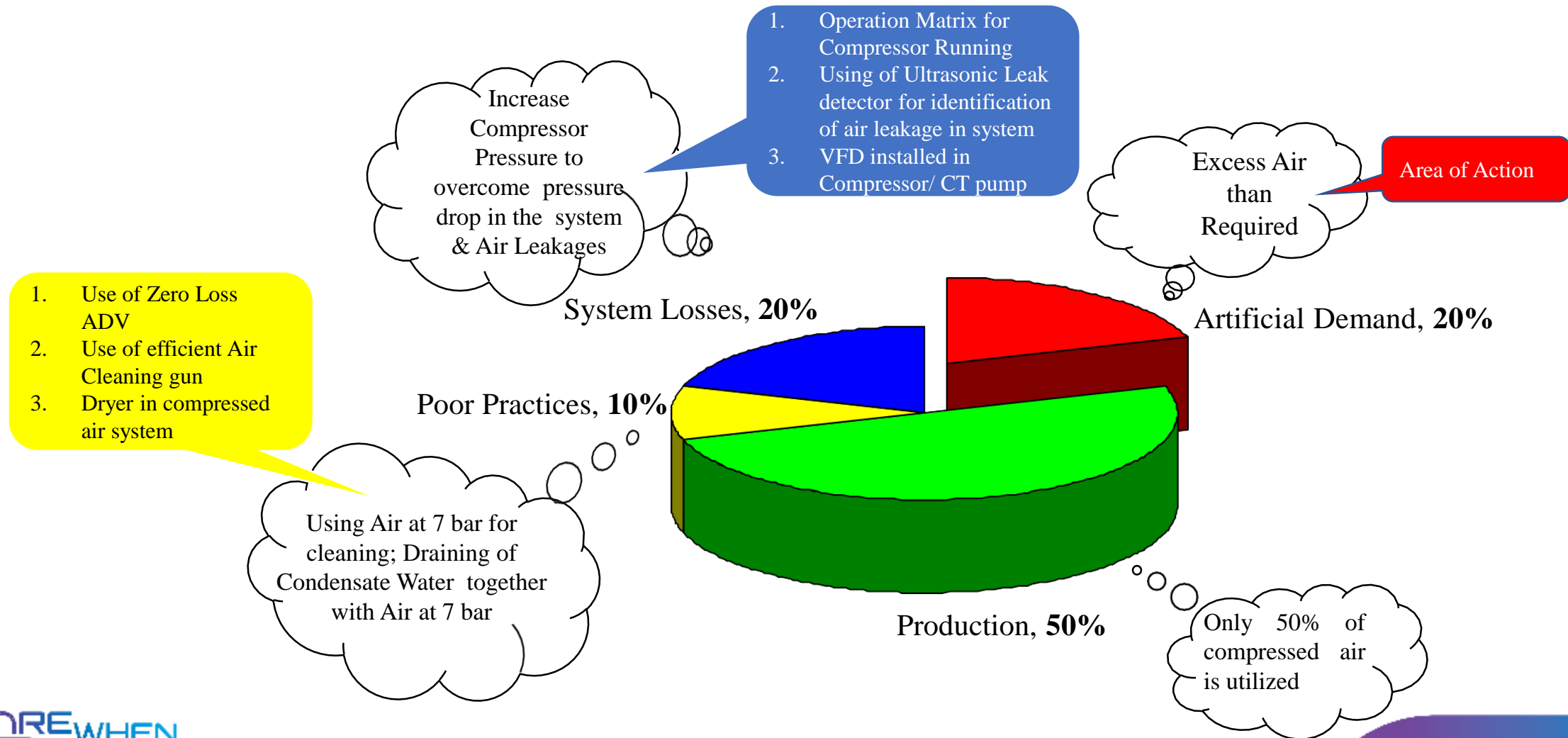
Compressed air is used for process requirements such as operating pneumatic tools & equipment and instrumentation. Air compressors consume a significant amount of energy, with only about 7.5% of the input energy actually being used.



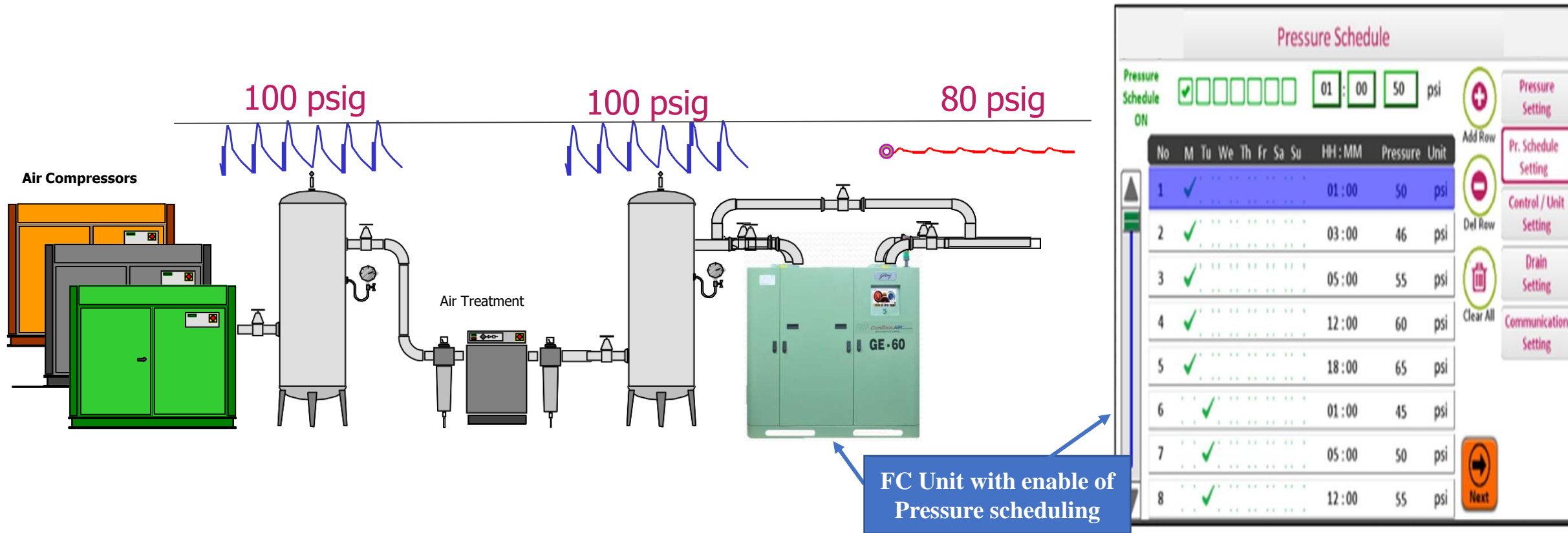
Energy Flow in Compressed Air System

Major Area of Utilisation of Compressed Air Consumption

Out of 100% Energy Input, Only 15% is used for Compressed Air Generation
From the remaining 15% Energy, only 50% of compressed air used in production i.e 7.5% of total Energy input



Compressed Air System



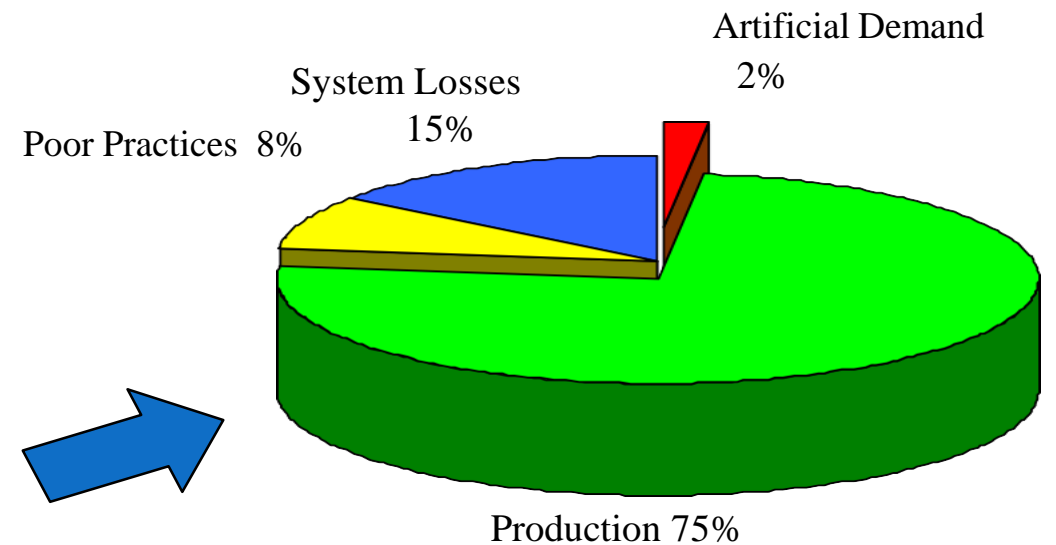
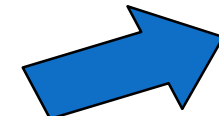
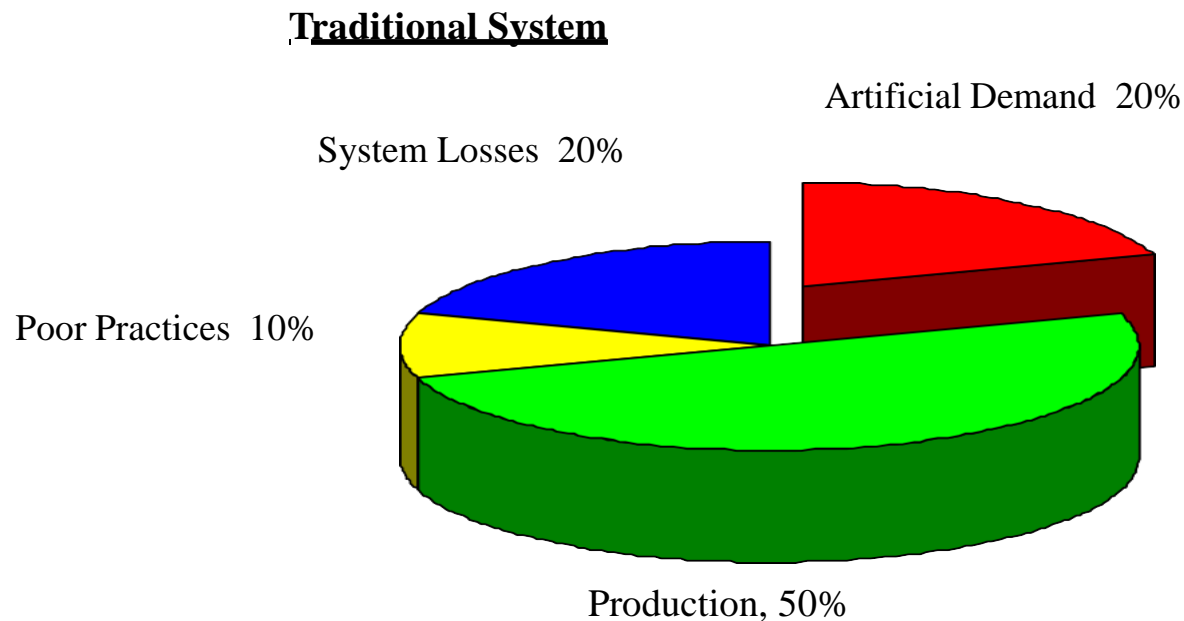
The FC with pressure scheduling is useful for running the system at desired operation pressure band within the preferred time frame in order to run the compressed air system efficiently by maintaining a stable reduced system pressure.

Using of FC Unit with Pressure Scheduling to increase efficiency

After upgradation of existing Flow controller unit, we are able to reduce pressure to 4.0 kg/cm² at desired time intervals as per process requirement against Compressed air pressure @ 5.5Kg/CM² from Compressor house.

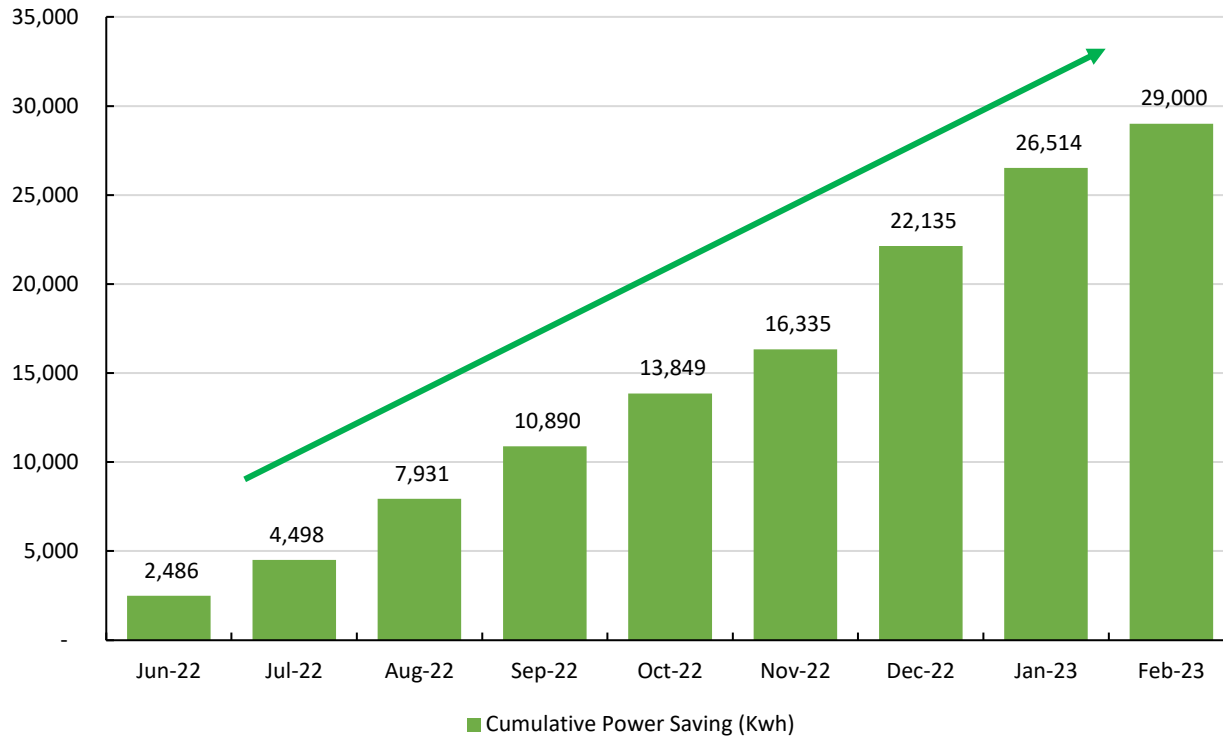
Compressed air pressure is reduced during the night shift and on non-working days, resulting in lower power consumption.

Increased Efficiency with ControlAiR

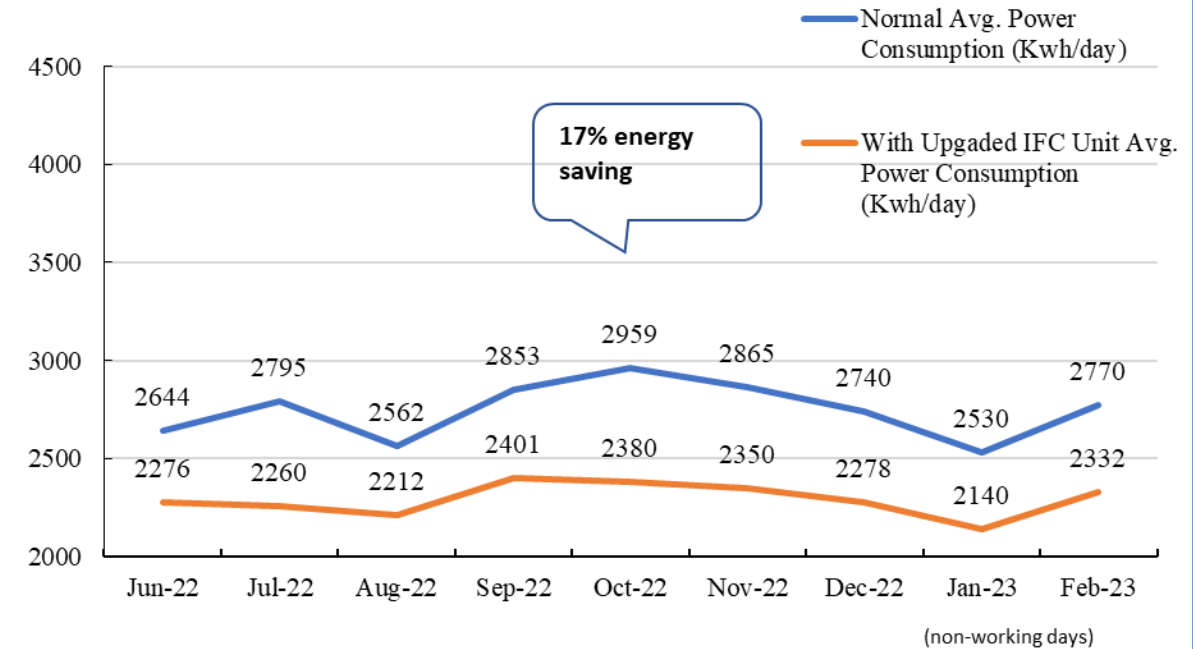


Power Consumption Saving By Upgradation Of FC unit in Paint Shop Compressed Air System

Cumulative Power Saving (Kwh)



Power Consumption Comparison With & Without Upgraded FC Unit



Total Cost Saving Till Feb'23:- INR 1.9 Lakhs in 9 Months

Way Forward- Compatibility with Industry 4.0

With FC ~ 17 % energy saving is achieved in existing compressed air network through reduction in artificial demand.

Along with that, it improves pneumatic equipment performance with constant air pressure within the range of +/- 1 psig (0.07 barg)

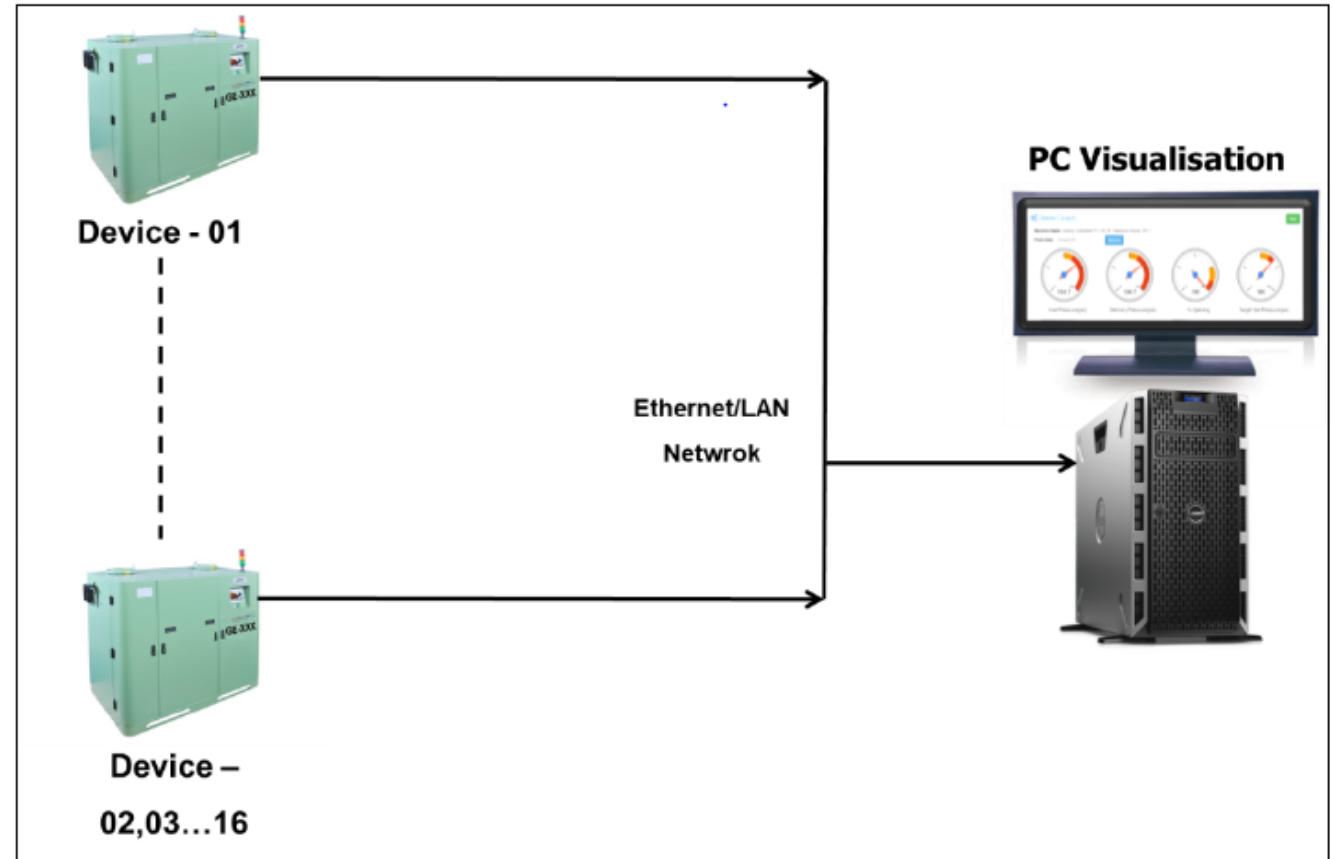
Industry 4.0 Compatible features of Upgraded IFC Unit

➤ Real Time Monitoring & Remote Access

- Live View Data & Graph
- Log Report/Alarm report & Export to Excel

➤ IFC Parameter Settings & scheduling

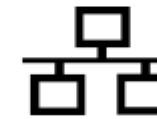
After synchronizing with Industry 4.0 savings can be further increased up to 25 %



USB



RS-485



Ethernet



GSM Modem



Wi-Fi

System Compatibility

Green Light for Clean Energy

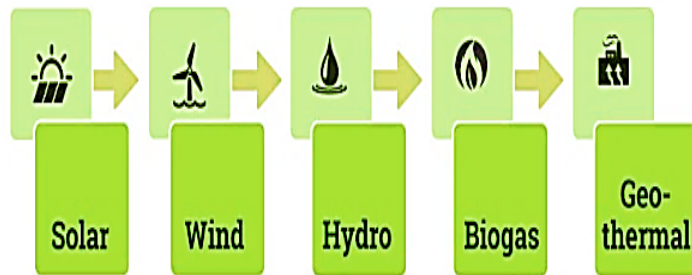
14 July 2017

RE 100 Signatory

As part of our sustainability approach and vision, Tata Motors has taken an initiative to go 100% renewable. In 2016, Tata Motors joined the RE100 group, a global initiative of the world's most influential businesses that are committed to transforming their energy resources to renewables.

About the RE100 Initiative

RE100 is the intent to transform our operations to 100% renewable. It implies establishing reliable sources for procuring renewable energy and consciously moving away from fossil fuels.

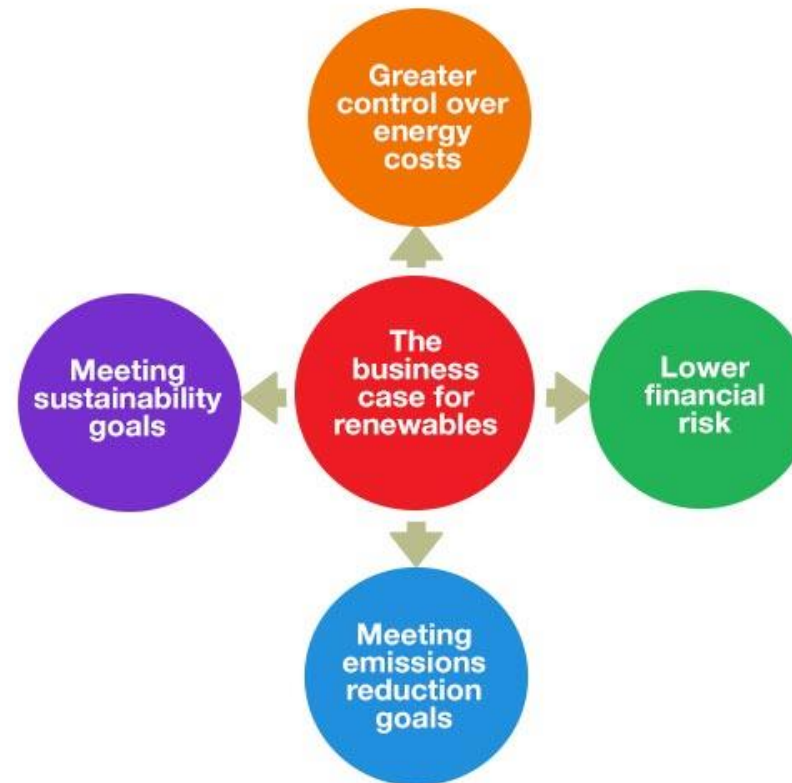


Future Ready Vision

As part of the Tata Group, Tata Motors is also committed to the United Nations' Sustainable Development Goals. Arvind Bodhanekar, Corporate Head - Health, Safety, Environment, and Chief Sustainability Officer of Tata Motors, sums up the company's renewable roadmap: "Our approach towards climate change mitigation and pursuing low carbon growth is three-fold - develop cleaner and more efficient vehicles, reduce environmental impacts of manufacturing operations, and build awareness among stakeholders."

Business case for renewables

For Tata Motors, the case for 100% renewable energy is aligned with our sustainability objectives and our endeavor to be Future Ready. Procuring electricity from renewables carries several strong business benefits.



Tata Motors is committed to ...

- Leading the automobile sector in minimizing year on year Green House Gas emissions from its products, operations and services by adopting eco friendly technologies/ practices.
- Developing products powered by alternate fuels and having higher recyclable and recoverable content.
- Promoting fuel blends sourced from non-fossil fuel sources.
- Maximizing use of renewable energy.
- Proactively engaging with Government, forums and institutions in shaping related regulations.
- Facilitating and maximizing reduction in carbon foot print throughout value chain.
- Actively working for carbon sequestration and community initiatives for resource conservation.

March 18, 2016

Guenther Butschek
Chief Executive Officer and Managing Director

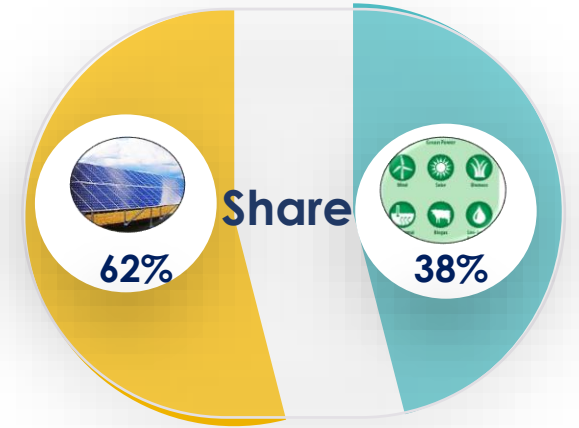
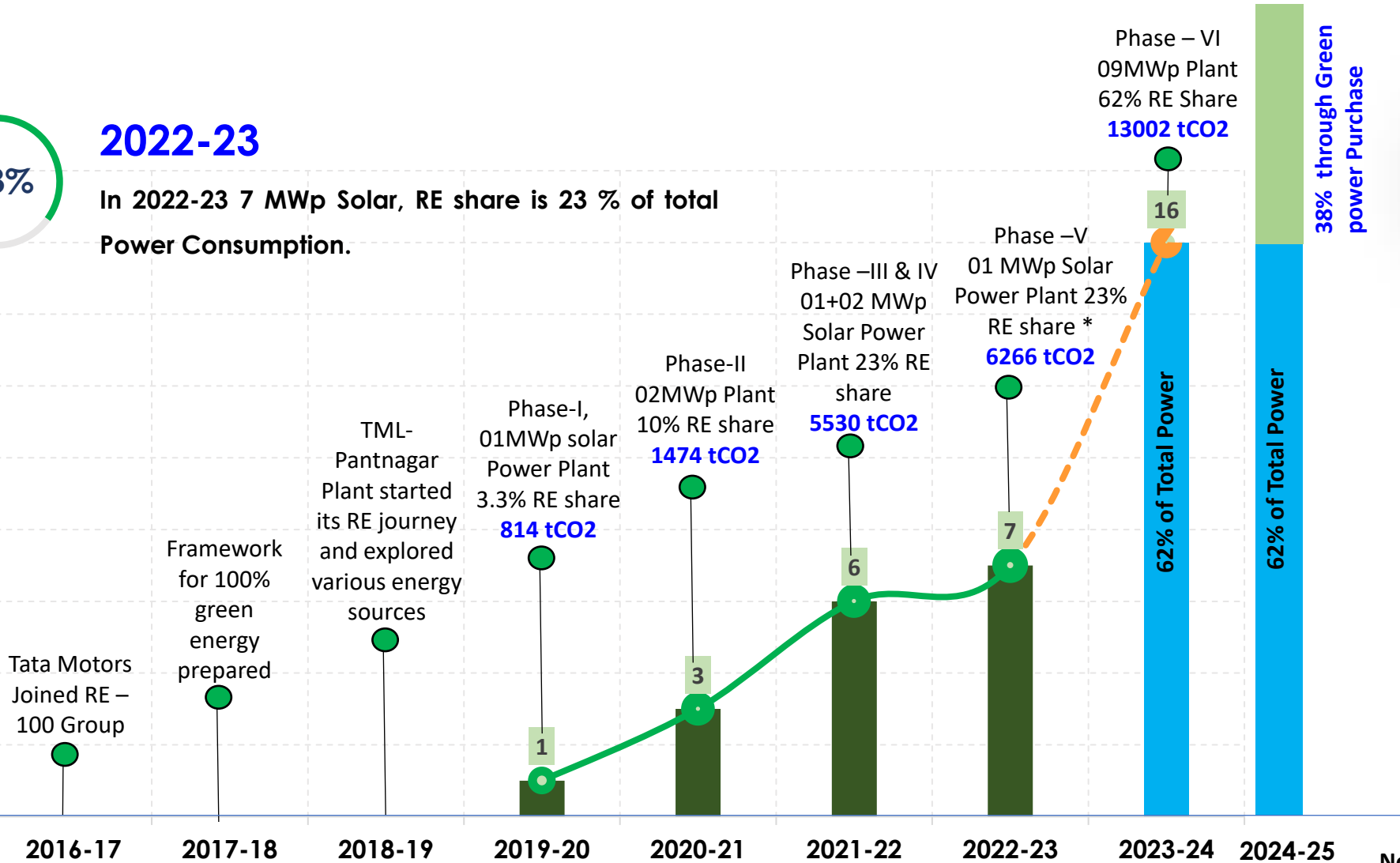
Renewable energy makes complete business sense

23%

2022-23

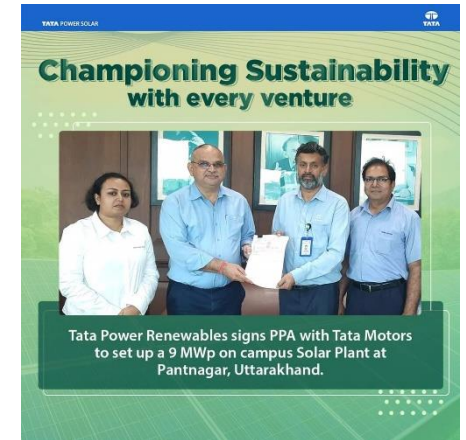
In 2022-23 7 MWp Solar, RE share is 23 % of total Power Consumption.

Solar Power in MW



Solar Power
16 MWp

Green Power Purchase
For dark hours



Note: * Current Solar Generation: 36000 Kwh/day

MORE WHEN ONE

TML Pantnagar is on track as per RE 100 Roadmap

Other Renewable Energy Applications

Solar Thermal
5000 Ltr per day



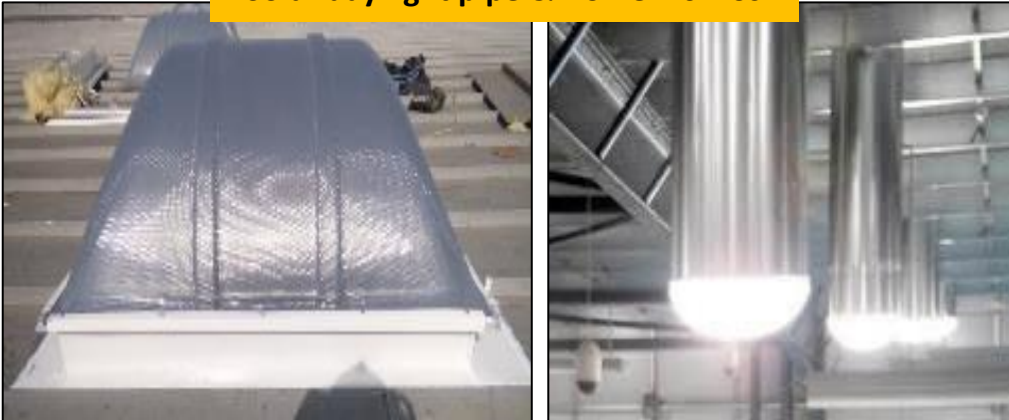
Solar Street Lights: 55
Nos



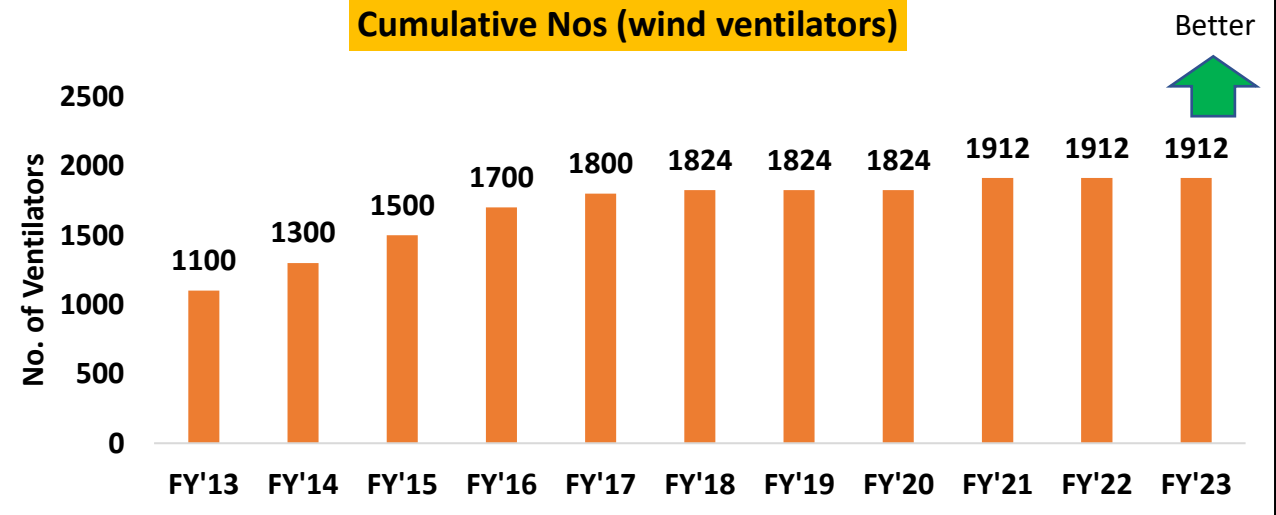
Wind ventilators



Solar day light pipe & Dome 46 Nos



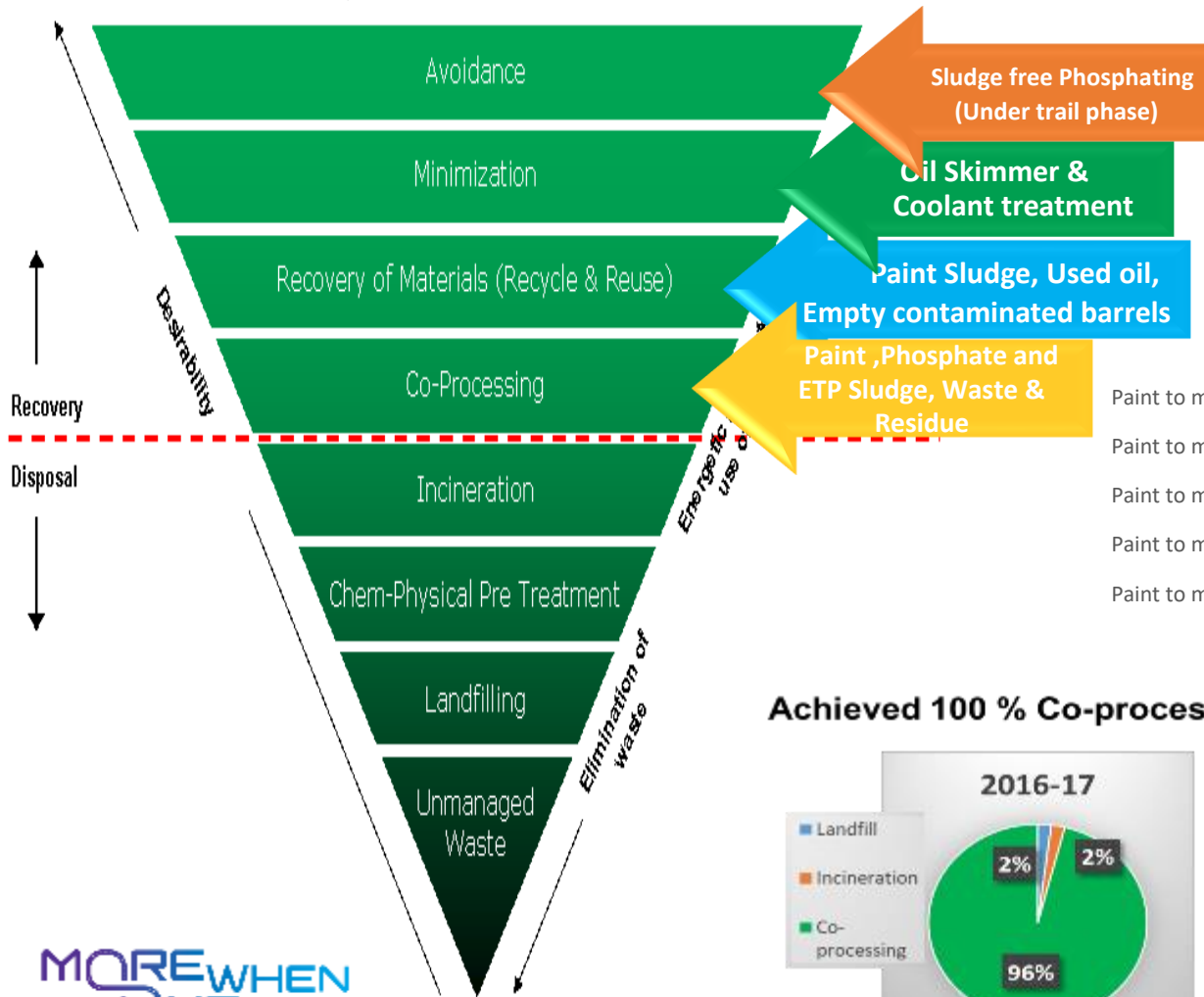
Cumulative Nos (wind ventilators)



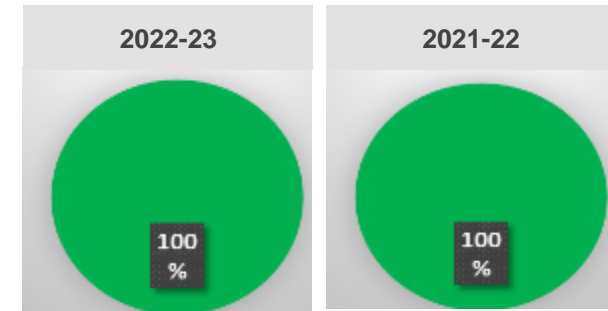
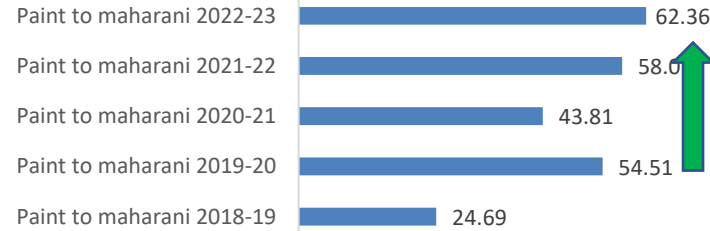
Mile Stone achieved :

- 1) 100 % Elimination of Incineration and Landfill
- 2) 100 % Co-processing of Hazardous waste
- 3) 8.6% increase in recycling of Paint Sludge

S. No	Type of waste	Unit	Waste disposed (FY 22-23)	Disposal Mechanism
1	Paint Sludge	MT	90.14 62.36 (8.6%↑)	Co-processing Recycling
2	Waste and Residue	MT	82.02	Co-processing
3	Phosphate Sludge	MT	56.93	Co-processing
4	Chemical Sludge (ETP Sludge)	MT	223.86	Co-processing
5	Waste Coolant	MT	22.12	Co-processing

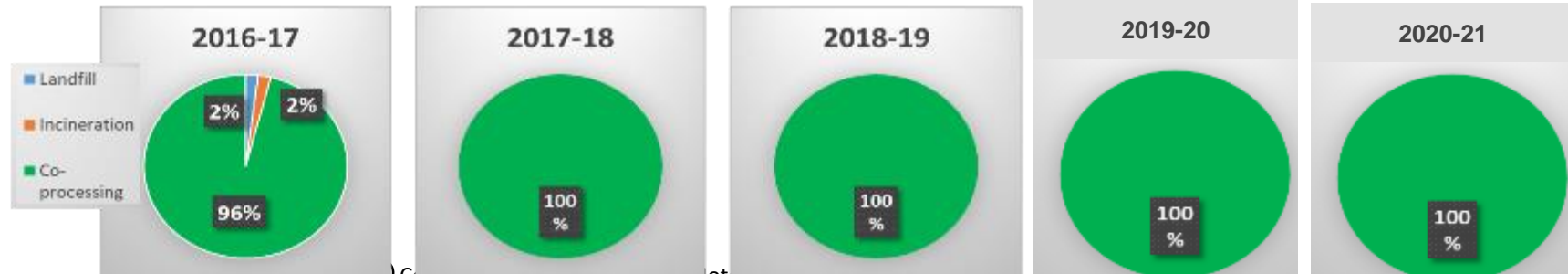


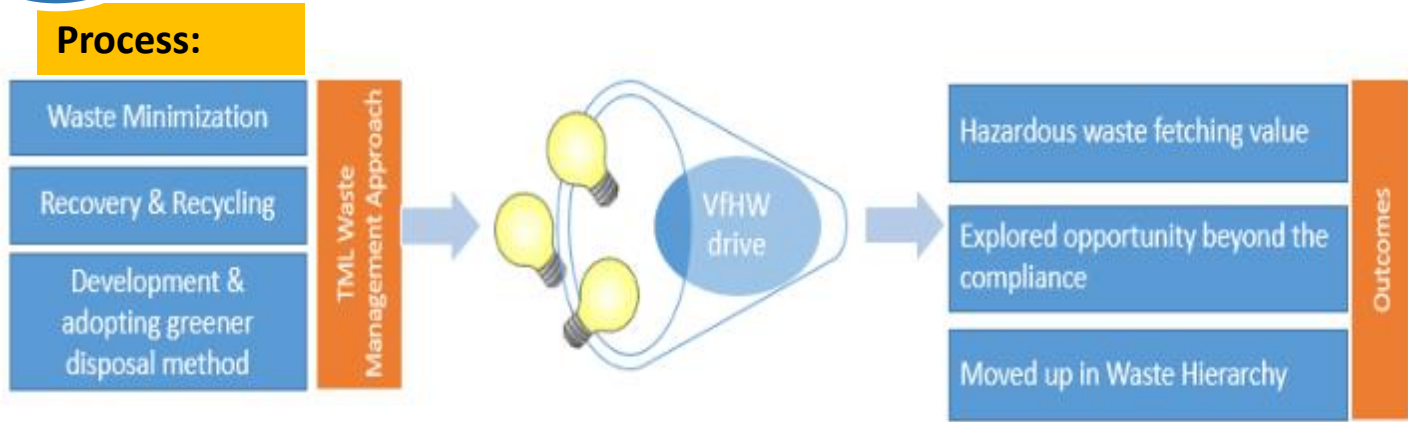
Recycling of Paint sludge YOY



Achieved 100 % Co-processing

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





Big ticket Projects

- Recycling of Paint Sludge
- Glass Glazing Sealant waste reduction
- Reduction in flushing thinner consumption in Paint Shop
- Changes in surface activation bath discarding frequency 15days to 45 days (paint shop)
- Reduction in consumption of Anabond 702 Sealant
- Reuse of oil in Engine Shop

3Cr Saving

Project 5

Problem

Oil wastage due to soaked with the filter paper

Existing system

Oil got soaked by the filter paper and while discarding the used filter paper oil also got disposed off.

Losses

1. Wastage of Oil
2. Hazardous waste increase.

Solution/Suggestion

Strainer provided in the collection trolley to separate the oil from the soaked filter paper

Strainer will filter & segregate the oil from the filter paper & the oil get sediment in the base of the tank, the oil is again top up in the oil tank and the weight of the filter paper is also reduced which will result into the reduction in wastage.

Benefits

1. Oil saving approx. 1000 liters per year
2. Reduction in oil / hazardous wastage

Before

After



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Project : REUSE OIL SOAKED COTTON GLOVES

RE-USE
RE-CYCLE

Generation Point :

During sheet metal part handling Gloves were contaminated with rust preventive Oil applied on parts.

Waste Generated /Day (Kg.):

11.7 Kg.
93.6 Rs.

Waste Reduction Plan:

- # Segregation of Oil Soaked Gloves & kept in separate bag.
- # Washing has to be done on Oil Soaked Gloves.
- # Washed Gloves has to be send to Scrap yard.

Waste Generated /Day (Kg.) After Washing implemented:

6.0 Kg.
48 Rs.

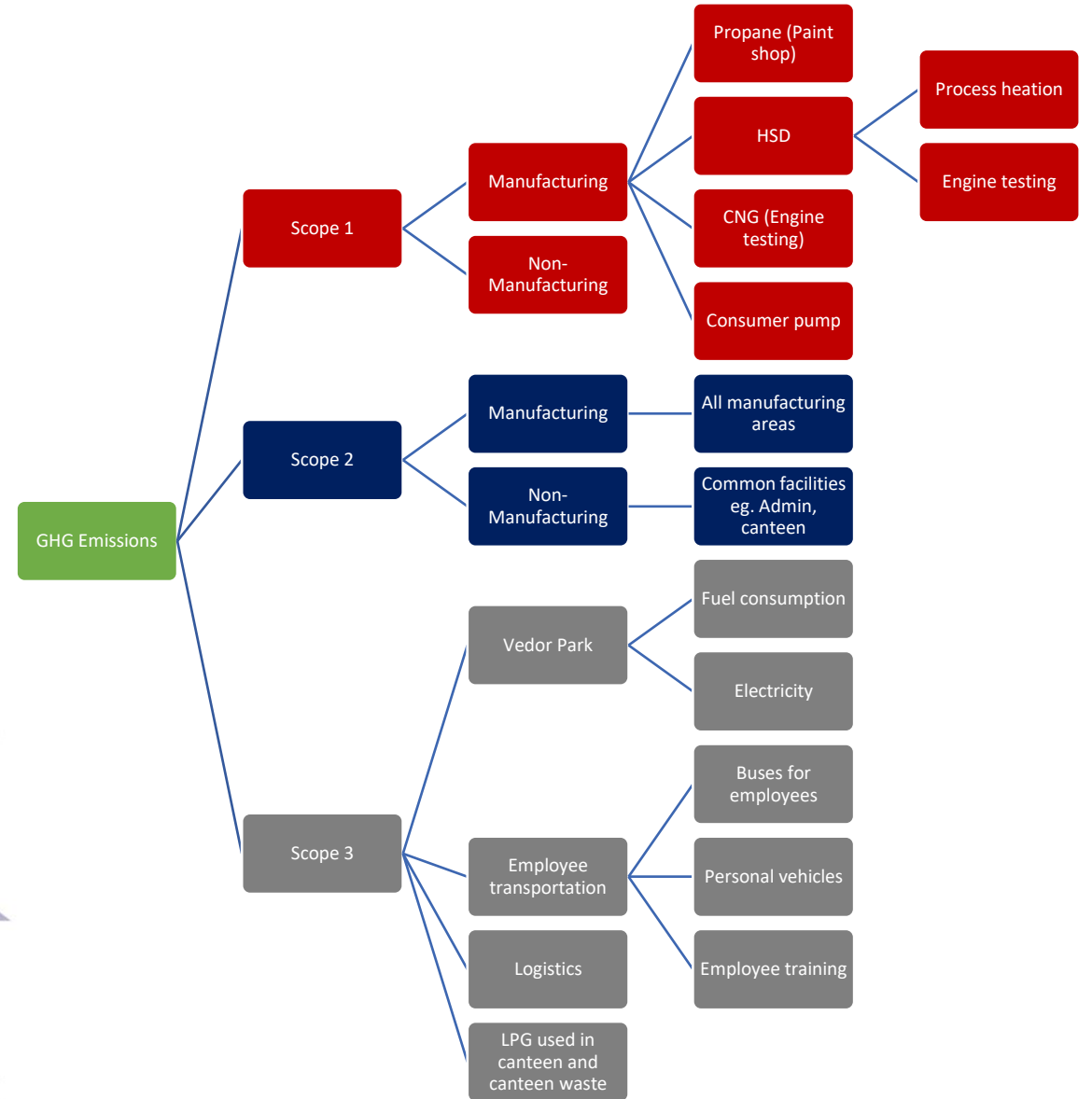
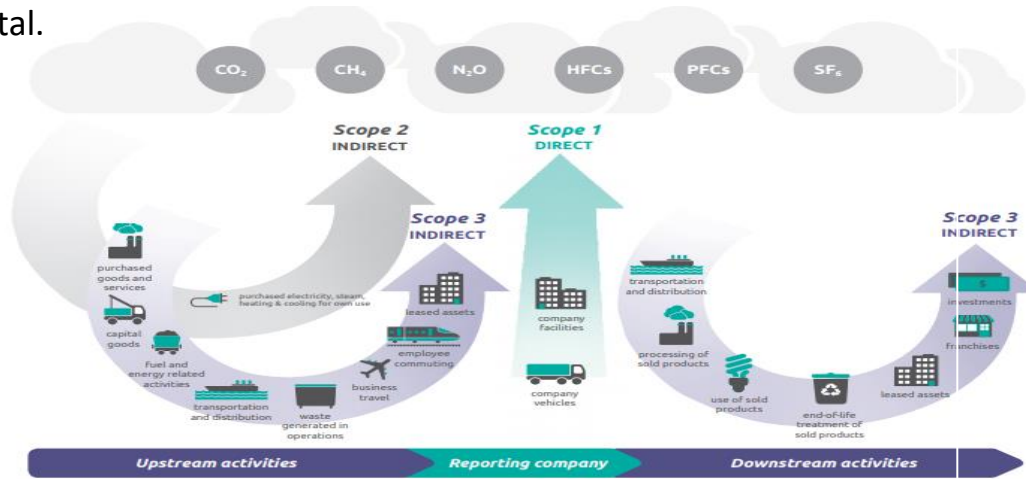
% Improvement = 49%

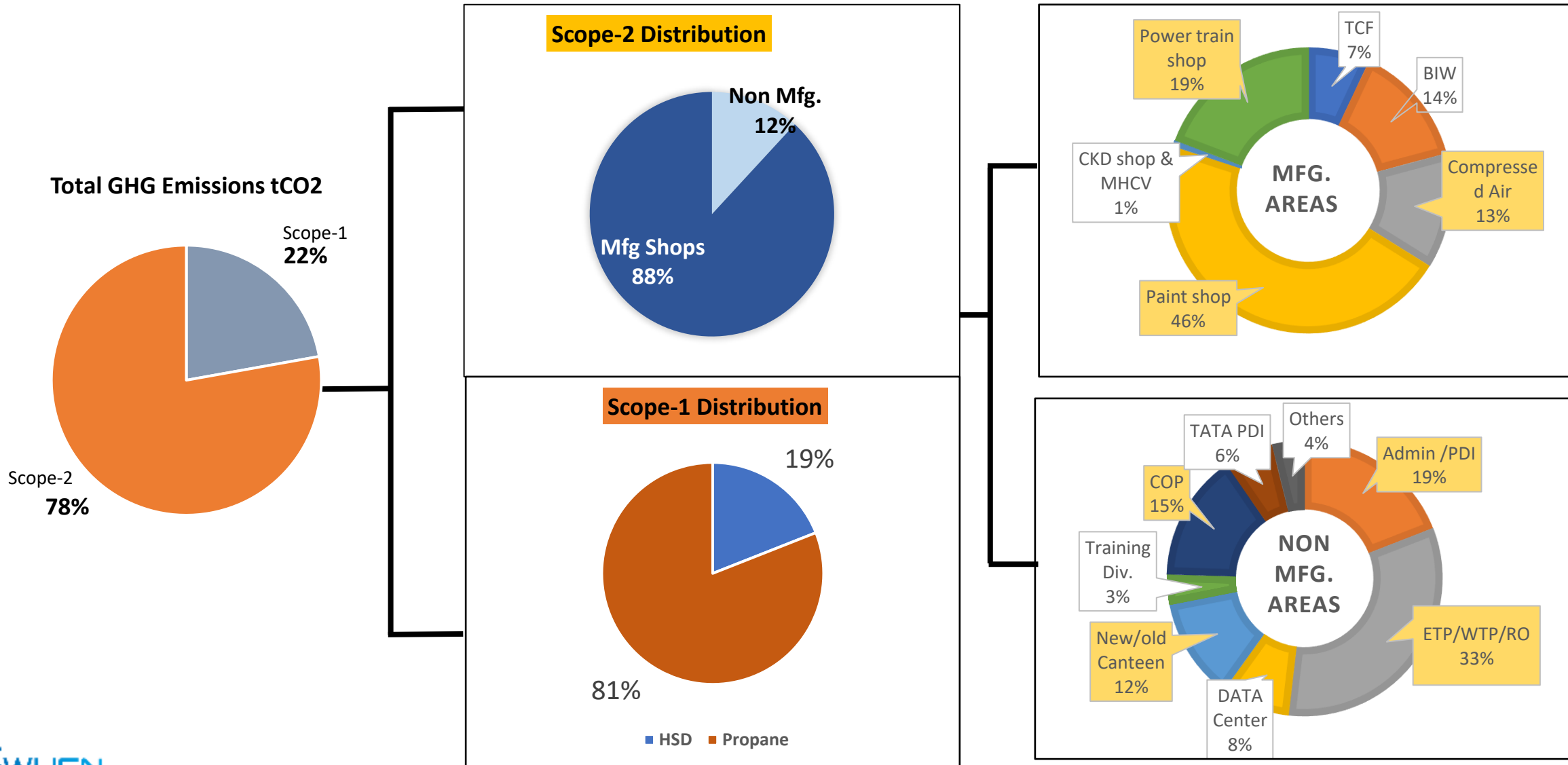
Oil Soaked Cotton Gloves

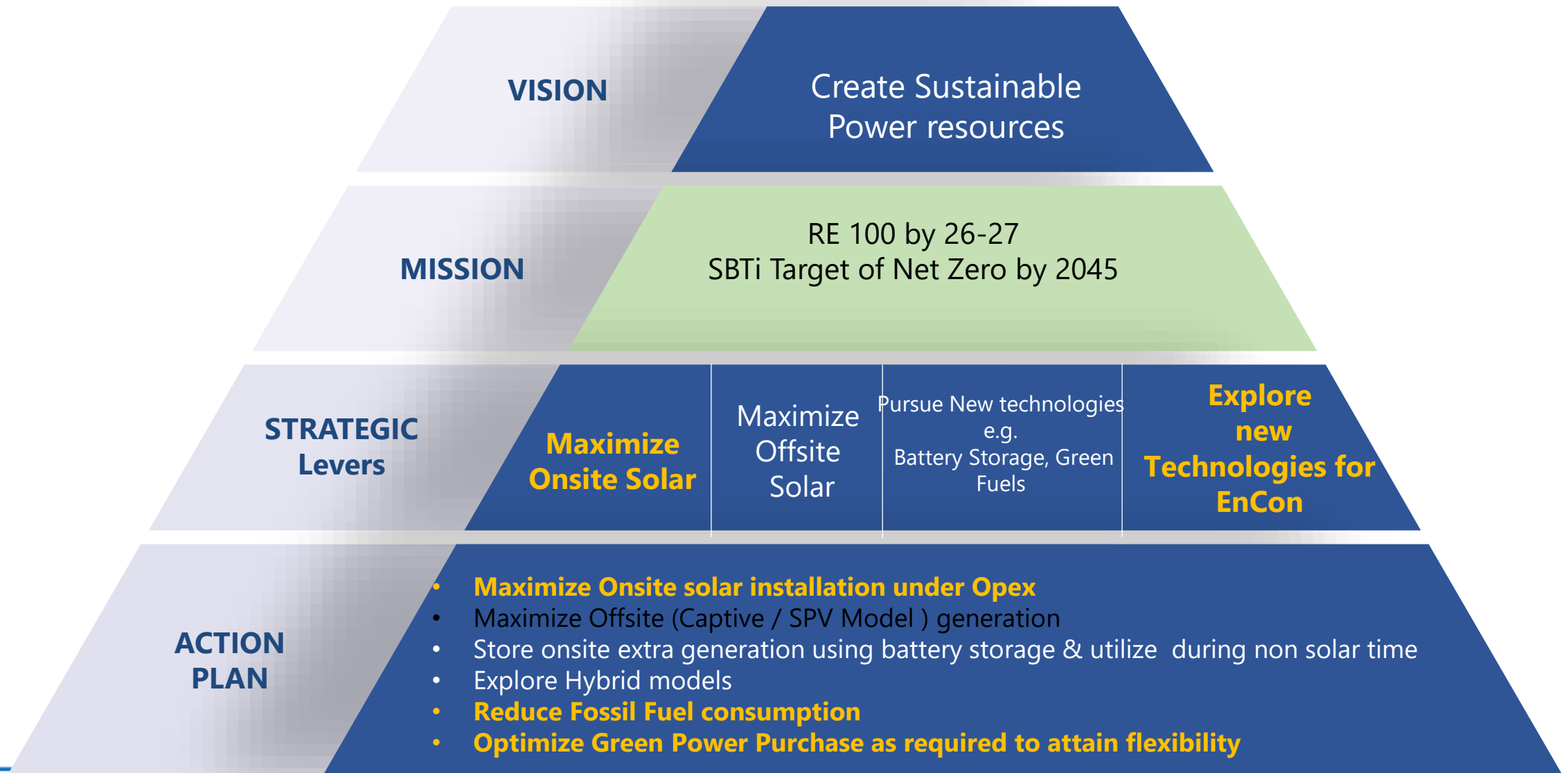


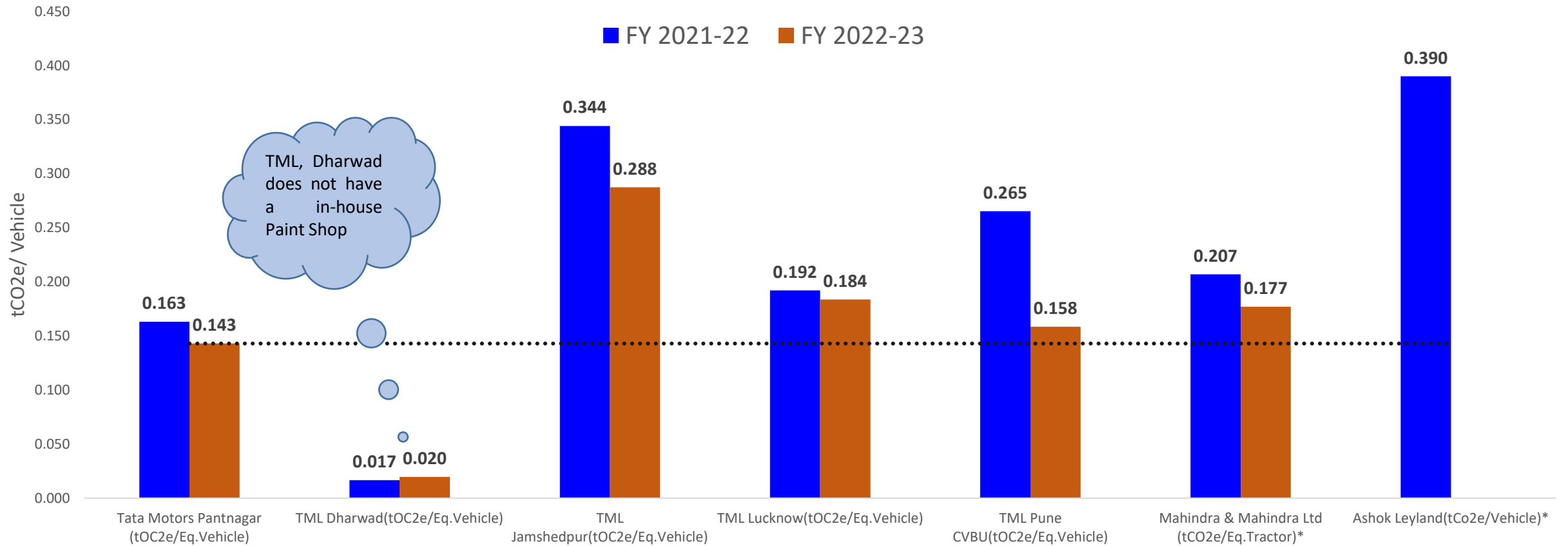
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- ❑ Scope 1 direct GHG emission which includes Manufacturing and non manufacturing which use the fuel (HSD, CNG, Propane) in the process and vehicle testing and along with vehicle.
- ❑ Scope 2 encompasses indirect emissions from generation of purchased electricity, steam, heating and cooling etc.
- ❑ Scope 3 inventorization , we have collected the data from various agencies for calculated the scope 3 emission :-
 - Supply chain team(Material logistics from vendor park)
 - Material Logistics from outside of location.
 - Admin team-Employee transportation for daily commute.
 - Admin team-Employee transportation for Business travel.
 - All business trip requests are monitored through Quest2travel portal.





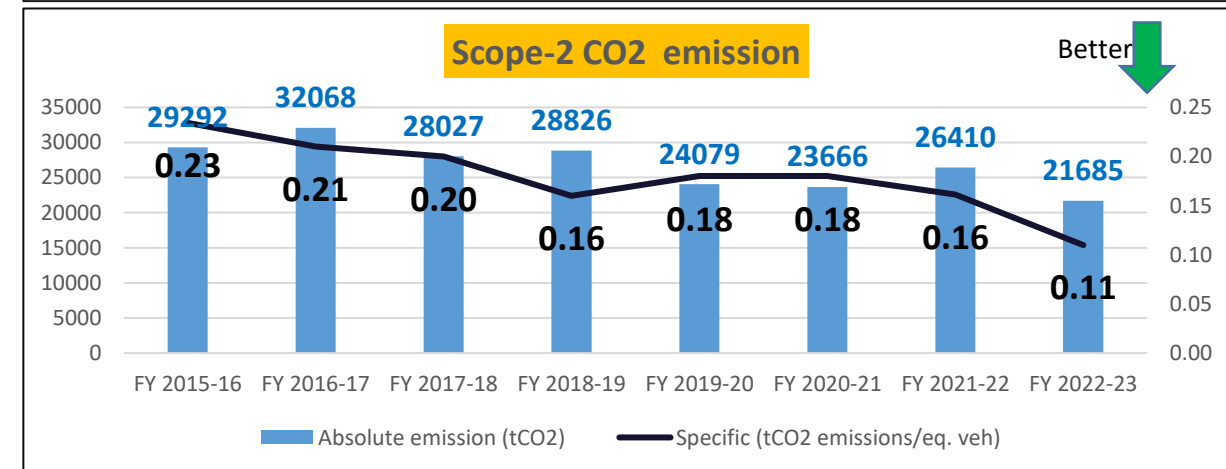
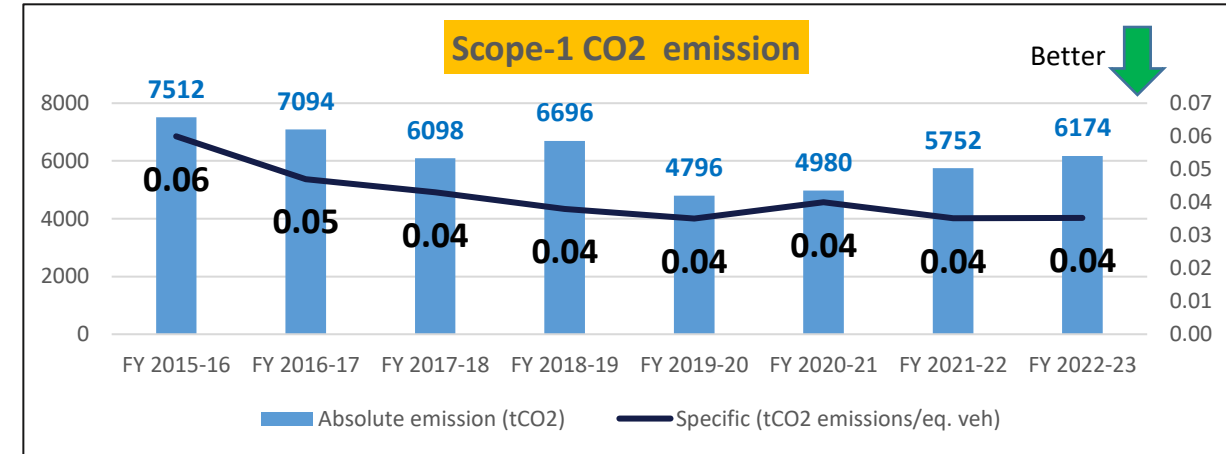
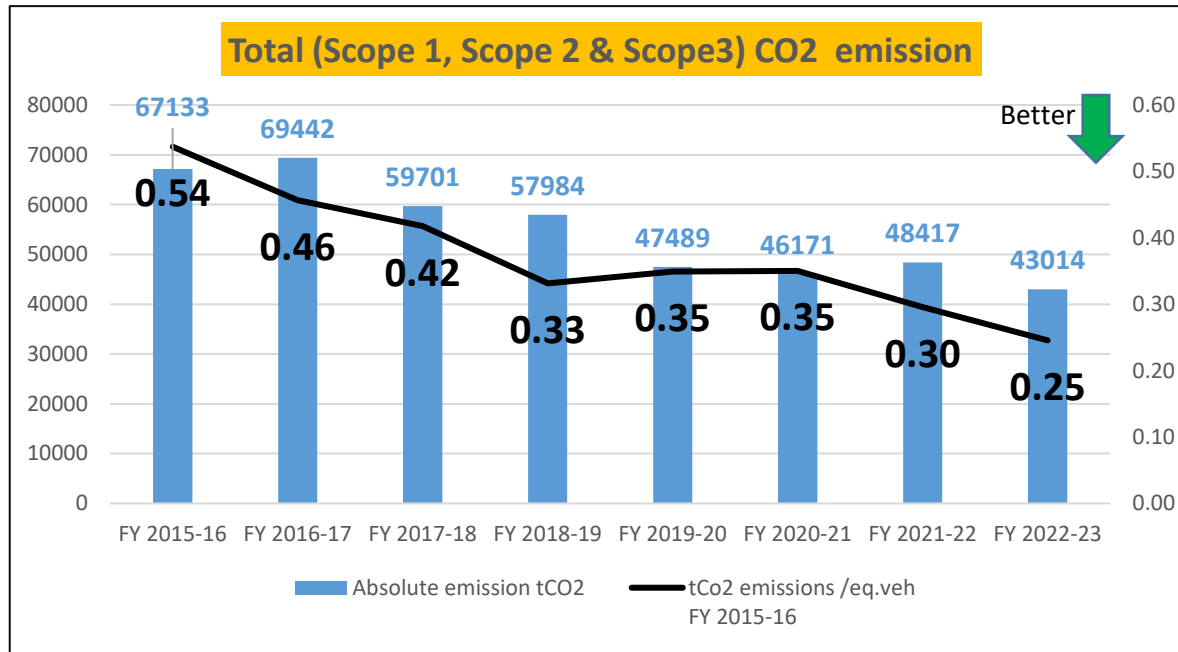




*Source of Information: Integrated Annual Reports

As per available data, TML Pantnagar is ahead of its competitors with in-house Paint Shop

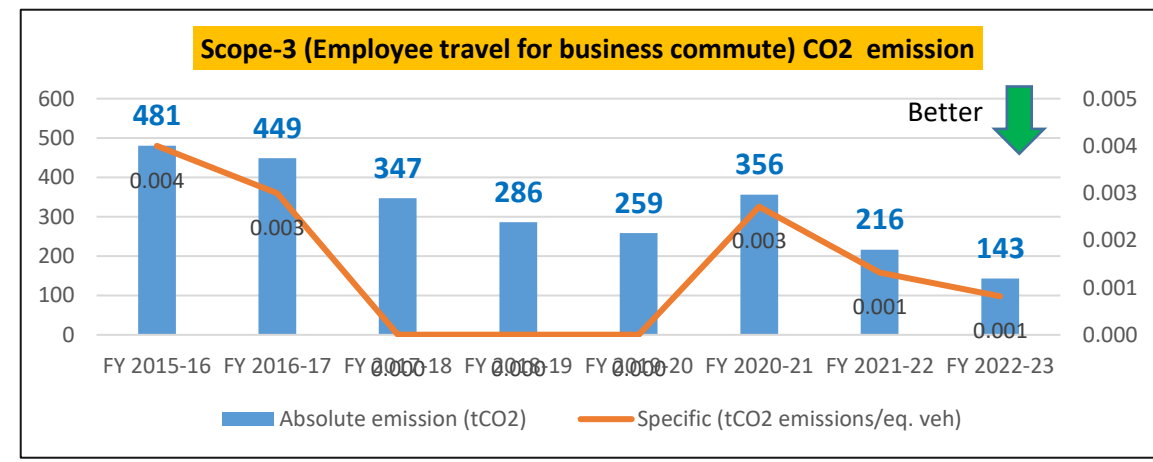
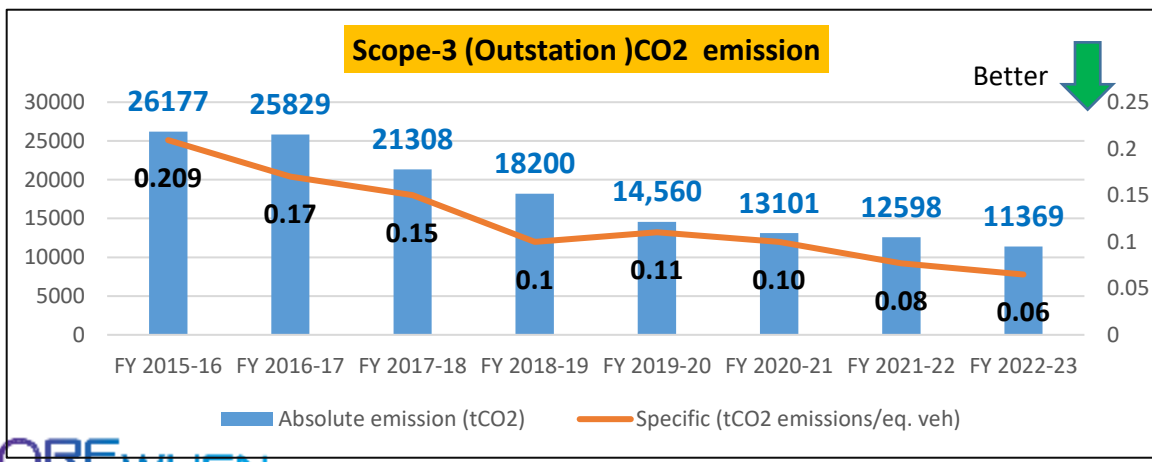
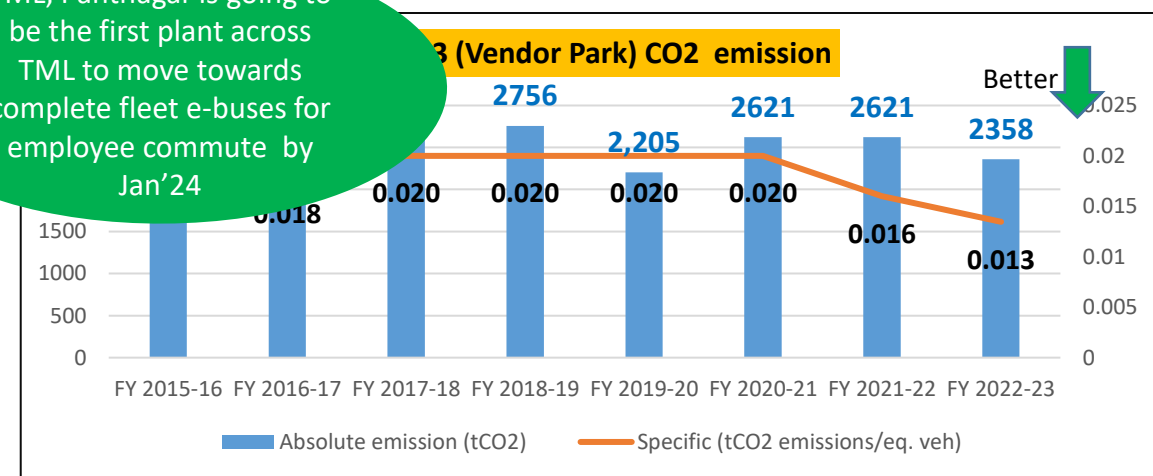
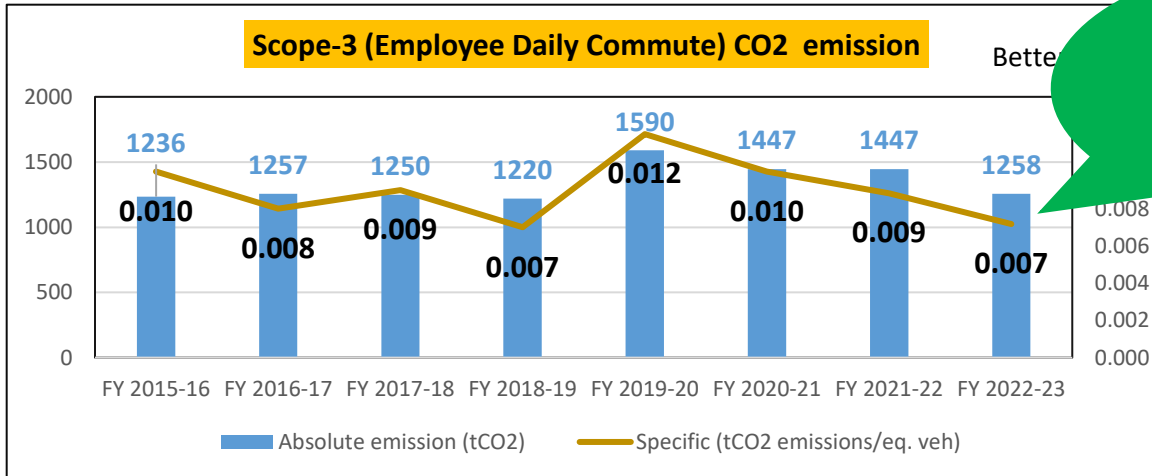
Reduction in Sp. GHG emission (Kg CO2 emission/ 25 SMH based Eq. Vehicle Produced).
Public disclosure is done through Annual Sustainability Report at TML



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

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 Jan'24



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...

Environmental Policy

Tata Motors reaffirms its commitment to minimize the adverse impact of its products, operations and services on the environment.

Climate Change Policy

Tata Motors is committed to...

- Developing products powered by alternate fuels and having higher recyclable and recoverable content.
- Promoting fuel blends sourced from non-fossil fuel sources.
- Maximizing use of renewable energy.
- Proactively engaging with Government, forums and institutions in shaping related regulations.
- Facilitating and maximizing reduction in carbon footprint throughout value chain.
- Actively working for carbon sequestration and community initiatives for resource conservation.

Environmental Procurement Policy

Tata Motors shall adopt a holistic approach to the procurement process by ...

- Expanding awareness of Tata Motors' 'Environmental Policy' and 'Code of Conduct' amongst Vendors, Contractors and Service Providers through various means;
- Involving Vendors, Contractors and Service Providers to improve their environmental performance by establishing an Environment Management System;
- Encouraging Vendors, Contractors and Service Providers to improve their facturing process to reduce their carbon footprint and use of chemicals;
- Encouraging Vendors, Contractors and Service Providers to minimize logistics and packaging material, and maximize reuse and recycling of packaging material and use of recycled materials.

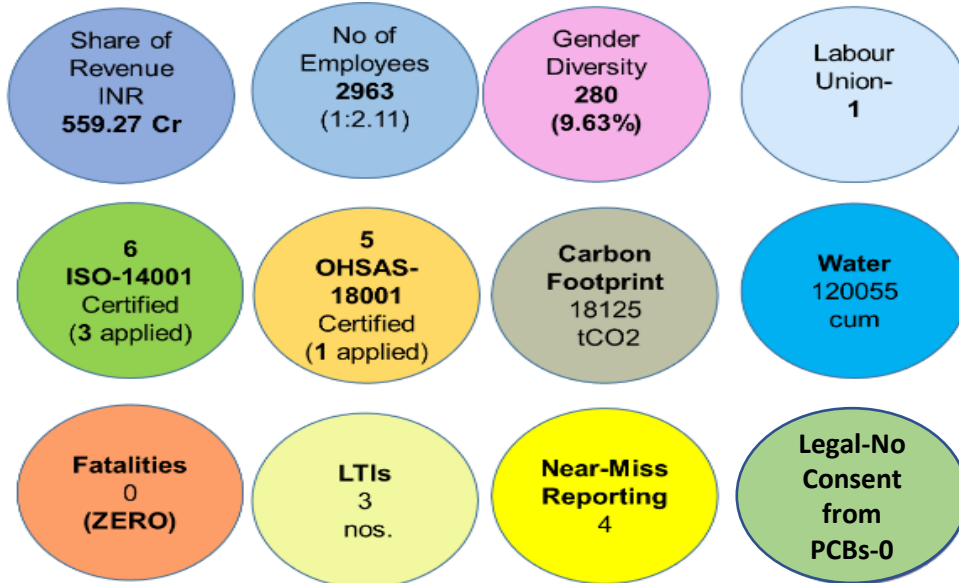
March 18, 2016

Guenter Botschek
Managing Director - CEO

Approaches



Supplier Sustainability Overview:



Tata Motors Supplier Code of Conduct

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

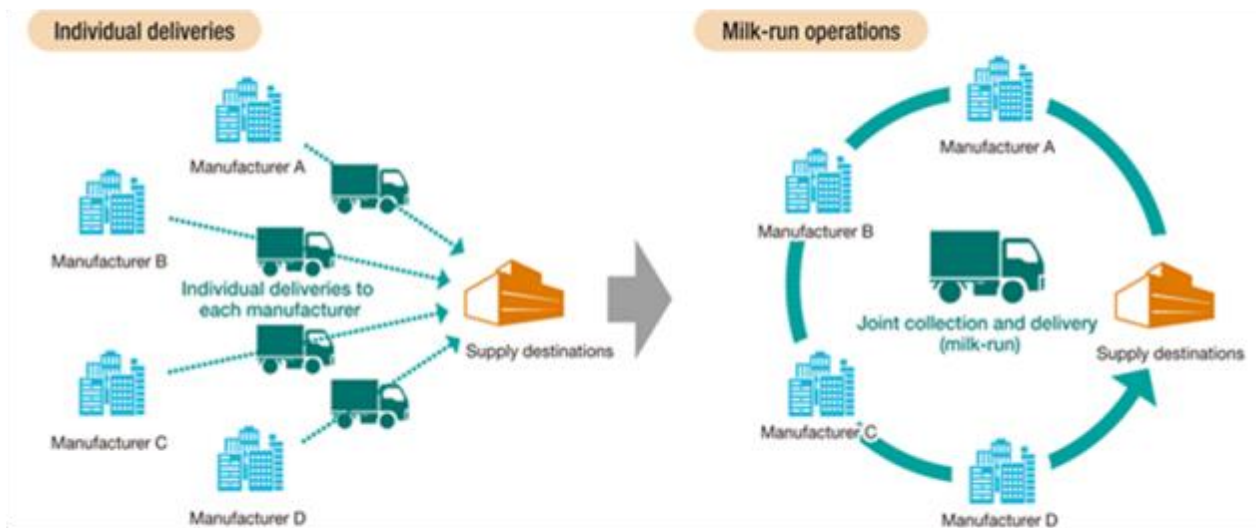
Supplier	Commodity	No. of Parts (FY'20)	No of parts (FY'23)	Status
M/s Adient	Front seat	17	23	Done
M/s Mutual	Front Bumper	18	24	Done
M/s D&S	Fuel Tank	2	4	Done
M/s Mitter & Mitter	Steering Wheel	2	6	Done
M/s Syndicate	Silencer	7	12	Done
M/s Mahabal	Front Axle	5	18	Done
M/s Taco	Front Panel	17	21	Done
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	

Environment Related points in Supplier Selection:

1.3. Does the organization follow EMS standard, environmental statutory and regulatory norms? Does the organization have responsibility defined internally?

1.3a Does the Organization follows statutory and regulatory norms related to IMDS, Conflict of Mineral and Persistent Organic Pollutant (POP) requirements?

Other Initiatives at Supplier End

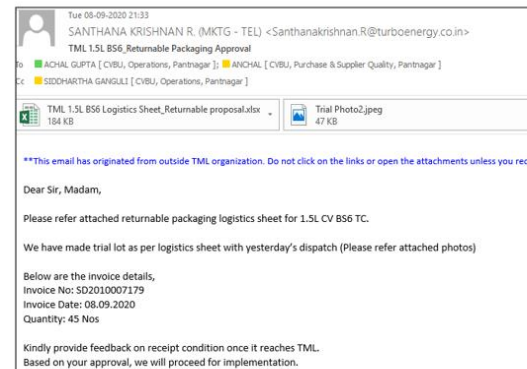


TML_PANTNAGAR COULD SAVE APPROX. 50,000 LTR OF DIESEL ANNUALLY EACH YEAR SINCE 2014 TILL LAST FY DUE TO SUCCESSFUL IMPLEMENTATION OF MILK-ROUTES AT PUNE, DELHI & CHENNAI ~ 4% Reduced



Green Packaging (Examples):

Corrugated / Foam Packaging to FLC



Trials : Underway;
OFIs : Polythene Elimination
Status : WIP

Part Name: Dashboard

Supplier: Mutual

Model: Ace

Poly Bag for packaging of Dash Board

Action Taken: Implemented Covered Trolley and eliminated use of poly bag



Corrugated box packaging replaced with returnable trolleys for alternators.

Before



After



Corrugated box packaging replaced with FLC boxes

Before



After



Corrugated box packaging replaced with returnable trolleys for dashboards.

Before



After



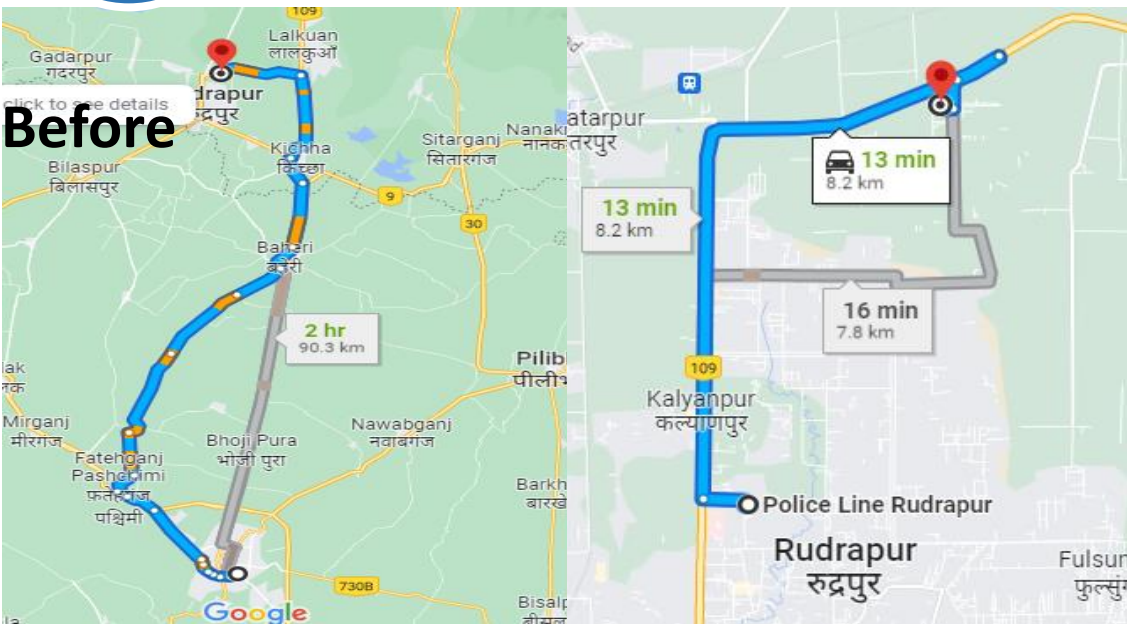
Corrugated box packaging replaced with FLC boxes

Before



After





Earlier Status: CNG transported from Depots everyday to meet production requirement. The transportation of CNG cost the company RS. 27 Lac and emission of more than **92 tCO₂ in Scope-3**

Action Taken: Dedicated PNG line laid from Depot. to the point of use.

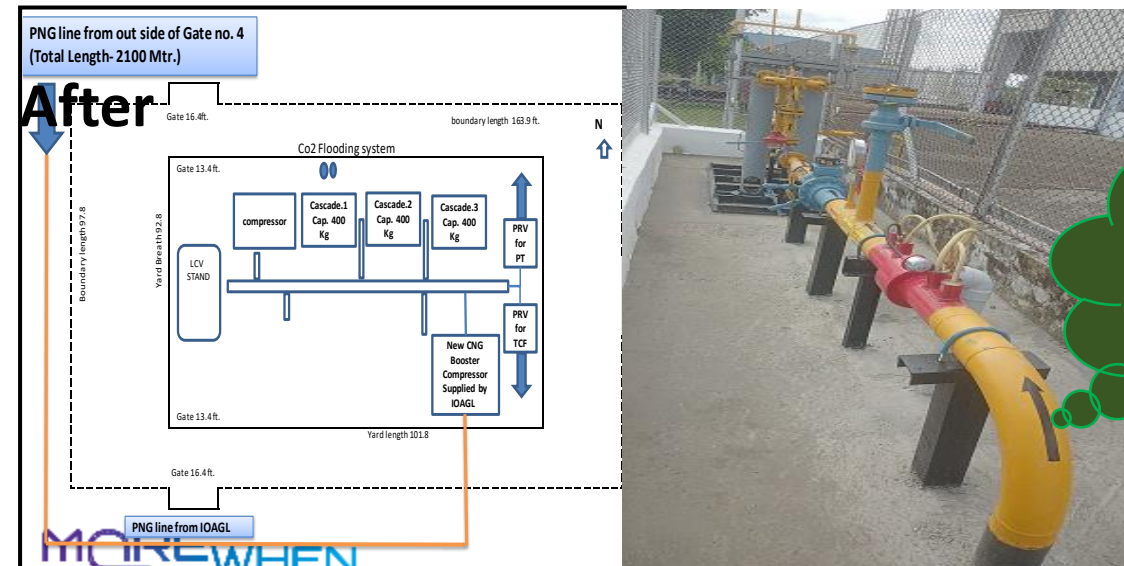
Key Measure:-

- No additional cost in creation of Infrastructure for PNG (Pipeline +CNG Booster Compressor)

Benefits:-

Reduction of **92 tCO₂ emission/year in Scope-3**

CNG Supply (Elimination of **3Nos. of LCV**)
 Elimination of transportation:- **INR 27 Lacs/ Year**
 Elimination of unloading CNG vehicle
 Risk Content (Unloading Activity, Regular checking of CNG
 Involvement of Fire team, Safety, SCM & IDM Team)



Tata Motors Ltd. Pantnagar, Uttarakhand Certified with Zero waste to Landfill Certification By TUV India



- ❑ *Tata Motors Pantnagar is Certified with Zero based to landfill certification based on the recently concluded assessment held during 3rd -4th August 2022.*
- ❑ *Tata Motors Pantnagar is first Tata Motor's plant who receive this rating indicating world class benchmark!*
- ❑ *Zero waste to Landfill means zero manufacturing waste is disposed directly to landfill or to Incineration without energy recovery by the site, except where local legal requirements specify that regulated wastes must be disposed in a landfill”.*
- ❑ *The Zero waste to Landfill assessment was done by a team of TUV India representatives comprising of Mr. Manoj Borekar and Vivek Nigam. It comprised of a two-step evaluation process*
- ❑ *The 1st step comprised of a pre-assessment & Site Visit and followed by the 2nd Step involving a review of all documentation including review of Process and documents of all our recycler/ Waste Handler.*

“At TML Pantnagar, we’re leading the charge toward that Healthy, sustainable future with our Zero waste to landfill Plant (ZWtL)”

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

Tata Motors Ltd. Pantnagar, Uttarakhand Certified with Water Neutrality Certification from CII-GreenCO....



- ❑ *Tata Motors Pantnagar has received Water Neutrality certification following a recently completed assessment in January- 2023.*
- ❑ *Water neutrality is the state of operations achieved and maintained by an organization by continuously increasing water usage efficiency, augmenting water, and offsetting for any remaining water consumed by making water available for further use beyond its boundary.*



“At TML Pantnagar, we’re leading the charge toward that healthy, sustainable future with Our Water Neutrality Certification”

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

Tata Motors Ltd. Pantnagar, Uttarakhand Certified with GreenCO Platinum + Certification from CII-GreenCO

GreenCo Rating is the "first of its kind in the World" holistic framework that evaluates companies on the environmental friendliness of their activities using life cycle approach.

- ❑ *Tata Motors Pantnagar has received GreenCO Platinum+ certification following a recently completed assessment on 4th & 5th July 2023*
- ❑ *The Green Company Rating System advocates a performance based approach. The rating system evaluates green features .*
- ❑ *A team of CII-Green CO Assessor led by Mr. U.K Shenoy & Mr. Rajesh Chandra along with Syed Ateeq conducted the GreenCO Platinum + requirement assessment. It was a two-step evaluation process.*
- ❑ *The first step included a pre-assessment and site visit, followed by the second step, which included a review of all documentation, including a review of the Process and final judgment made by GreenCO Assessment Committee based on overall review .*



“At TML Pantnagar, we’re leading the charge toward that healthy, sustainable future with Our GreenCO Platinum + Certification”

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

Tata Motors Ltd. Pantnagar, Uttarakhand Won Gold Award in National Competition on Low Cost Automation (LCA) by CII

- ❑ *Tata Motors Pantnagar has received Gold Award in National Competition on Low Cost Automation (LCA) by CII following a recently completed assessment on 6th & 7th July 2023*
- ❑ *The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering Industry, Government and civil society, through advisory and consultative processes..*
- ❑ *A team of CII Judges evaluate the idea. It was a two-step evaluation process.*
- ❑ *The first step included a evaluation of Low Cost Automation (LCA) ideas generated and the second step included presentation and explanation of the idea to the Jury.*



“At TML Pantnagar, we’re leading the charge toward that advanced automated future”

This Certificate reconfirms our commitment towards Creativity and the continual participative approach of Team Pantnagar towards our journey for Future Innovations.

Tata Motors Limited, Pantnagar believes in achieving Energy Efficiency through Operational Excellence and Low Cost Automations with a numerous small innovations leading us to achieve our Energy as well as Climate goals.

CII Certified Water Neutral Organization



Certificate Zero Waste to Landfill



Green Gold Certified Building since 2012



ISO 50001 certified company since 2013



CII GreenCo- Platinum Plus Rated factory in 2023, (Upgraded from Platinum rating in 2023)



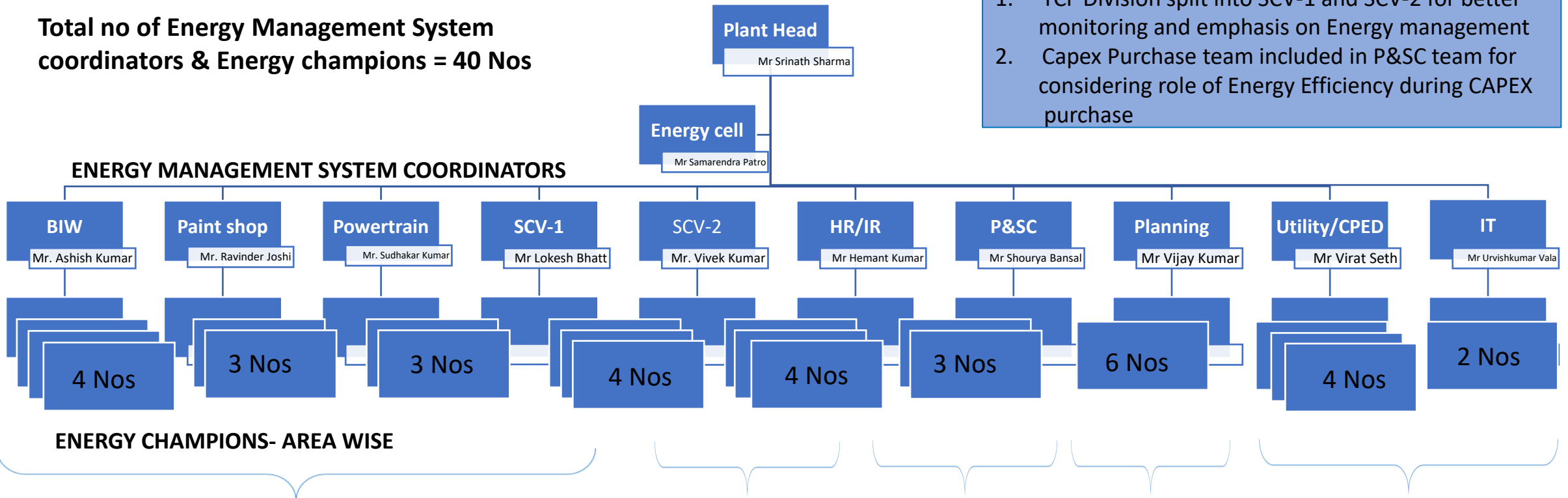
GreenCo Star Performer 2020



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

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



ENERGY CHAMPIONS- AREA WISE

- 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

Daily Energy Monitoring

Energy Monitoring : DAILY

Plant Head review on daily basis - (Plant & Factory wise)

POWER

Absolute, Specific, Cost & Interruptions

FUEL

Propane, HSD, Petrol, CNG

COMPRESSED AIR

SHOP WISE ENERGY CONSUMPTION VS TARGET

PREVIOUS DAY STATUS & CORRECTIVE ACTION



Energy Monitoring : MONTHLY

Energy & environment report

POWER & FUEL

Absolute, Specific, Cost & Interruptions
Shop wise

ENERGY COST ANALYSES

COMPRESSED AIR

Shop wise comparison and

ENVIRONMENT FOOTPRINT

HAZARDOUS WASTE, WATER etc

Compressed air leakage monthly audit

Compressed Air leakage % trend

Better
↓



FY'23 Target : 05 %

FY'15 FY'16 FY'17 FY'18 FY'19 FY'20 FY'21 FY'22 FY'23

● % Leakage

Leakage % mapping

Shop floor audit

RED tag on leakage points

Rectification

System Improvements

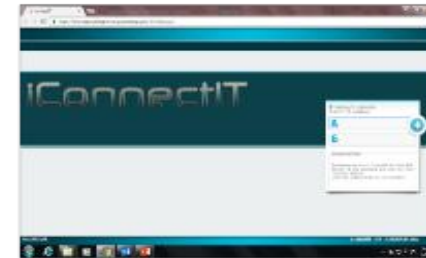


Trainings Mechanisms On Energy Management :

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

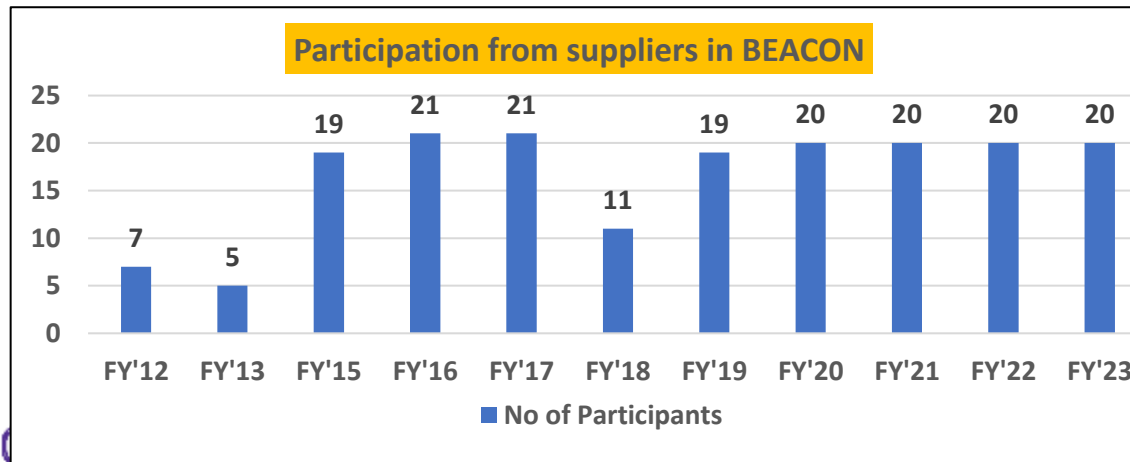


- Average 55000 suggestions per year
- Monetary reward – Rs 200 – Rs 5000
- Special suggestions schemes

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	35	28	38	39	15	24	394	
5	Frame	20	41	29	32	19	32	14	19	18	0	0	0	246
6	CMS	3	3	36	0	2	2	2	2	2	50	11	12	127
7	CPED	0	0	0	0	0	0	0	0	0	0	38	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	17	21	20	38	22	30	10	36	254	
11	Paint Shop	182	174	210	169	173	159	117	180	120	155	1909		
12	SOIG	0	0	0	0	0	0	0	0	0	0	0	0	0
13	TCF 1A	0	53	49	75	0	25	0	150	100	80	586		
14	TCF 1B	118	27	26	85	127	64	110	236	175	220	1427		
15	TCF 1C	110	110	140	110	109	119	132	136	136	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	1022	10036

Sample year FY 22-23
Total Kaizen 10036



Suggestions generated in Unique EnCon suggestion scheme

Sugg ID	Date Entry	Title	Category	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	IMPLEME NTED	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 HEALTH 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 SPREADS ON SHOP FLOOR AND ALL	FROM WIND MOVING EXHAUST TO WELDING STATION. IN THIS CASE WELDING FUME EXHAUSTED COMPLETELY FROM STATION AND NO CHANCE TO SPREADED WIND	NO HEALTH ISSUE REGARDING LUNG DISEASE FOR ALL EMPLOYEE OPERATOR WORKAL HIGH
2030386	03/06/2021	Addon Holding tank installation for BOO TSS reduction	Environment	PROCESS	STP	HOLDING TANK	IMPLEME NTED	No provision of holding tank leads to flood and high TSS BOO load over the Fine Screen	additional Holding tank with aeration system added in the system which reduce the fine load and reduce TSS & BOO	improve the quality of treated effluent of the STP
2030338	03/06/2021	Online Real time Monitoring system	Environment	PROCESS	STP	OCEQMS	IMPLEME NTED	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	IMPLEME NTED	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	IMPLEME NTED	NO BAFFLE IN THE SYSTEM	BAFFLE AND LAUNDER ADDED IN THE INLET TANK	REDUCE THE TSS AND FLOCKS 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 top 1A shower.	shower testing machine.	NORMAL	Unpleasant smell coming on shower due to shower water not timely recycling.	timely shower water recycling.	For benefits of environment & operator health.
2032653	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 BBL HONING	Honing machine (Gearing/Nagle)	IMPLEME NTED	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 the light in janarit hoti hai , uske baad 10-11 am tak sun ki light se kam chal jata hai, lekin light on rahit hai switch off karna thul late hai. Energy loss hota hai.	Installation of photo sensor/ nagro jana chahye- station par 300-400 lux level se jayada hone par light off kar denge.	Energy saving Cost saving Operator Moral high

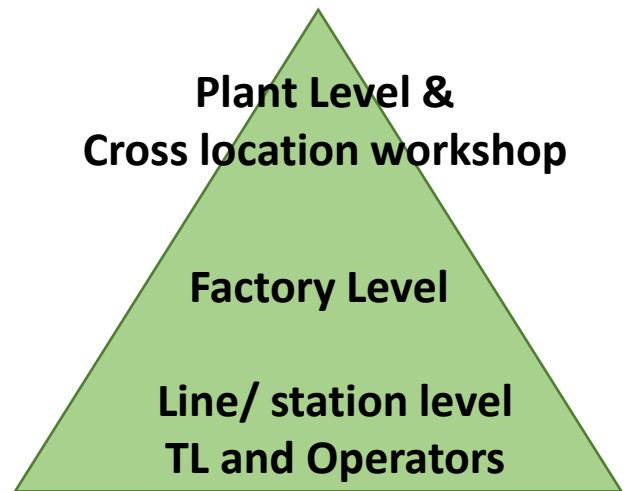
7 + 02 New levers

- Measurement & Analysis
- Operational Efficiency
- New technology introduction
- Renewable energy
- Benchmarking
- Energy cost
- Knowledge & Capability building
- Fix cost reduction
- Standardisation
- Digitalization & process automation

ERASE idea generation workshop
13 Magical questions

- E** - Eliminate 'Need'
 - Do we really need this process for desirable outcome ?
 - Do we need Energy input in this process for desired outcome?
- R** - Reduce Abs & Sp. Energy consumption
 - How much is productive and non-productive energy?
 - How can I reduce non-productive energy use?
 - How can I improve throughput ?
- A** - Alternative energy sources & Application innovation
 - Is there an alternative cost effective energy source available?
 - What is my application advantage ?
- S** - Sizing of equipment
 - What is the equipment capacity?
 - What is the actual demand ?
 - How can I right-size the equipment capacity?
- E** - Efficiency improvements / Elimination of losses
 - Is there excessive Noise, Heat, Vibration, Radiation or leakage ?
 - What is my equipment/process energy efficiency?
 - What is the best efficiency point?

Workshops at three levels



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	• Audit process mapping for overall energy consumption. As & Ms, and other aspects based on insights from their own equipment monitoring, data analysis.	• Audit process mapping for other high consumption areas. As & Ms, and other aspects based on insights from their own equipment monitoring, data analysis.	• A & Ms and other aspects based on insights from their own equipment monitoring, data analysis.	• Sustainable energy and related strategies.	• Sustainable energy and related strategies.
Operational Efficiency	• Energy Efficient equipment procurement for new facility and projects. Application of E2 monitoring/efficiency audit with respect to their existing equipment. • Shift optimization.	• Energy Efficient equipment procurement for new facility and projects. Application of E2 monitoring/efficiency audit with respect to their existing equipment. • Shift optimization.	• Energy Efficient equipment procurement for new facility and projects. Application of E2 monitoring/efficiency audit with respect to their existing equipment. • Shift optimization.	• Energy Efficient equipment procurement for new facility and projects. Application of E2 monitoring/efficiency audit with respect to their existing equipment. • Shift optimization.	• Energy Efficient equipment procurement for new facility and projects. Application of E2 monitoring/efficiency audit with respect to their existing equipment. • Shift optimization.
New technology introduction	• Adoption of alternate energy source for process heating. • E2 monitoring/efficiency audit with respect to their existing equipment.	• Based on the adoption of alternate energy source for process heating. • E2 monitoring/efficiency audit with respect to their existing equipment.	• Based on the adoption of alternate energy source for process heating. • E2 monitoring/efficiency audit with respect to their existing equipment.	• Based on the adoption of alternate energy source for process heating. • E2 monitoring/efficiency audit with respect to their existing equipment.	• Based on the adoption of alternate energy source for process heating. • E2 monitoring/efficiency audit with respect to their existing equipment.
Energy cost	• Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system.	• Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system.	• Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system.	• Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system.	• Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system. • Track adoption of cheaper power system.
Knowledge & Capability building	• Participation in external platforms. • Organizing training on energy efficiency and technologies.	• Participation in external platforms. • Organizing training on energy efficiency and technologies.	• Participation in external platforms. • Organizing training on energy efficiency and technologies.	• Participation in external platforms. • Organizing training on energy efficiency and technologies.	• Participation in external platforms. • Organizing training on energy efficiency and technologies.
Fixed cost reduction	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.
Standardisation	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.
Digitalization (E1, E2) and process automation (E1, E4)	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.	• E2 monitoring/efficiency audit with respect to their existing equipment. • E2 monitoring/efficiency audit with respect to their existing equipment.

Lever wise analysis of ideas

BEACON 8.0: ENERGY EFFICIENT PLANET

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		10 Days Cycling Challenge Start	Opening Ceremony Brief Lamp Lighting	Slogan Competition Save Energy, Save Money, Save the Planet	Brainstorming Sessions
19 Dec'22	20 Dec'22	21 Dec'22	22 Dec'22	23 Dec'22	24 Dec'22
KAIZEN 改善 EVENT Shop Rangoli Competition	Clash Of Minds	Lamp Lighting at Shop	Beacon Star Employee Award	Spot Quiz	Best Non Manufacturing Shop Award
26 Dec'22	27 Dec'22	28 Dec'22	29 Dec'22	30 Dec'22	31 Dec'22
Best Manufacturing Shop Award	Poster Competition for Families	30 KM cycle rally	Tree Plantation @ Supplier End	Reserve Day	Reserve Day
2 Jan'23	3 Jan'23	4 Jan'23	5 Jan'23	6 Jan'23	7 Jan'23
Reserve Day	Reserve Day	Nukkad Natak	Tree Plantation	Energy Shutterbugs	Tree Plantation with Family
9 Jan'23	10 Jan'23	11 Jan'23	12 Jan'23	17 Jan'23	
Innovative QC Story Award	Technological day	TATA MOTORS ENERGY CHAMPION AWARD for Suppliers	GAME TIME!	Winners Announcement	
Quiz for all categories		Expert Session			

BEACON 8.0

Preserve, Conserve and Sustain Smartly

Clash Of Minds

... Debate Competition

Enter to Win!

Participants : Operators (Permanent/Temporary)/ST/SO/DET
 Date:- 29.12.2022
 Venue:- SuperAce Conference Room, New Admin Building
 Time:- 12:00 PM-02:00 A(Shift)
 3:00 PM- 05:00 PM (B Shift)

Queries????
 Pl Contact - 7617565918

Send Nominations along with Shop & T.No. >> Samarendra.Patro@tatamotors.com

BEACON 8.0

10 DAYS CYCLING CHALLENGE

- 1) For Cyclists, entry & exit should be from Gate No 4 Only.
- 2) Must carry all safety PPEs while cycling - Helmet, Reflector, Binkers etc.
- 3) Max speed limit 20Kmph.
- 4) Only working days of G-shift will be counted for the challenge.
- 5) Winners will be felicitated with awards at the end of the challenge.



From 14th Dec to 14th Jan 2023
 Nominations date: 14th Dec to 14th Jan 2023

Mr. Devesh Patro
 Mr. Pankaj Ramani

Preserve, Conserve and Sustain Smartly

Let's take a step towards energy conservation ☺. Challenge yourself to save fuel for ten days. Use bicycle to travel because one day oil will be costlier than gold!

BEACON 8.0

Energy Efficient Planet

Takeaways from BEACON 8.0 Event

- A month long celebration, Competition and Awareness campaign starting from / Energy Conservation Week 14th Dec to 14th Jan 2023
- Creates a **sense of urgency** among all employees to act towards **Energy Efficiency and Conservation**
- Competition among employees and shops , Reward & Recognition **encourage** employees to **drive Energy Efficiency at their shop floors** and personal lives alike.
- **Cycling challenge** encourages employees to follow a healthy and carbon free lifestyle
- **Manufacturing/Non-Manufacturing Shop competition** encourages all shops/divisions to work towards energy efficiency throughout the year
- **Technology Day** facilitates all stakeholders including suppliers and vendors to explore new opportunities of Energy Efficiency

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 interaction with suppliers for the same

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)

Target Setting –short term & Long term targets
Science-based Target approach for GHG reduction

Science-based targets show companies how much and how quickly they need to reduce their greenhouse gas (GHG) emissions to prevent the worst effects of climate change. Targets are considered ‘science-based’ if they are in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement – limiting global warming to well-below 2°C above pre-industrial levels and pursuing efforts to limit warming to 1.5°C.

We used SBTi tool to target our GHG emission level. SBTi defines and promotes best practice in science-based target setting. Offering a range of target-setting resources and guidance, the SBTi independently assesses and approves companies’ targets in line with its strict criteria.

We are committed to demonstrating that creating a climate-secure world goes hand-in-hand with successful business operation. Below is the snapshot of the target setting window on *scienbasedtarget.org*

SCIENCE BASED TARGETS
Version 1.0 | Feb-19 | Support: info@sciencebasedtargets.org | Contact: target@wwtmot.org

Sector / Industry: Vehicle manufacturing (PLDV)

Section 1. Enter target details

Select a base year: 2018
Select a target year: 2025

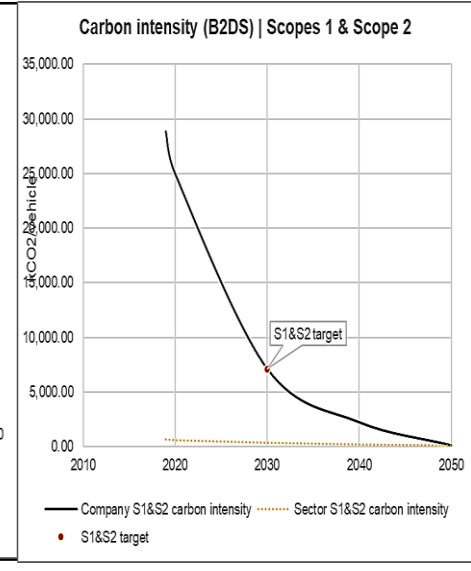
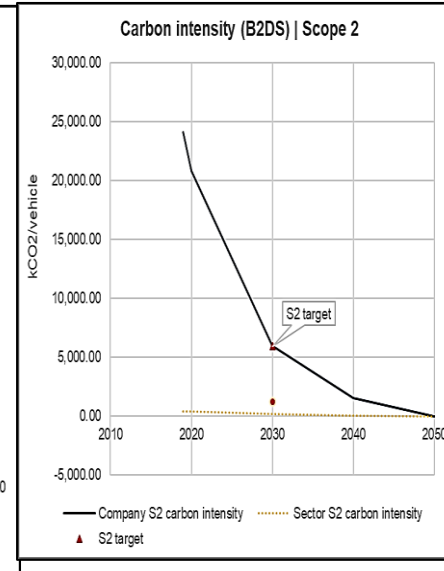
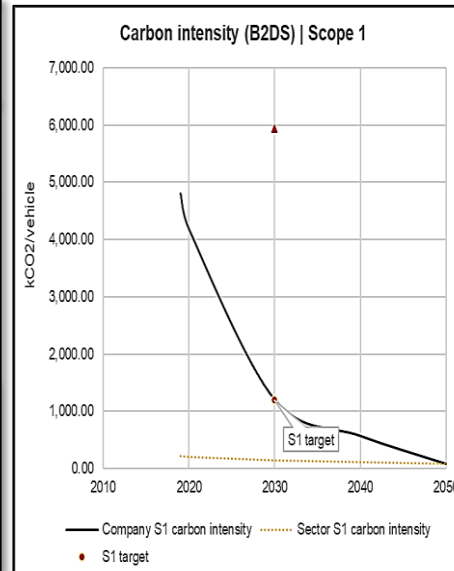
Activity in base year: 2,01,078 units sold
Expected activity in target year: 2,79,765 units sold
Scope 1 carbon intensity in base year: 33.30 kgCO2/vehicle
Scope 2 carbon intensity in base year: 143.36 kgCO2/vehicle

Section 2. Review target modelling results

Target modelling results - B2DS

Sector information		2018 - 2025	
Sector growth rate - B2DS (units sold)			0.57%

Sectoral Decarbonization Approach		Base year 2018	Target year 2025	% Reduction 2018 - 2025
Vehicle manufacturing (PLDV)	Scope 1 carbon intensity	kgCO2/vehicle	33.30	55.67 (67.19%)
	Scope 2 carbon intensity	kgCO2/vehicle	143.36	68.63 (52.13%)
	Scope 1 & Scope 2 carbon intensity	kgCO2/vehicle	176.66	126.94 (28.14%)



GHG Intensity 5 Year Glide Path – UTK till FY 2024-25 as per SBTi Tool

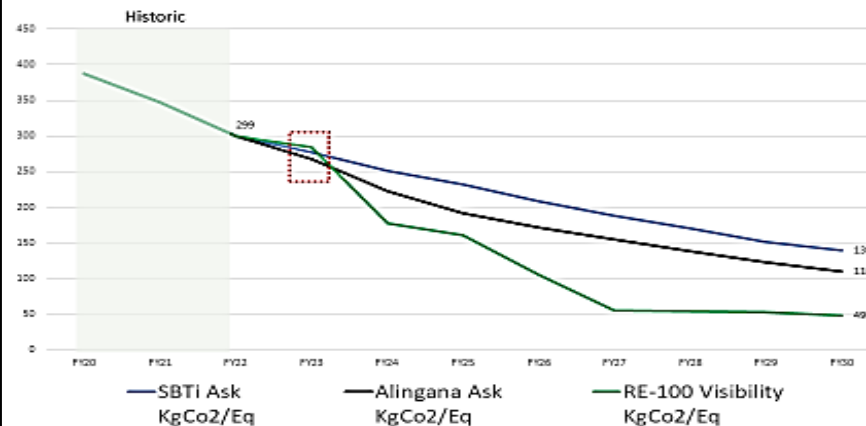
CV Plants - FY23 GHG (Scope 1 + 2) related target

TATA MOTORS
Connecting Aspirations

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%

Alingana Vs SBTi Vs RE-100 (Intensity)

TATA MOTORS
Connecting Aspirations



- 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

MOREWHEN ONE

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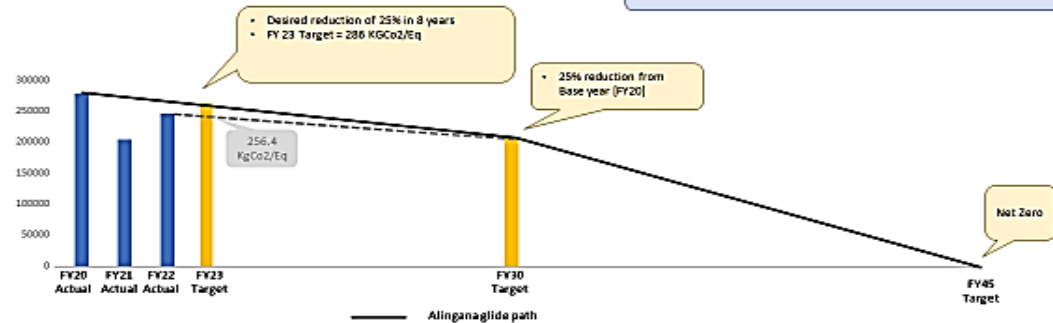
Target setting basis Alingana

TATA MOTORS
Connecting Aspirations

- 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
CV Intensity	396	344	298	283

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



MOREWHEN ONE

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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

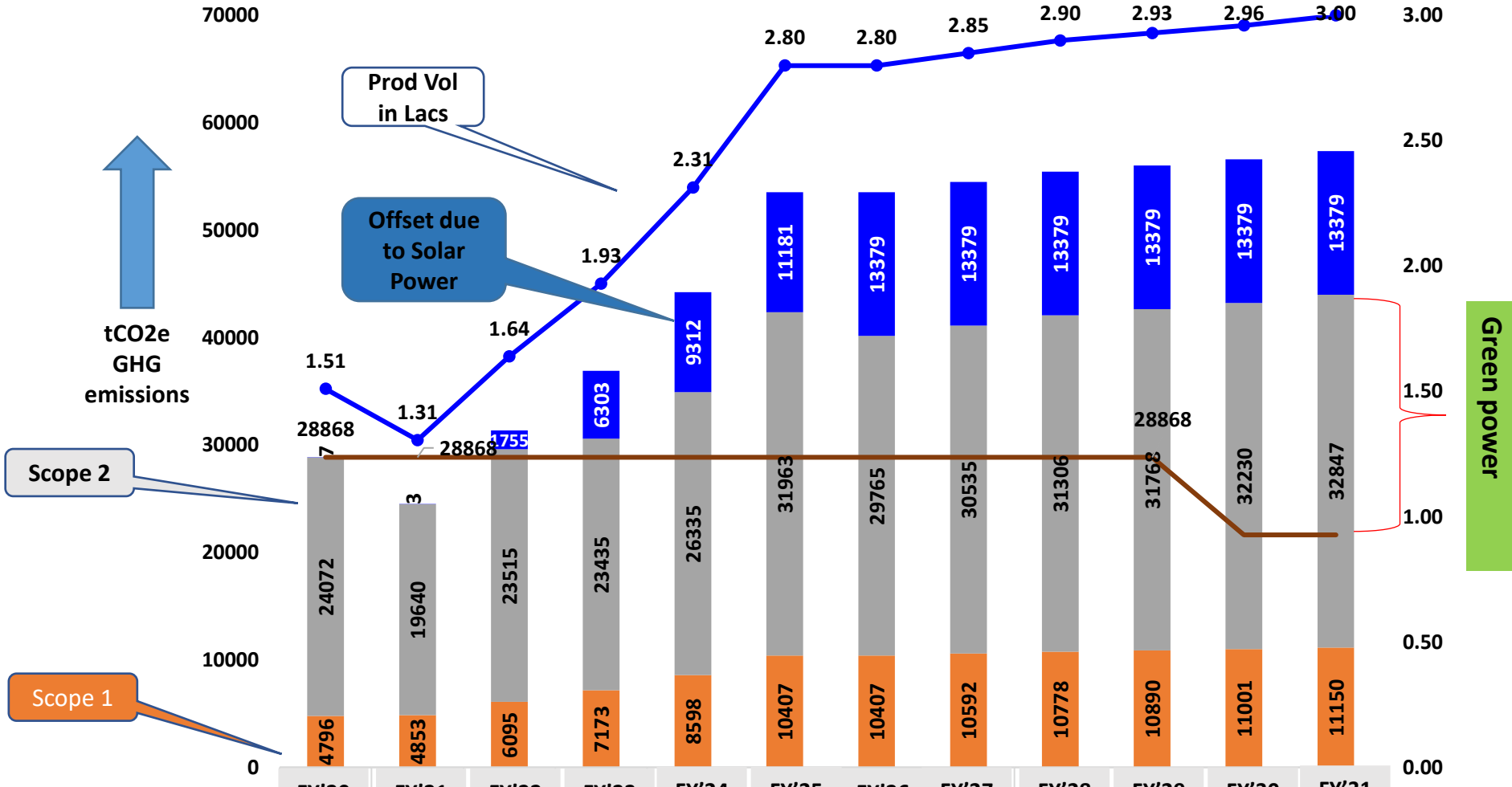
Livemint

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



FY2023 GHG Reduction Activities

- Additional 01 MWp installed. Total solar 7 MWp
- Industry 4.0 in Paint Shop and other shops
- Transition of CED paint from CG500 to CG800
- Installation of IFC at Paint Shop Compressor
- DO based Automatic Aeration system
- VFD for ETP
- 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
- AC, Street light and AHU timing Change
- Charging of TCF-1D shop from TCF-1C instead of Main line:- To reduce compressed air leakage as well line loss:- 50Kwh/Day.



	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 adjustment)(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

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

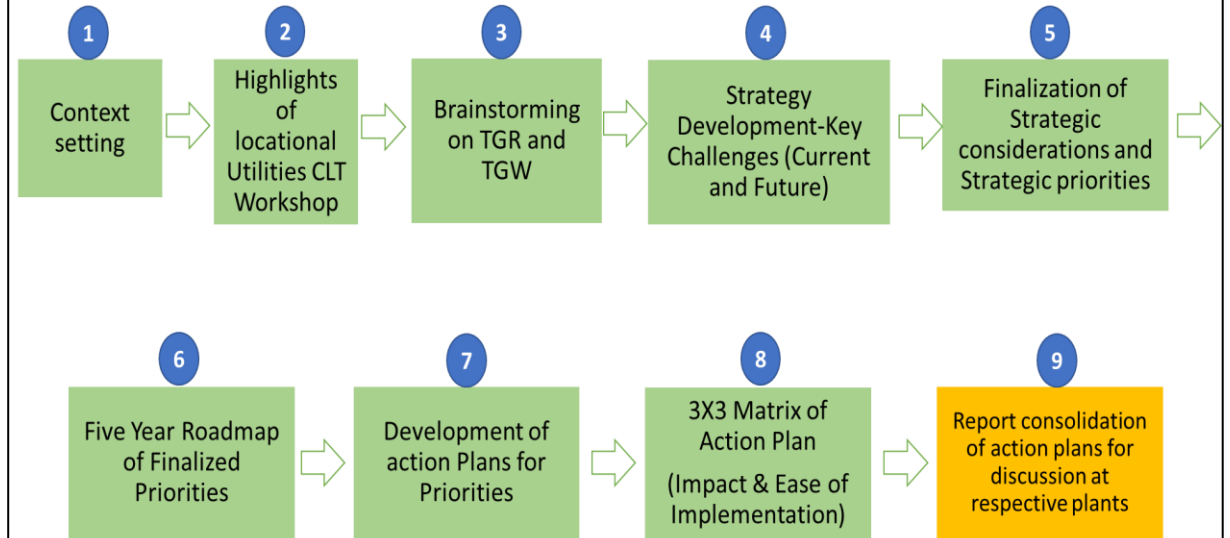


Team 4	
Iliyas Ahmed	UTK
Vipin Jain	UTK
Ravi Sharma	DWD
Ramit Dutt	JSR
Devesh Pant	UTK
Kapil Sharma	UTK

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

2

CLT Utilities Workshop Workflow



Key highlights of CLT Strategy Workshop

Summary

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

Levers	Roadmap for Year wise Priorities				
	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. Sustainance of actions and realized savings.	1. Sustainance 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 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.	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, EY , 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	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 .

Awards & Accolades

2015

- Green CO Gold rating 2015
- Golden Peacock Environment Management award 2015

2016

- Golden Peacock Environment Management award 2016

2017

- Excellent Energy Efficient Unit
- CII National Energy Management Award 16-17
- Winner- Innovative Project
- CII Energy Efficiency Circle Competition 2017-18

2018

- Green-Co Platinum Rating 2018
- Golden Peacock Award in Energy Efficiency 2018
- CII National Energy Leader Award 2018
- CII National Energy Management Award 17-18
- Excellent Energy Efficient Unit

2019

- 1st Runner-up - 6th CII NR EHS Competition 2019
- CII National Award for Excellence in Energy Management 2019
- Winner of overall SHE performance at TML Group level (CV)

2020

- 21st National Award for Excellence in Energy Management 2020
- 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

2021

- 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

2022

- 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

2023

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