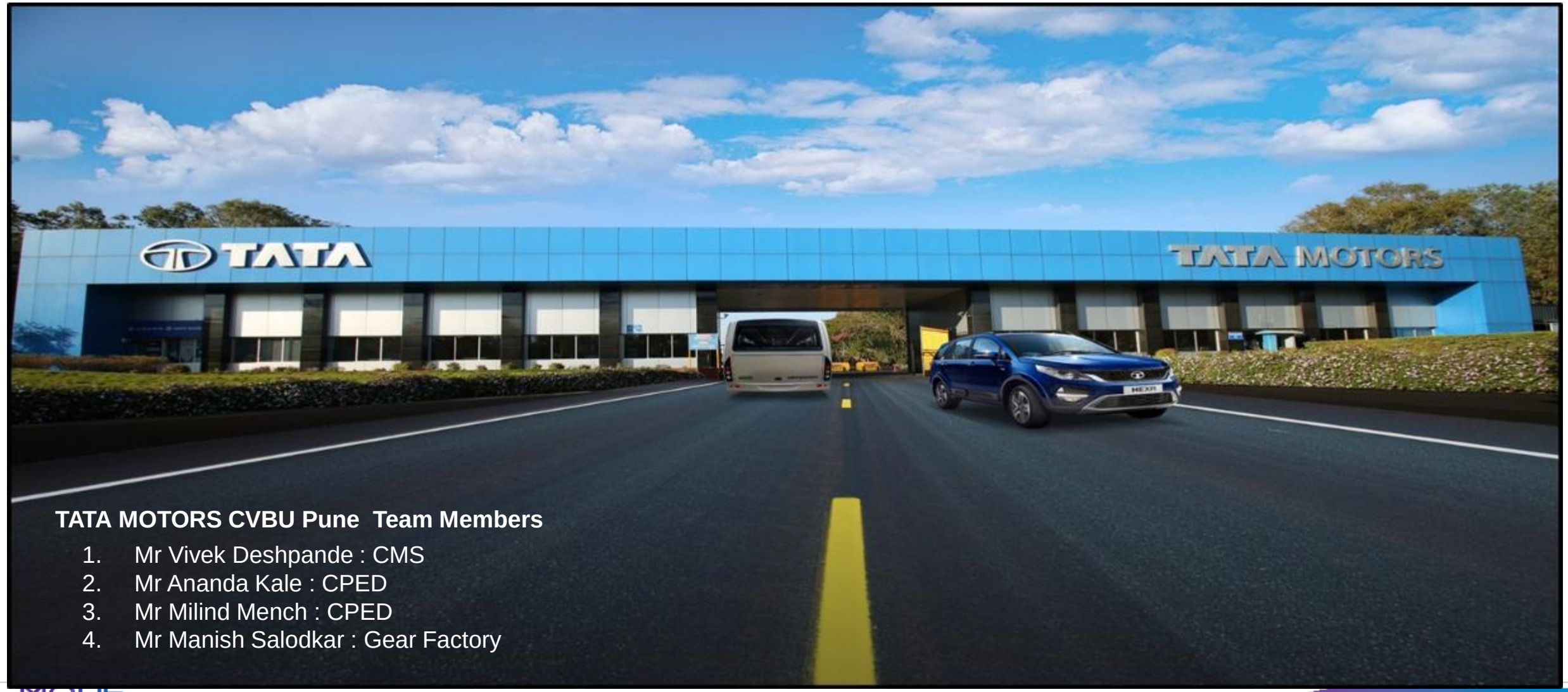
# CII – 23rd National Award for " Excellence In Energy Management - 2022"

TATA MOTORS
Connecting Aspirations




**TATA MOTORS CVBU Pune Team Members**

1. Mr Vivek Deshpande : CMS
2. Mr Ananda Kale : CPED
3. Mr Milind Mench : CPED
4. Mr Manish Salodkar : Gear Factory

## 1. Brief introduction on Company/Unit

# Our Purpose

**We Innovate Mobility Solutions With Passion To Enhance Quality Of Life**

## 1. Brief introduction on Company/Unit

# Our Products

### Ultra Truck

### CONSTRUCK

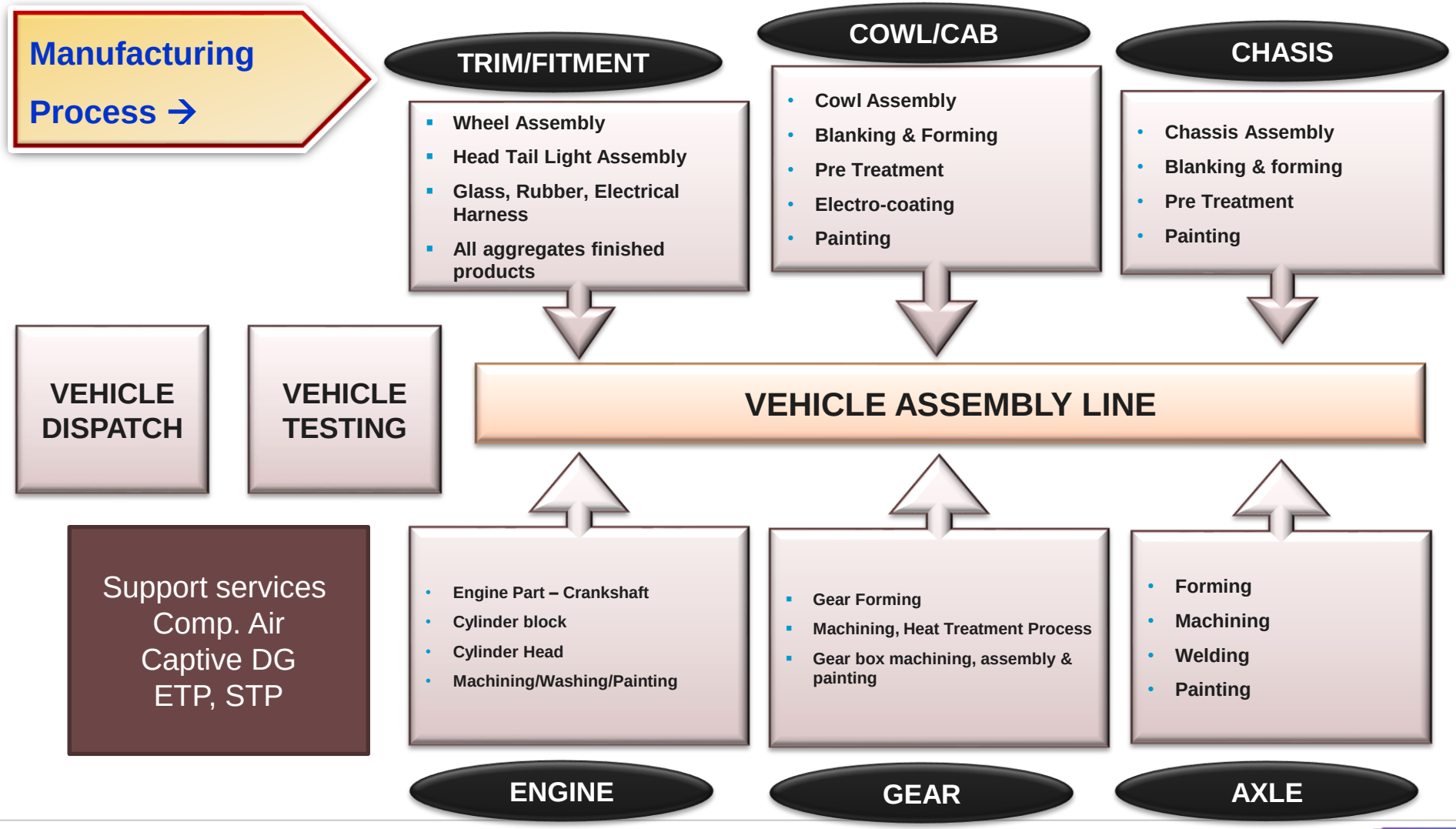
### TATA Buses

### Xeon Pickup

### Defense Truck

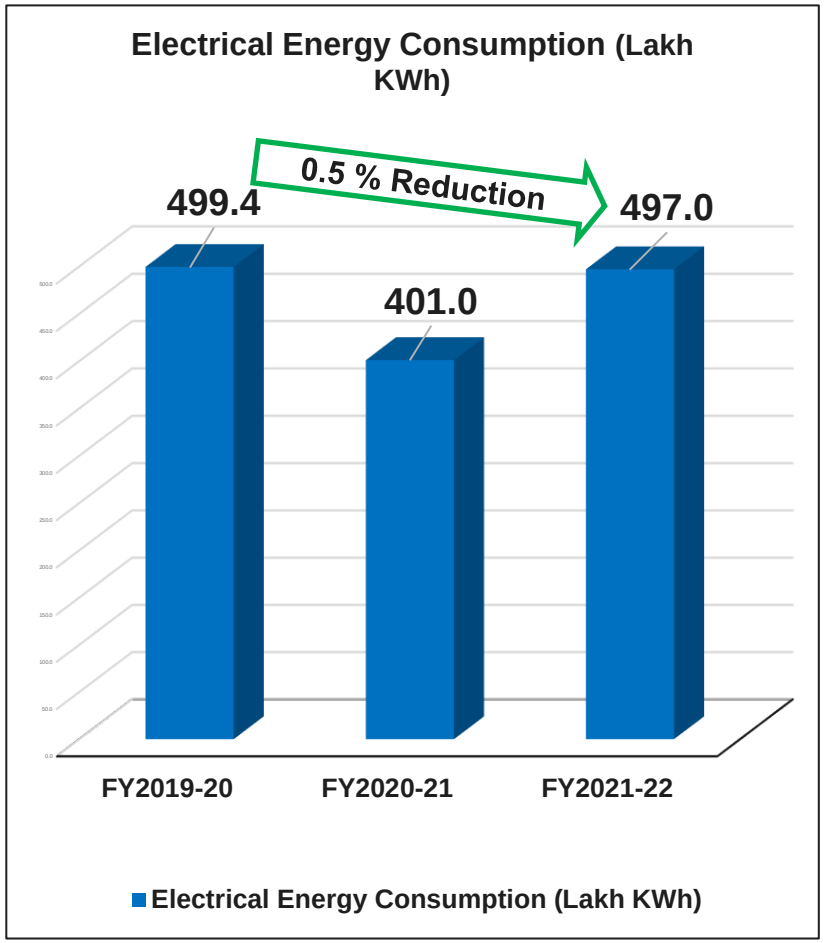
### Winger

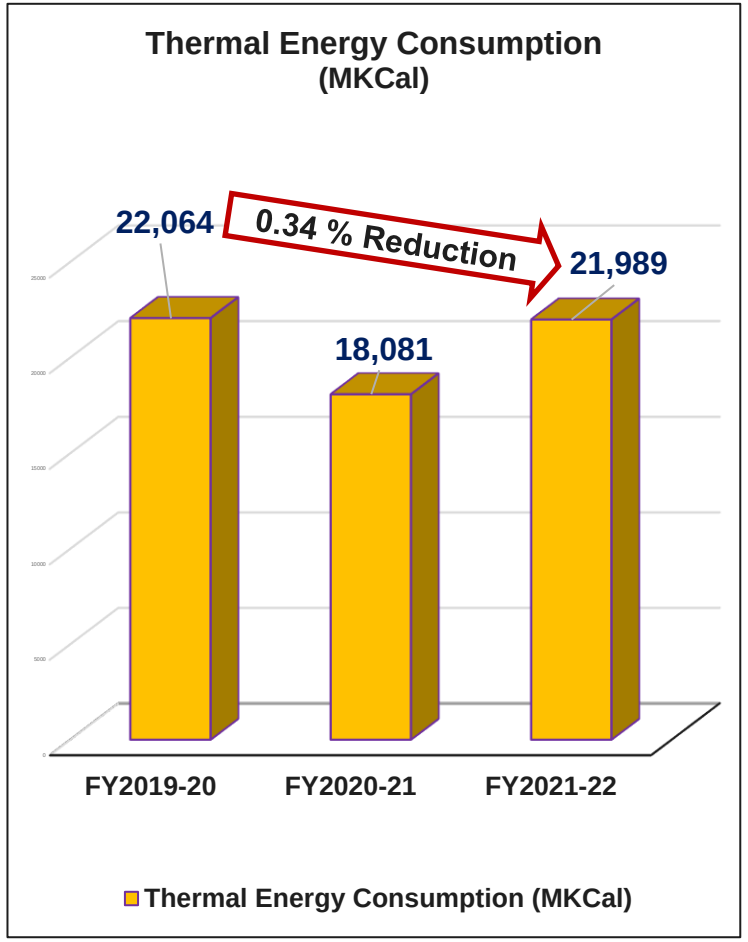
# 1. Brief introduction on Company/Unit

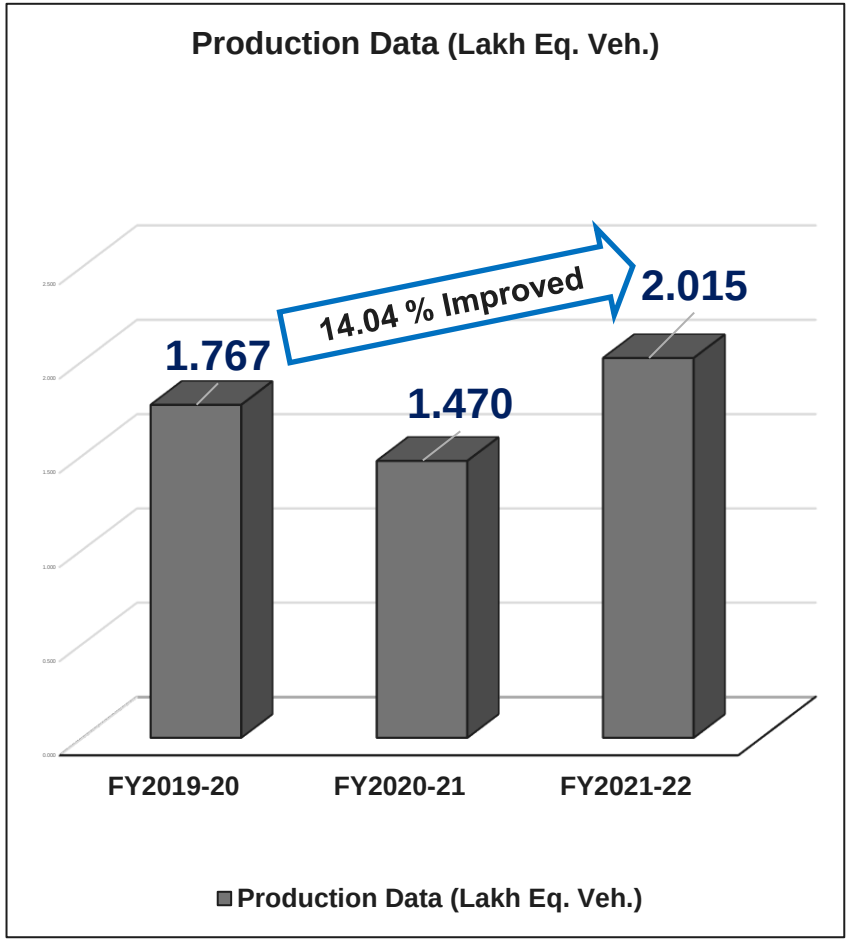


## 2. Energy Consumption Overview

# Overall Energy Consumption and Production Data FY2018 - 2021



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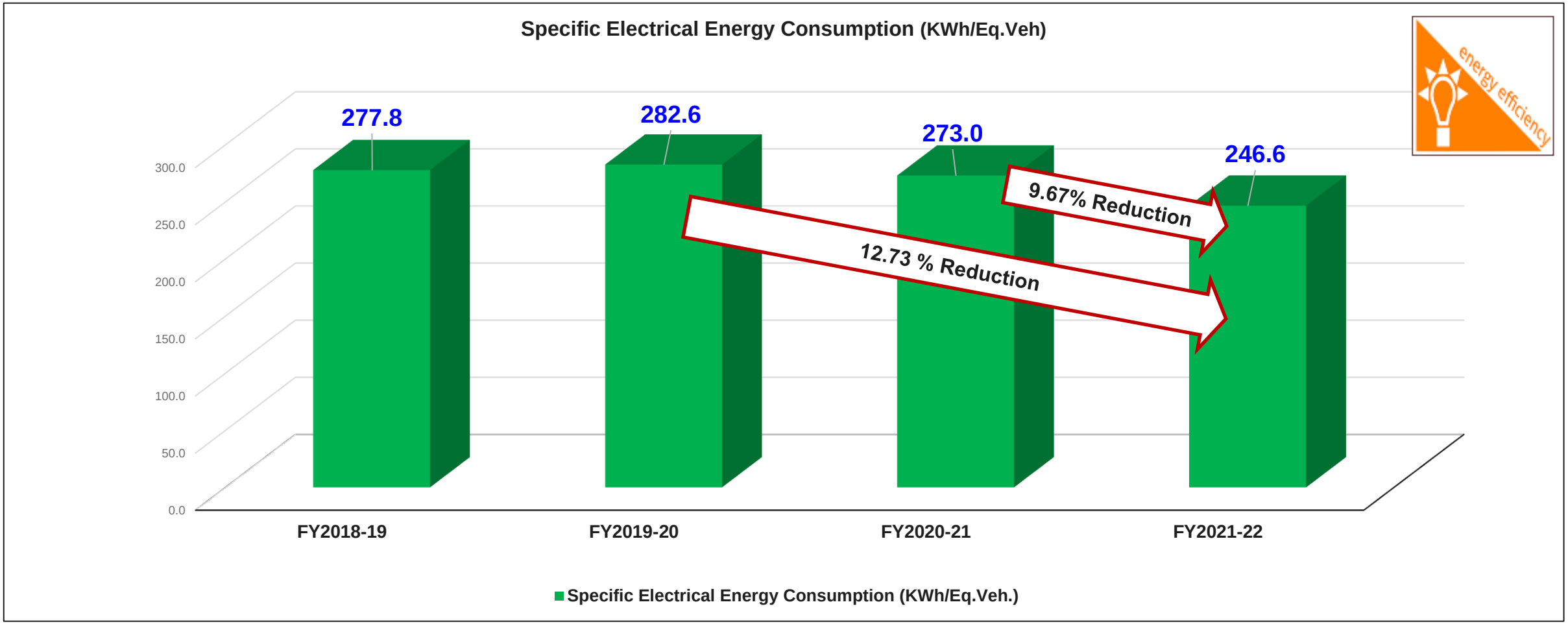
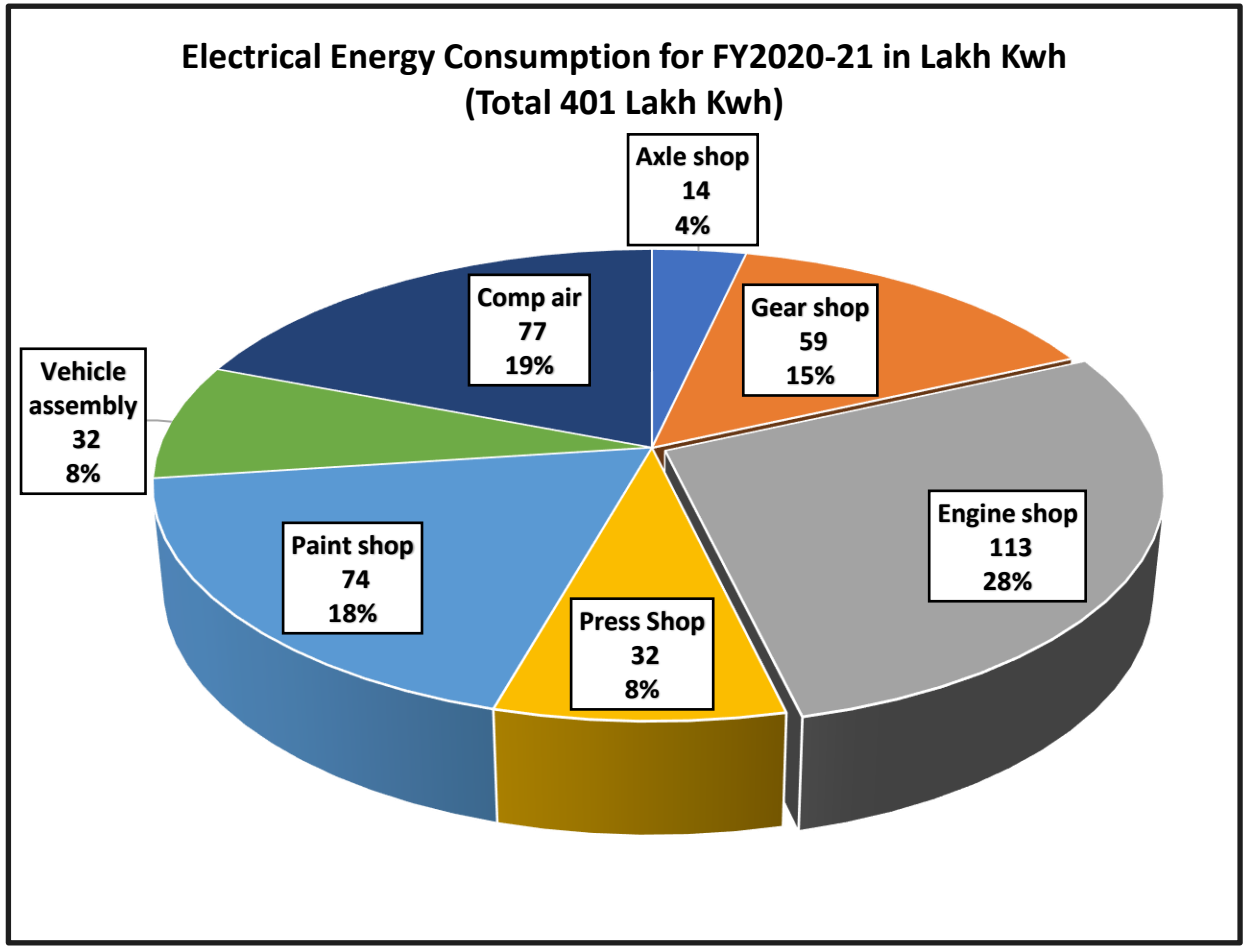
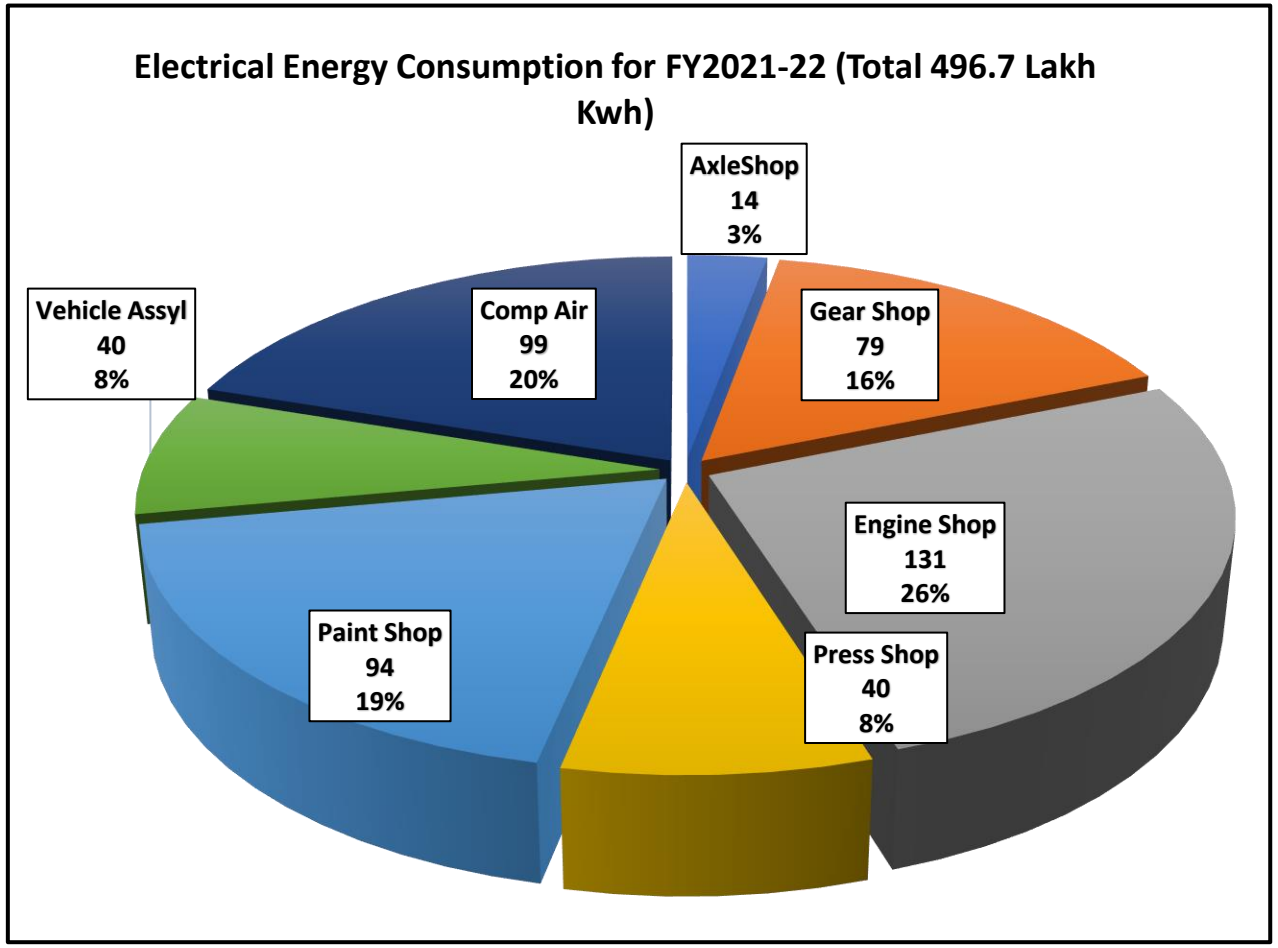


# 2. Energy Consumption Overview

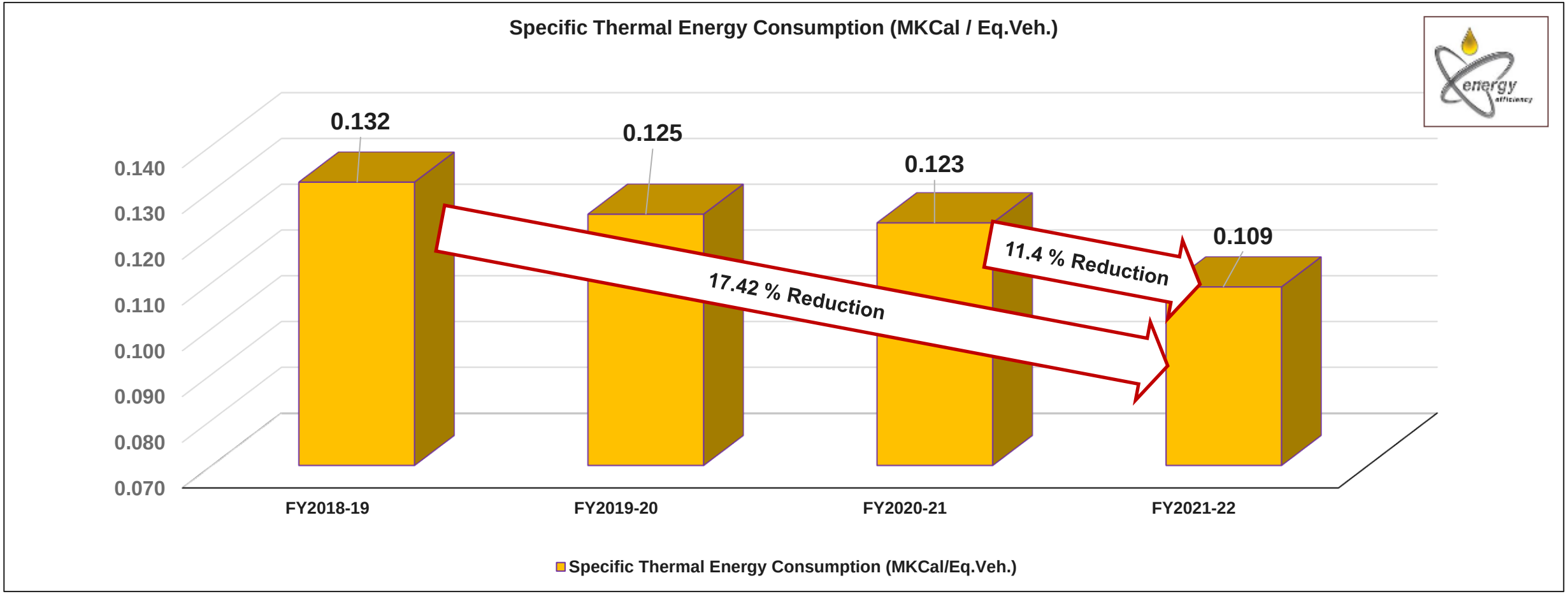
## Process wise Electrical Energy Consumption FY2019 - 20




## Process wise Electrical Energy Consumption FY2021 - 22

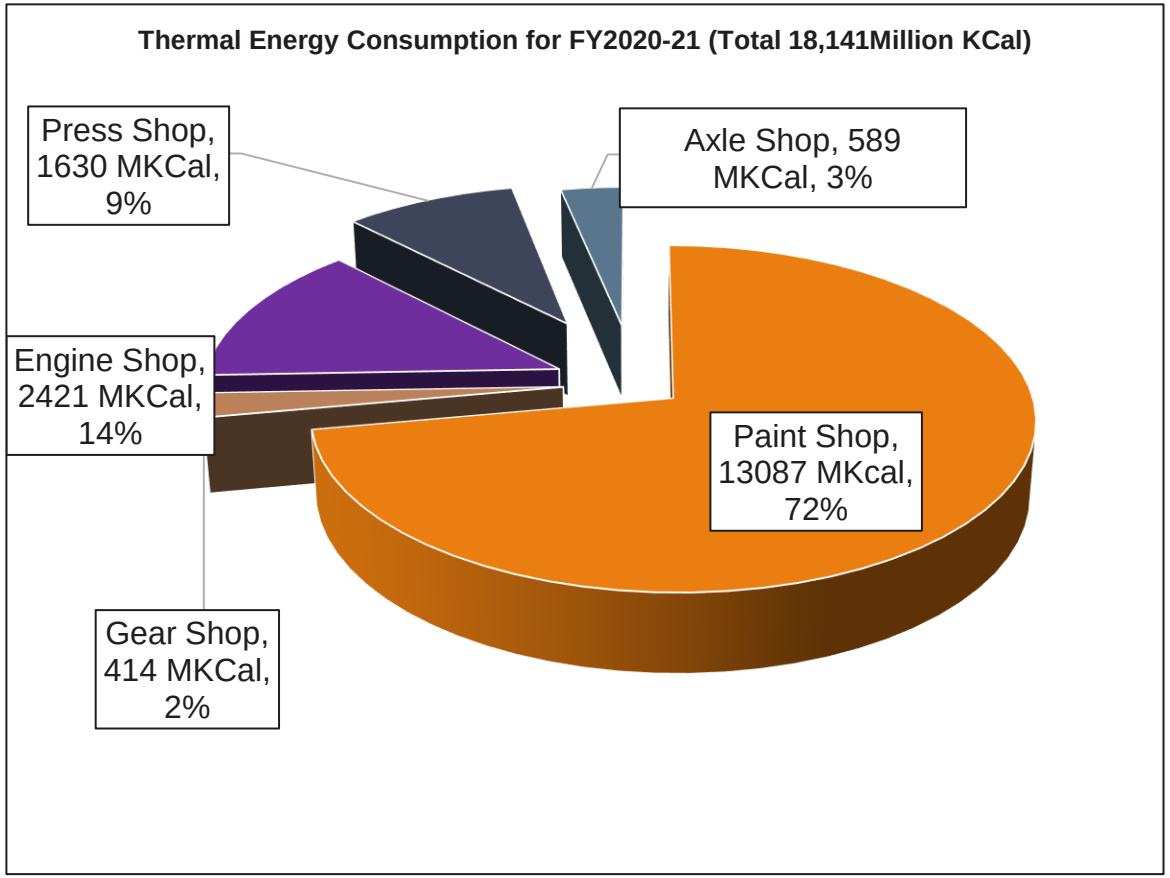


# 3. Specific Energy Consumption in Last 3 Years - Thermal

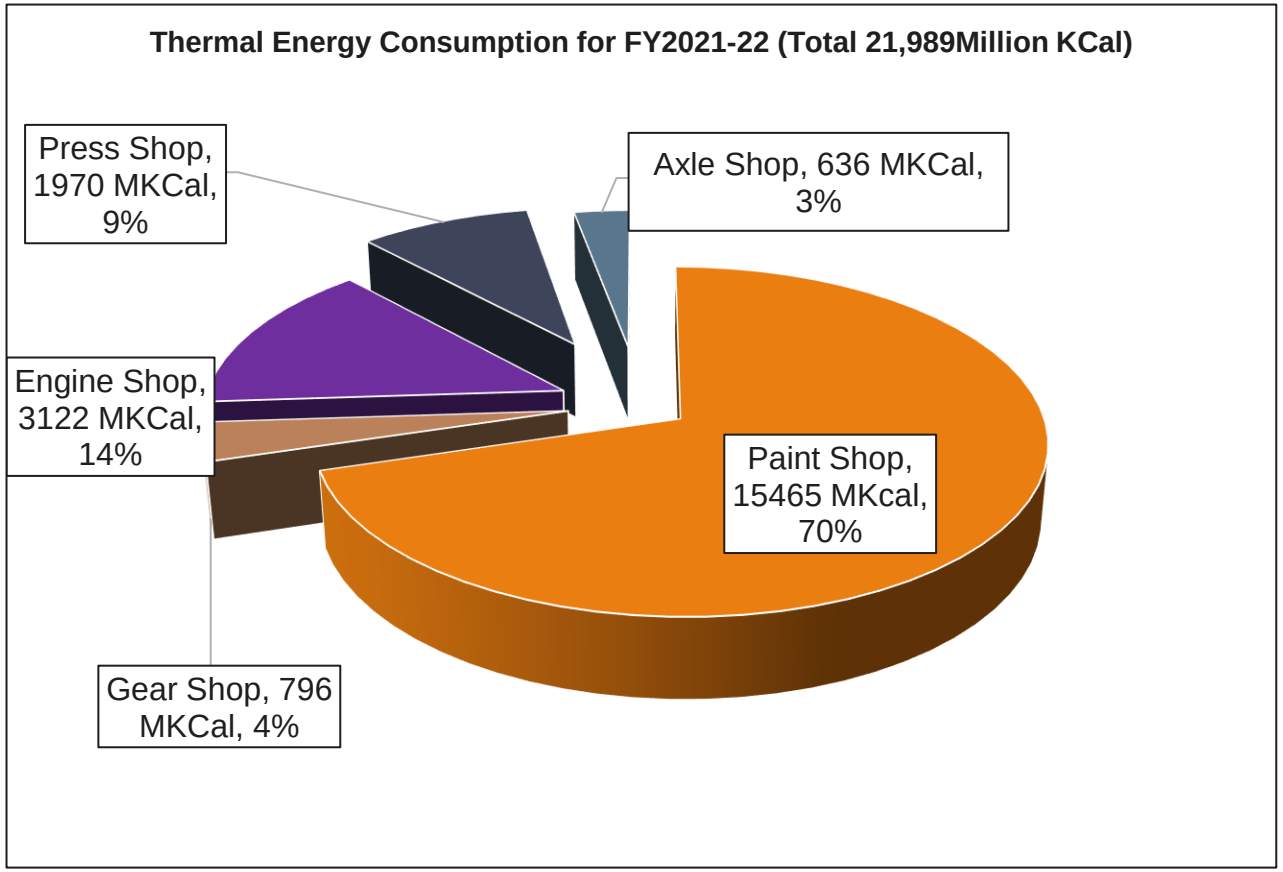


# 3. Specific Energy Consumption in Last 3 Years - Thermal

## Process wise Thermal Energy Consumption FY2020 - 21

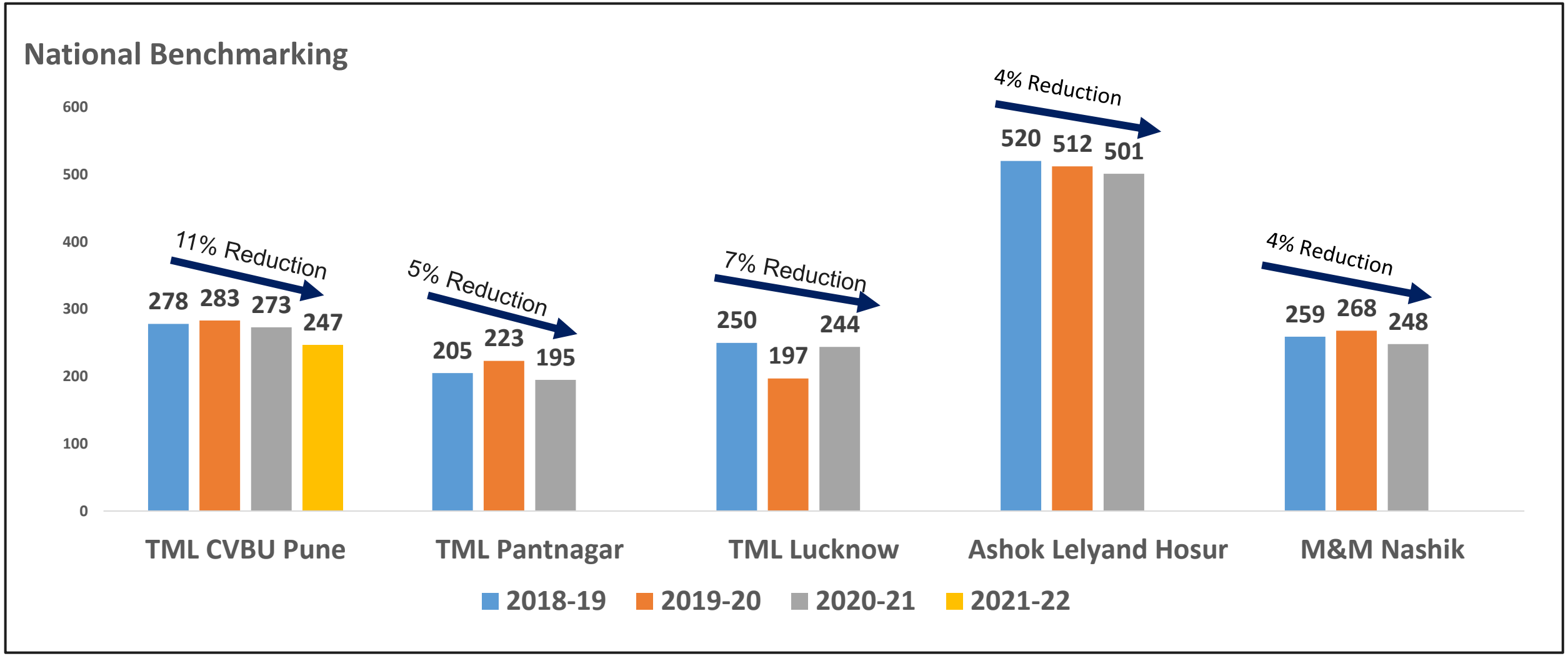



## Process wise Thermal Energy Consumption FY2021 - 22

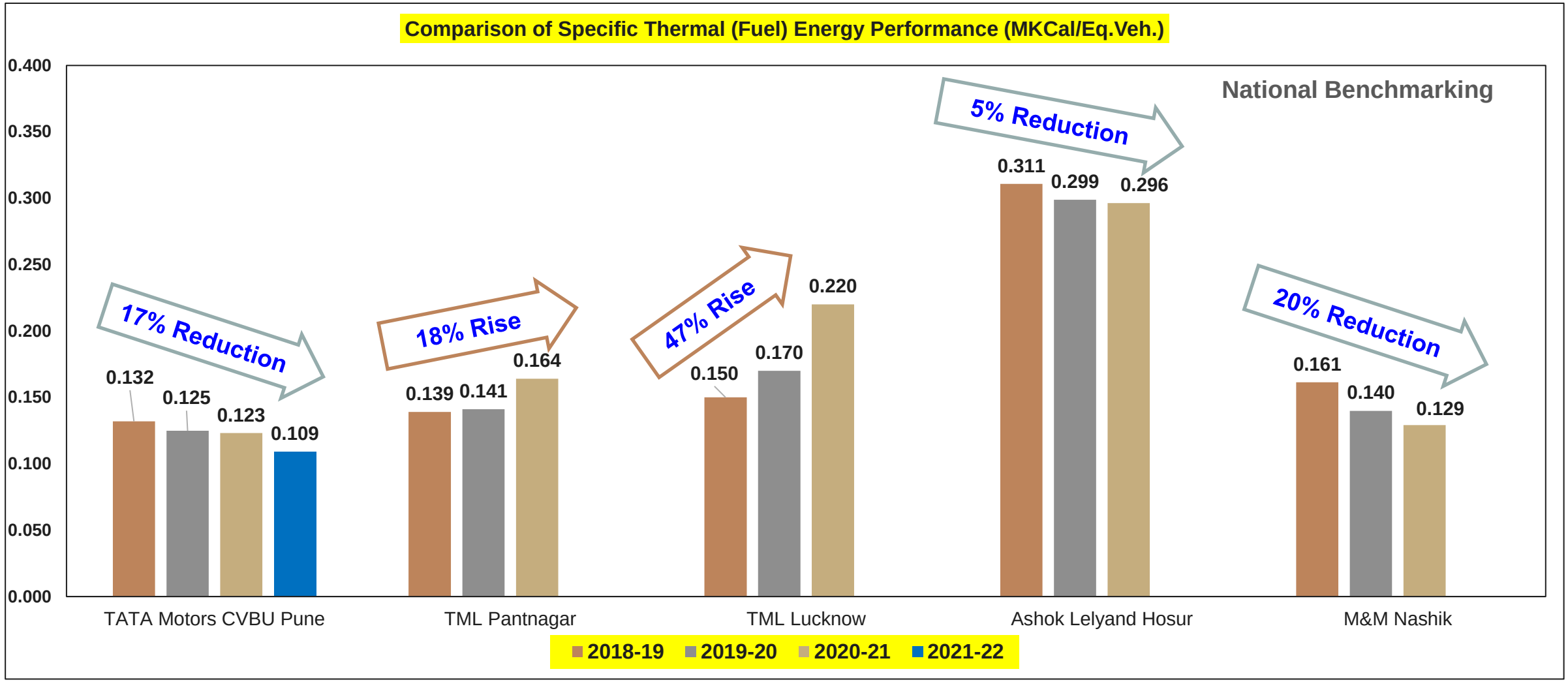


# 4.0 BENCHMARKING

## 4. Information on Competitors, National & Global Benchmark



# 4. Information on Competitors, National & Global Benchmark



## 4. Information on Competitors, National & Global Benchmark

# Global Benchmark

TATA Motors CVBU Pune Energy performance is better than its Global competitors but still we would like to highlight the following aspects

- Apple to apple comparison is very difficult to compare
- Manufacturing models are different, eg. In CVBU Pune, we are having all manufacturing processes.
- Climatic conditions varies

## 4. Information on Competitors, National & Global Benchmark

### Roadmap to achieve Benchmark / Global Best :-

TATA Motors CVBU Pune Plant will continue to refine all process to achieve Benchmark Level.

### To Sustain the Best Achieved Level :-

We are following robust process of assessment of performance vis-à-vis comparative information / benchmark from different organisation and standards.

### Roadmap :-

- ❑ Intelligent management-Optimise and effective use of Resources
- ❑ IOT / Machine management - Adapt Latest Technology
- ❑ Lean manufacturing and Processes Management - Innovations
- ❑ Clean resources - Maximise Renewable Energy
- ❑ GHG Management - Reduce Carbon Footprint
- ❑ Real-time Monitoring and analysis

## 4. Information on Competitors, National & Global Benchmark

# Roadmap

| | | | | |
|---|---|---|---|---|
| • Realign the Processes<br>• Continual process improvement | • ECO (Machines IDLE run optimization)<br>• CNC / Robotic Technology<br>• RTPFC – Unity PF<br>• IoT – industry 4.0 | • Sensor Technology<br>• Process Optimization<br>• Energy Bank Concept | • 22MW captive Wind Power + Additional wind 18 MW & Solar 17MWp Third Party Purchase.<br><br>• 4.5 MW Rooftop Solar Power | |
| • Improve to the MOP (measurement of Performance) up to 400 | • HVLS Fans<br>• Room temp washing<br>• Day light utilization technology. | • Conversion of LDO to NG for Pretreatment | • 80 % Achieved for CVBU Pune | |
| • Adapt Cleaner Fuel Eg. LDO to NG | • Lighting management and standardization. | • WHRS(Waste Heat Recovery System) in Engine Test Beds | • Signed RE100.<br>• GHG Management - 5 Year Road Map. | |
| **Optimize Resources** | **Adapt Latest Technology** | **Innovations** | **Maximize Renewable Energy** | **Reduce Carbon Footprint** |

## 5. Energy Saving Projects Implemented in Last Three Years

❑ **Summary of Project Implemented in Last Three Years**

| Year | No of Proposals | Investments (Rs. Million) | Savings (Rs. Million) | Payback Months |
|---|---|---|---|---|
| **2019-20** | 14 | 12.8 | 28.9 | 5 |
| **2020-21** | 20 | 12.4 | 32.5 | 5 |
| **2021-22** | 23 | 5.492 | 17.25 | 4 |
| **Total** | **57** | **30.692** | **78.65** | **5** |

## 5. Energy Saving Projects Implemented in Last Three Years

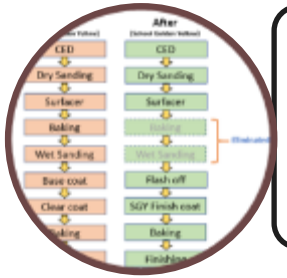
❑ List of Major Implemented Energy Conservation Projects_**FY2021-22**

**CED Inspection and Underbody Booth Supply and exhaust Fan Working Modification**

- Energy Cost Saving → **Rs. 5.89 Lakh**
- Investment → Nil (Zero Investment Project)
- Total kwh saving→ **76000 kwh/Year**

**Moist sanding booth Equipment working optimization**

- Energy Cost Saving → **Rs. 5.66 Lakh**
- Investment → Nil (Zero Investment Project)
- Total kwh saving→ **73000 kwh/Year**




**2C-1B For yellow ,Artic white color to reduce 3 Coat cycles**

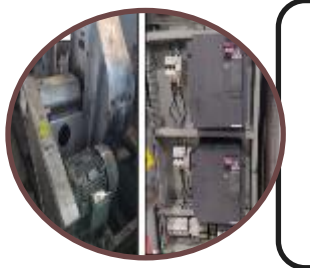
- Energy Cost Saving → **Rs. 8.04 Lakh**
- Investment → Nil (Zero Investment Project)
- Total kwh saving→ **103000 kwh/Year**

## 5. Energy Saving Projects Implemented in Last Three Years

❑ List of Major Implemented Energy Conservation Projects_**FY2020-21**

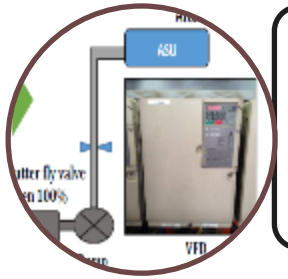
**Electrical heating to CNG conversion (Total 5 Machines converted to NG)**

- Energy Cost Saving → **Rs. 26.33 Lakh**
- Investment → **Nil**
- Total kwh saving → **2,82,000 kwh/Year**



**REDUCING ENERGY CONSUMPTION OF PERFORMANCE TEST BED BY LOWERING SPEED OF BLOWER SPEED (16 no's VFD installed).**

- Energy Cost Saving → **Rs. 27.56 Lakh**
- Investment → **Rs. 8 Lakh**
- Total kwh saving → **3,32,448 kwh/Year**




**ELIMINATION OF PUMP THROTTLING AT J11/J12 PAINT SHOP(Modulation of pump flow with VFD)**

- Energy Cost Saving → **Rs. 19.73 Lakh**
- Investment → **NIL**
- Total kwh saving → **2,12,585 kwh/Year**

## 5. Energy Saving Projects Implemented in Last Three Years

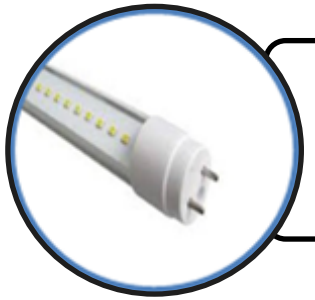
List of Major Implemented Energy Conservation Projects _ **FY2019-20**

**New Technology - Replaced CL666 & installed new Cylinder Block Honing (Servo-controlled system without Hydraulics).**

- Energy Cost Saving → **Rs. 5.5 Lakh**
- Investment → **Rs. 5 Lakh**

**Converting Nos. of Sodium Vapour Lamps to Highbay LEDs - High bay lamps to convert to LED Qty 1579 Nos.**

- Energy Cost Saving → **Rs. 106.93 Lakh**
- Investment → **Rs. 105.78 Lakh**



**Conversion of 36W Tube light to 18W LED Tube - Qty 787 nos.**

- Energy Cost Saving → **Rs. 7.89 Lakh**
- Investment → **Rs. 3.15 Lakh**

# 6.Innovations

## 6. Innovation 1 – Heat Treatment Furnace Analytics


# INNOVATION 1

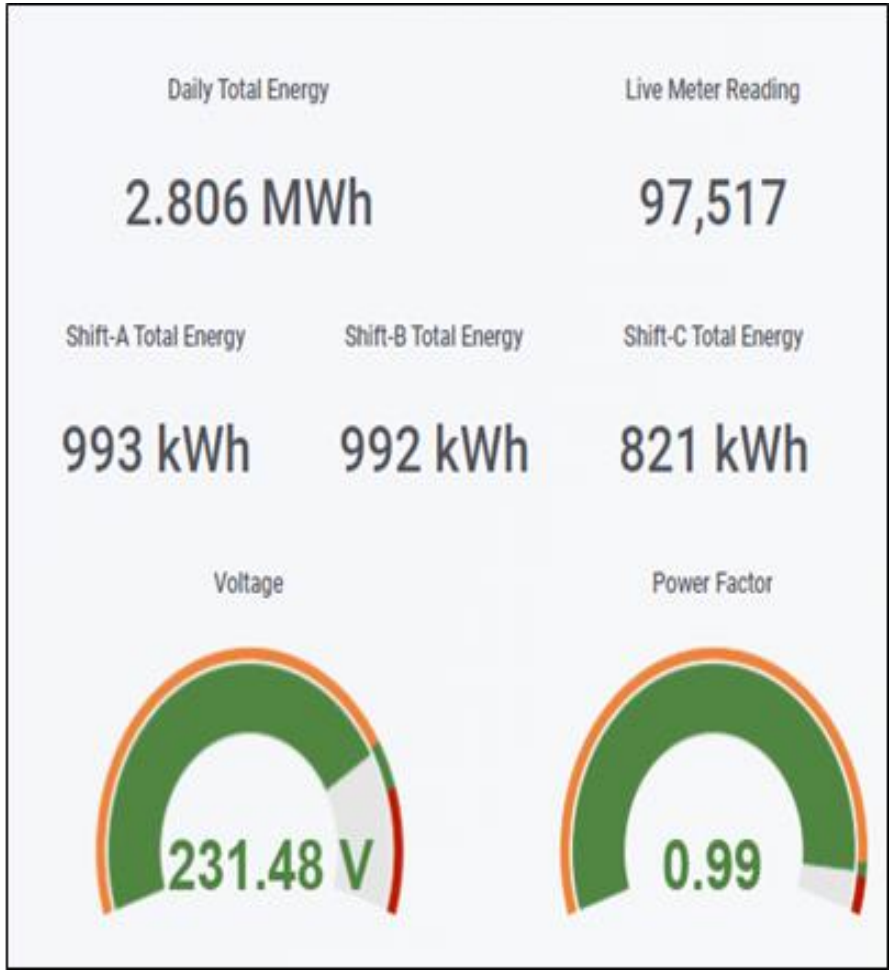
## Hear Treatment Furnace Analytics – CCHF4 Furnace

## 6. Innovation 1 – Heat Treatment Furnace Analytics

**Project Overview:** Reduction of energy consumption of Heat treatment using online real-time energy monitoring and analytics.

### Brief Outline of the Project:

- Micro level monitoring :
  - Equipment level energy loss identification.
  - Overall Equipment Efficiency (OEE).
  - Full load vs ideal consumption.
  - Specific power consumption per kg part produced.
- Alarms for critical events and equipment running status.
- Regression related analytics for prediction of energy consumption w.r.t production plan.



## 6. Innovation 1 – Heat Treatment Furnace Analytics

### – ROAD MAP-DIGITIZATION

**The digitization planned in three phases:**

- Phase 1: Preparing machines/Equipment for providing necessary data.
- Phase 2: Data Monitoring : Connecting machines to server and storing the data in the Data Server.
- Phase 3: Data Analytics further Linkage to Production Planning and Control.

**Prioritization of Area / Categories where it can be implemented:**

- **Plant wise selection of Category :**
  - Process wise category: Heat treatment, Painting, Machining and Assembly.
  - Substation Level and Distribution Level (LTDB Panel).
  - Equipment Level (Parameters Monitoring and Analysis i.e. EnMS, OEE, Productivity etc.)
- **Plant wise cost / impact analysis.**
  - VCC Energy Monitoring and Analysis.
  - Equipment Operation Maintenance Cost Analysis

## 6. Innovation 1 – Heat Treatment Furnace Analytics

### – Project Planning and Execution

### POC : CCHF04 Project Details:

Area Selection:

- CCHF04 Furnace is significant Equipment in Heat treatment area and Running 24/7.

Vendor Selection:

- Approach 2 to 3 Vendors and Selected M/S TATA POWER as a integrator.

Project Duration:

- 10 Months (March 2021 to Dec 2021).

Project Planning and Scheduling Activities:

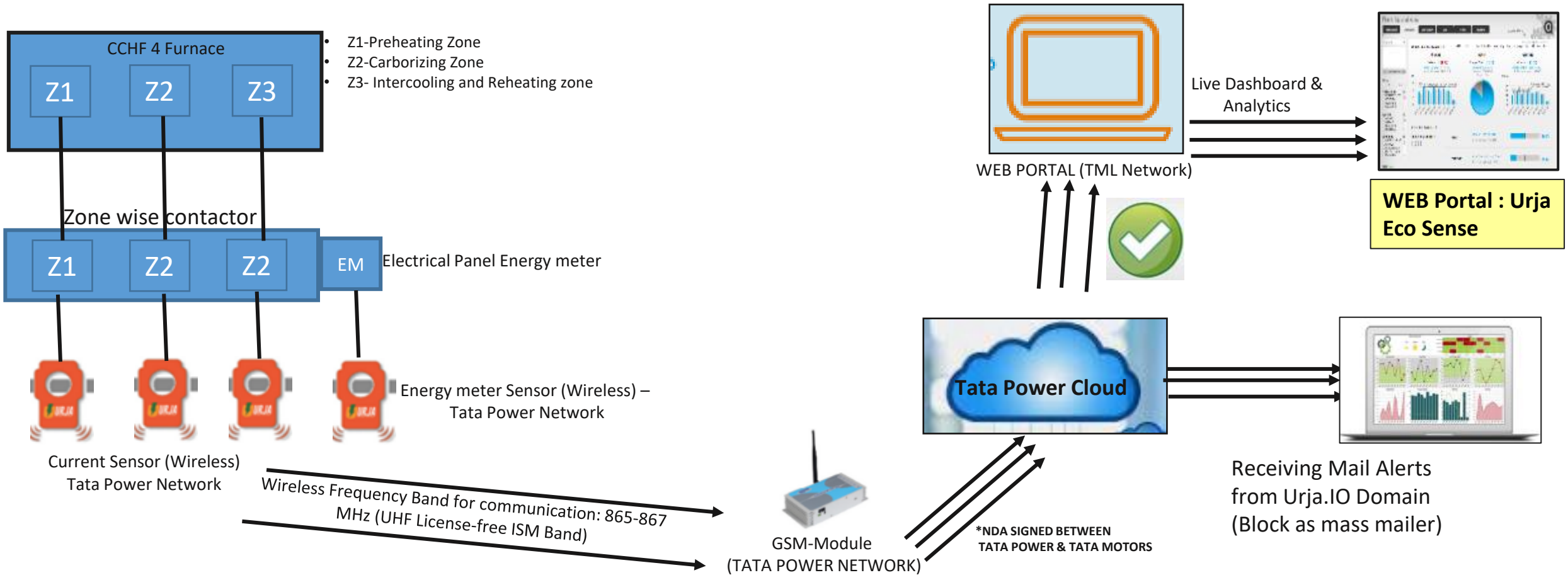
During initial phase i.e. in the month of March, April and May 2021. team faces **challenges of Covid 19** so actual work is started in last week of May 2021.

- Phase wise implementation done for hardware part and software integration part w/o hampering Production.
- Sample analytics window development done and team deliberated for further changes.
- Proto Type is made ready for monitoring and data generation point of view.
- User expectation and experience suggestions provided for further fine tuning of analytics.

# 6. Innovation 1 – Heat Treatment Furnace Analytics

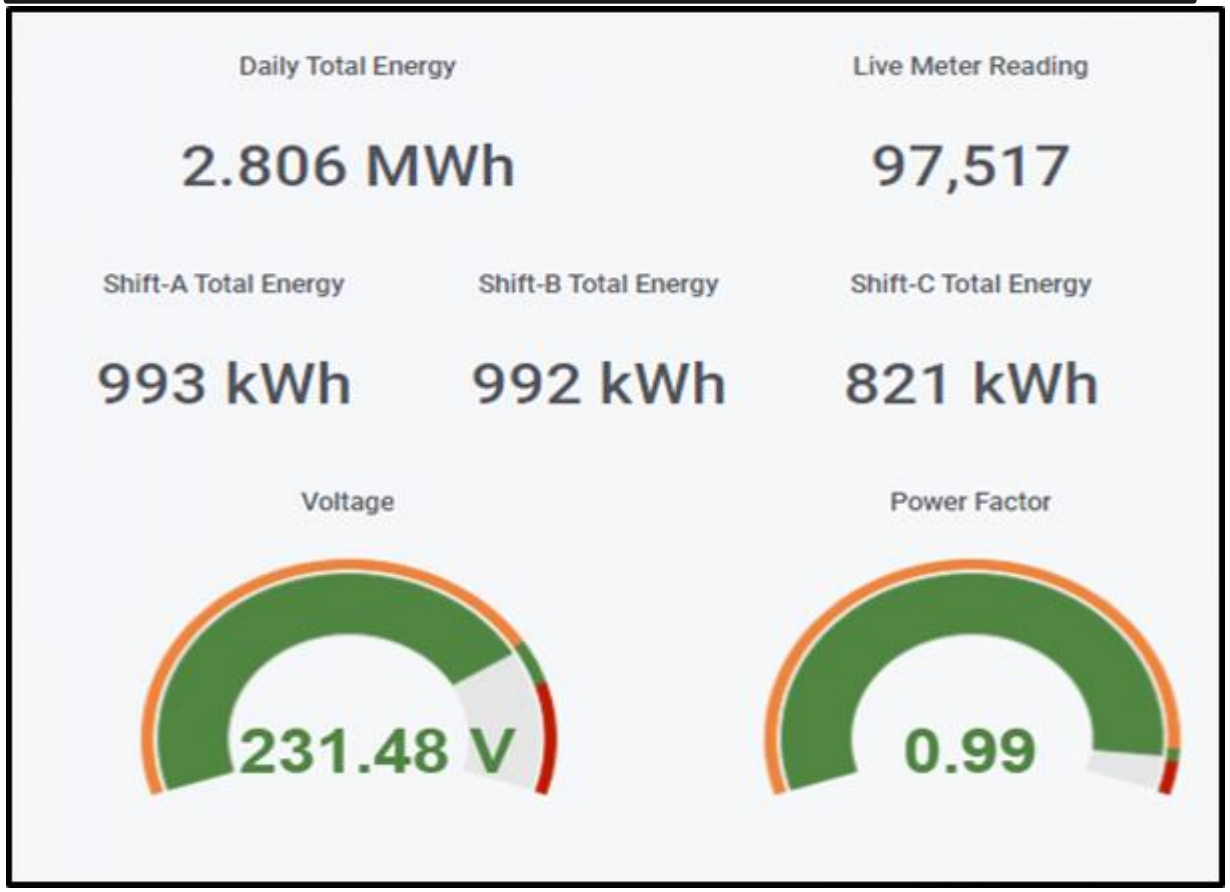
## Architecture of Data Flow CCHF 04 Furnace

**Platform Used – R programming and Python**



## 6. Innovation 1 – Heat Treatment Furnace Analytics

### – Live Analytics Dash Board Glimpses CCHF 04

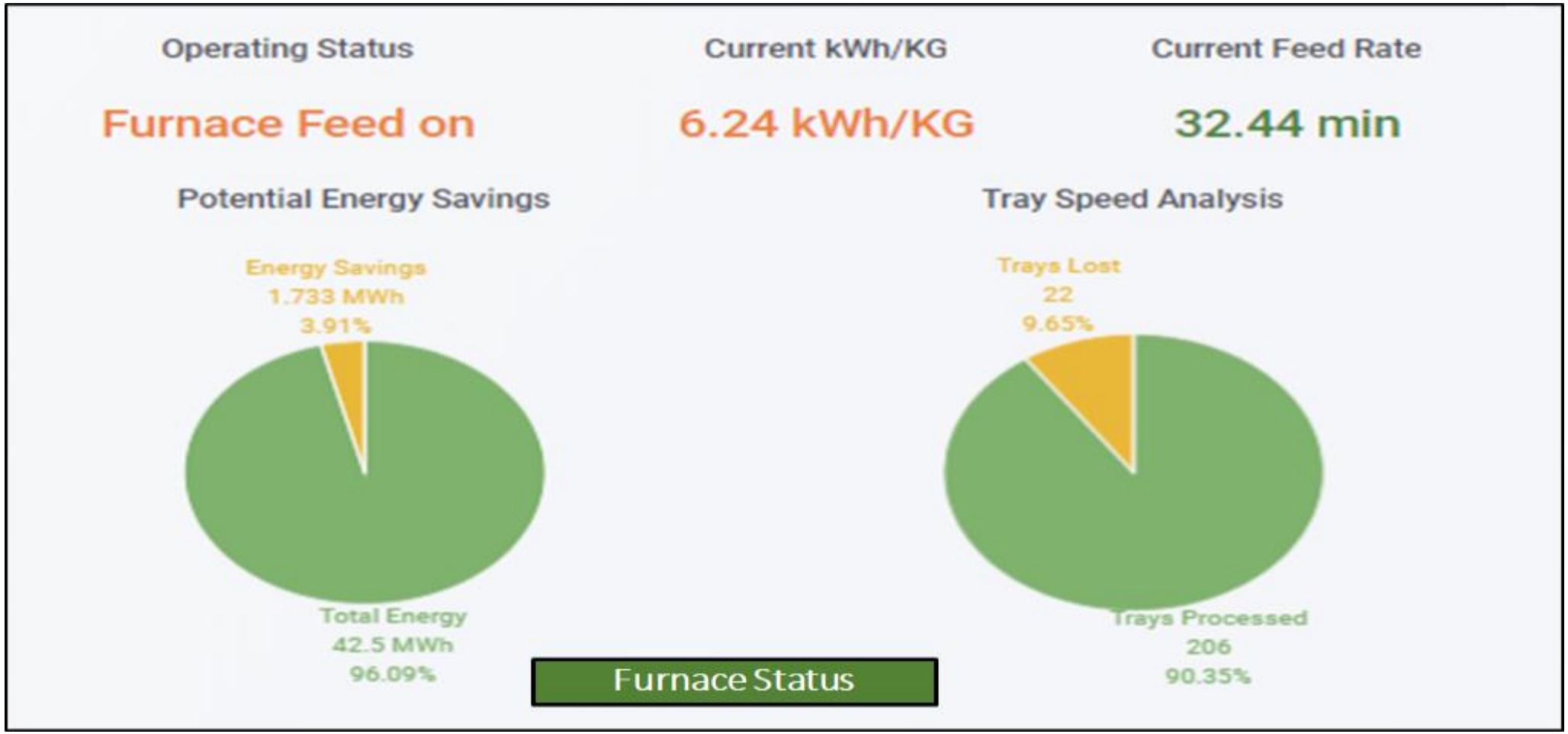



Over All Power Summery


Zone Wise Consumption Over View

## 6. Innovation 1 – Heat Treatment Furnace Analytics

### – Live Analytics Dash Board Glimpses CCHF 04



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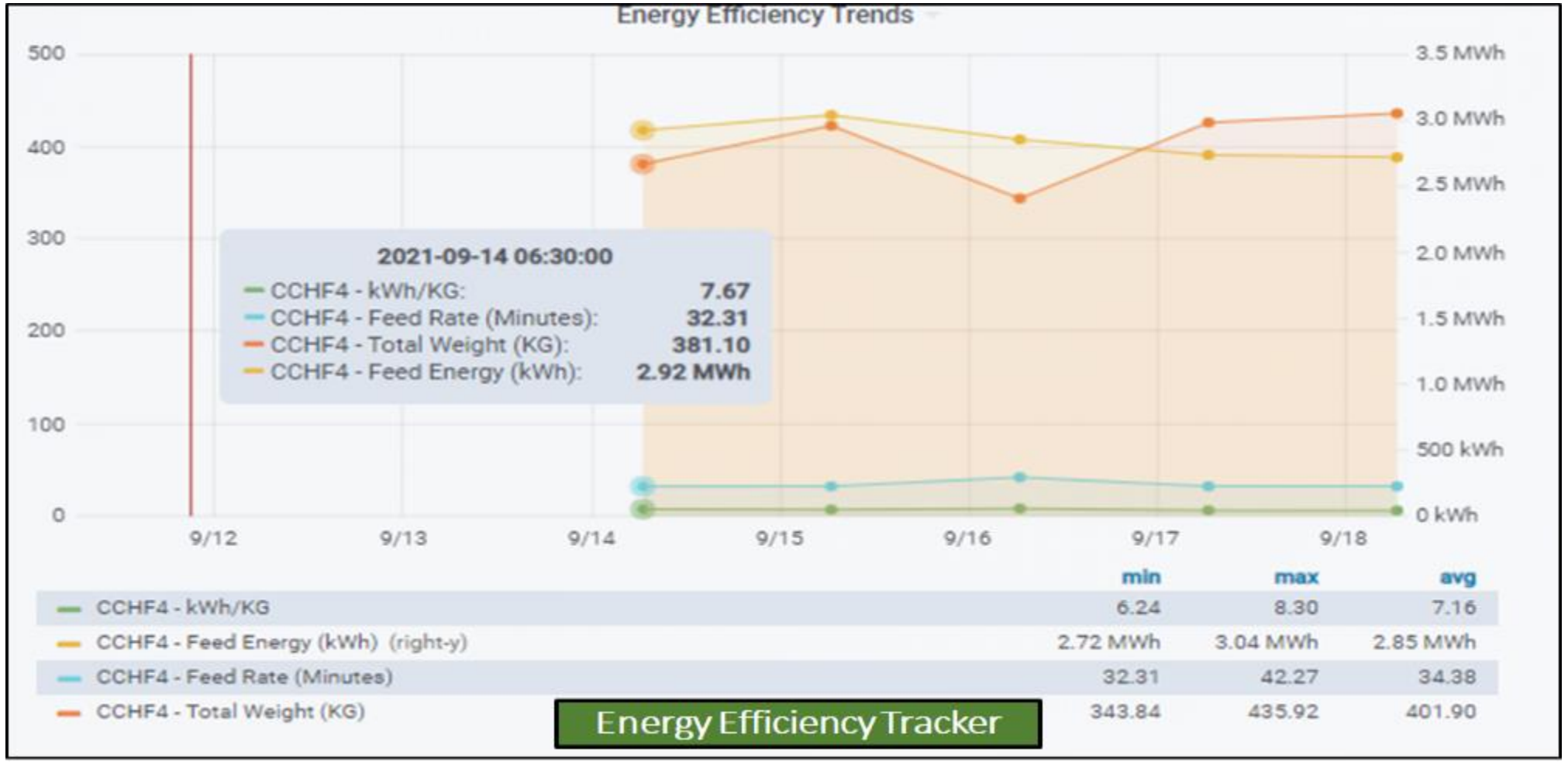

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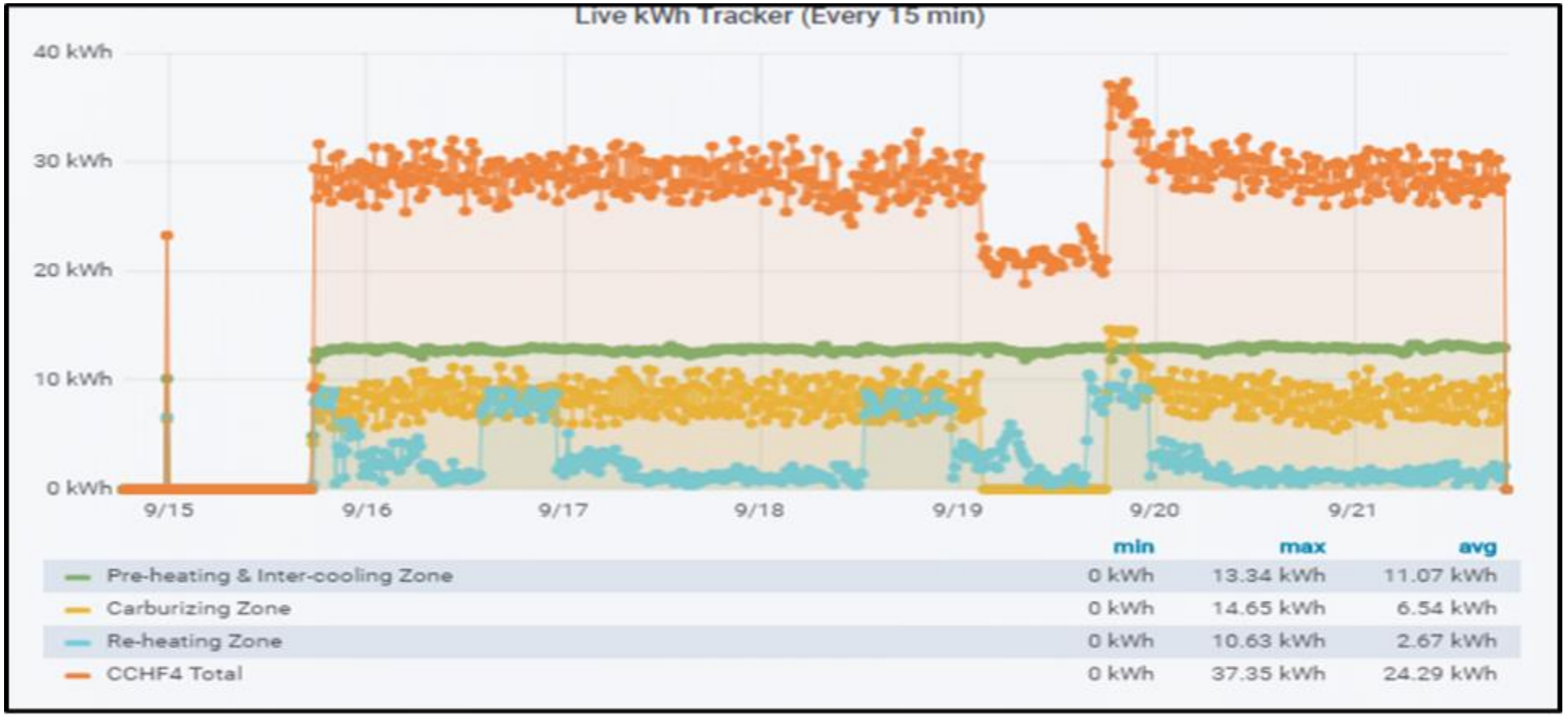
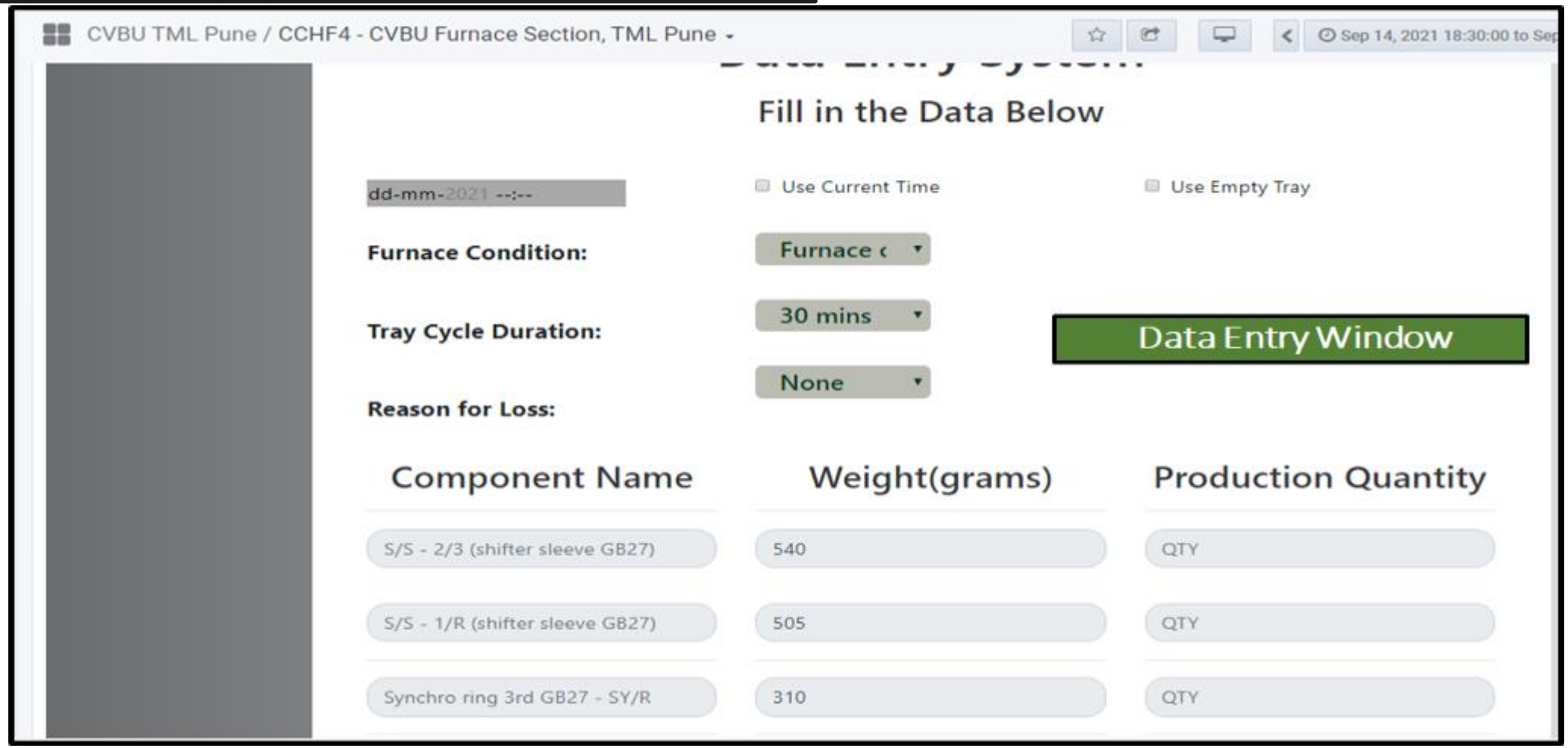



Live KWH Tracker

## 6. Innovation 1 – Heat Treatment Furnace Analytics

### – Live Analytics Dash Board Glimpses CCHF 04



## 6. Innovation 1 – Heat Treatment Furnace Analytics

### – PROPOSED BENEFIT & WAY FORWARD

Tangential Benefits:

- Reduction in Specific Power Consumption Kwh/kg.
- Loss optimization (idle equipment running).
- Enhancement in OEE in %.
- Zone wise absolute Power Consumption.
- **Cost management tool.**

In-tangential Benefits:

- Predictive performance of Furnace.
- Reduction in GHG Emission.
- Breakdown tracking.
- Production Planning as per material availability.

Way Forward

- Integration with Production Planning IPMS System.
- Horizontal deployment for other furnaces.
- Process Parameter integration in existing IOT.
- Line efficiency as Per OLE guide Line.
- Predictive detailed Analytics.
- Can be integrate to other process like Painting, Assembly and Machining.

## 6. Innovation 2 – Energy Mix – Cost Optimization at Tata Motors


# INNOVATION 2

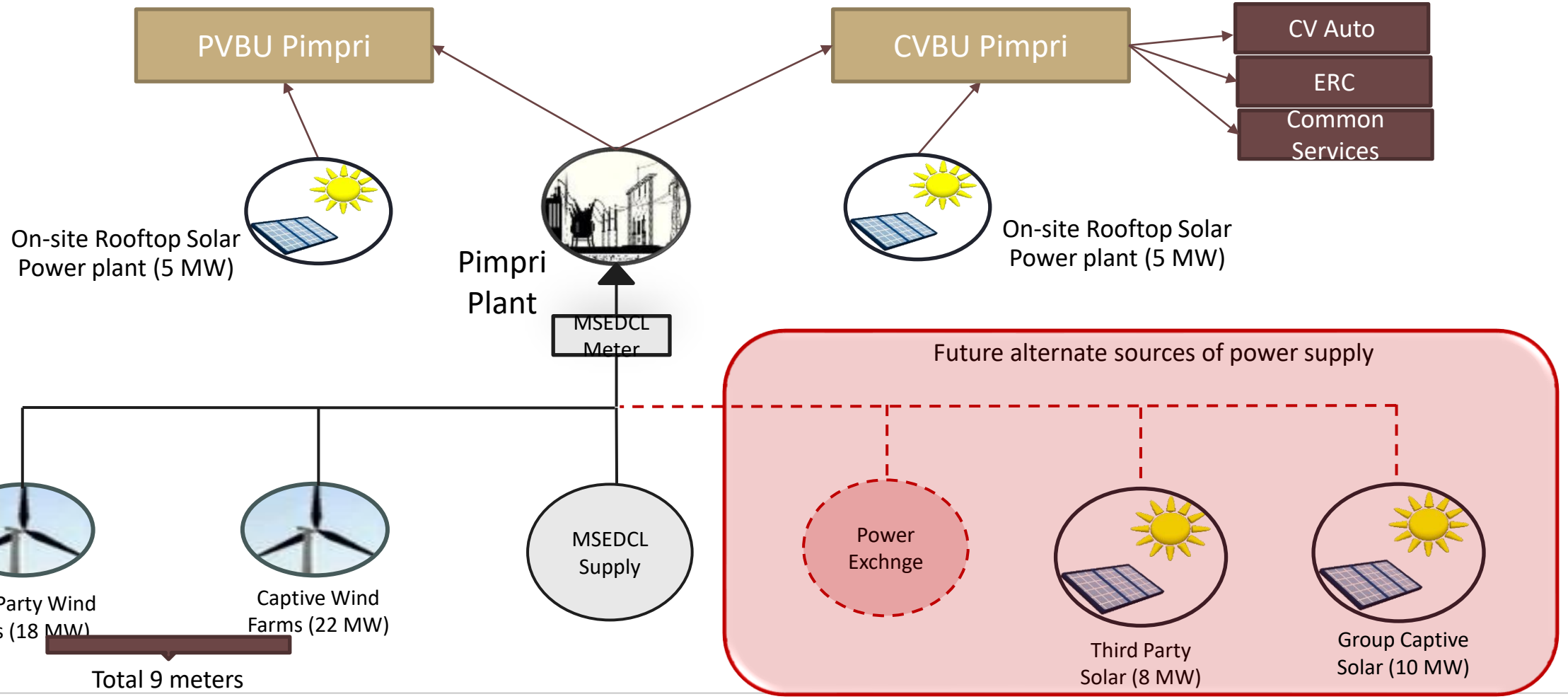
## Energy Mix - Cost Optimization at Tata Motors

## 6. Innovation 2 – Energy Mix – Cost Optimization at Tata Motors


# Energy Mix Cost Optimization at Tata Motors

## 6. Innovation 2 – Energy Mix – Cost Optimization at Tata Motors

### – Energy Mix Optimization POC - Pune

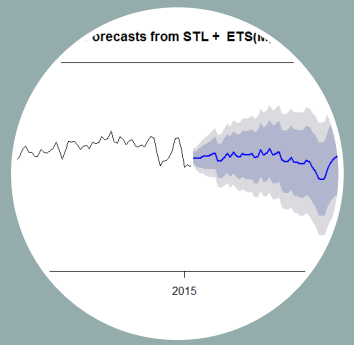


## 6. Innovation 2 – Energy Mix – Cost Optimization at Tata Motors

# –Objectives

**Monitoring**

- Energy consumption trend
- Renewable and Third party energy generation trend
- Rs. per Eq. vehicle and KWh per Eq. vehicle trend
- Compressed Air Monitoring




**Forecasting**

- **Output Forecasted Data**
- Energy demand forecasting as per planned production (Roll Out Plan)
- Energy Rate prediction

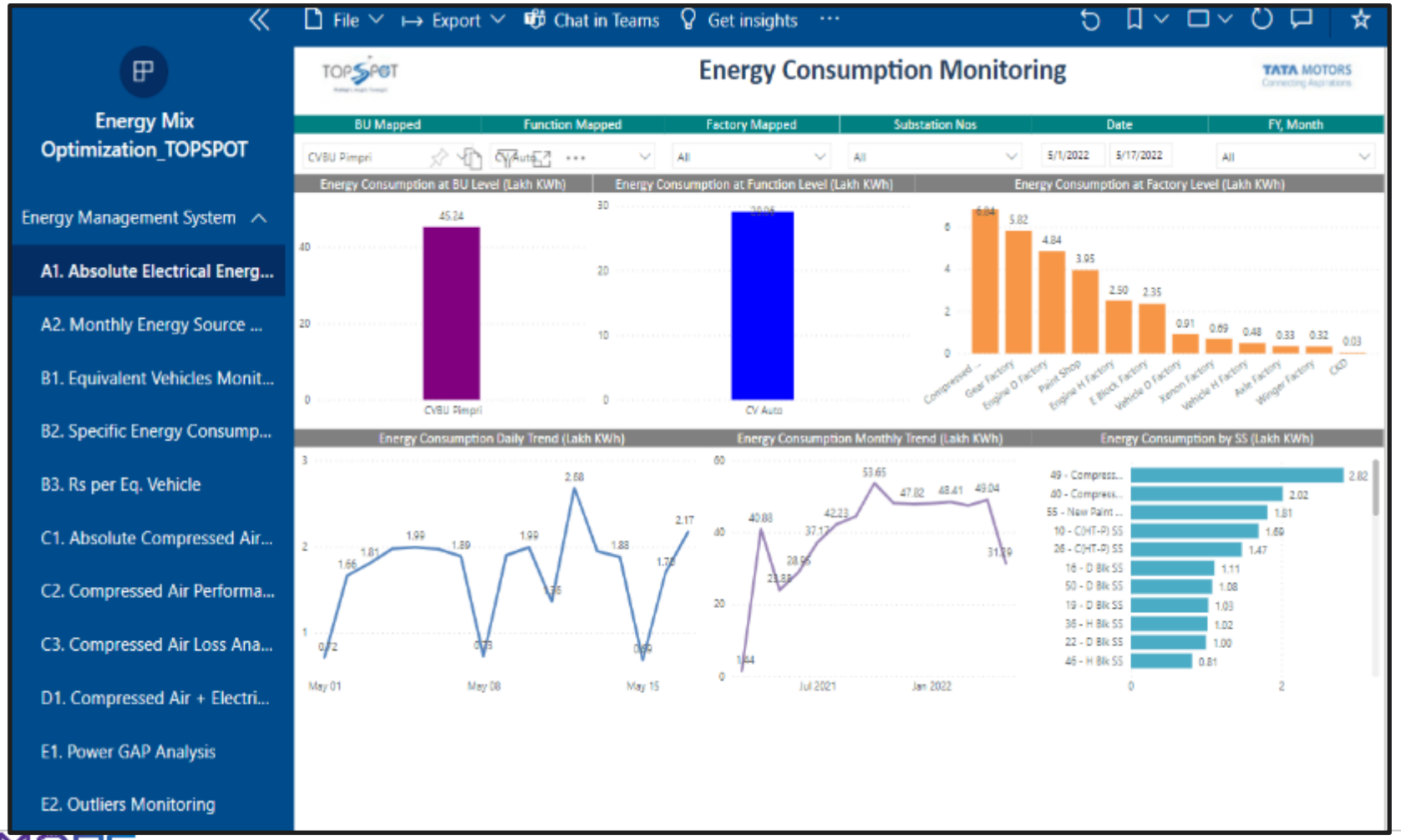
- **Input Forecasted Data**
- Equivalent vehicle production (PPC Team)
- Commercial vehicles roll out plan data
- Renewable & Third party energy generation projection (Supplier)

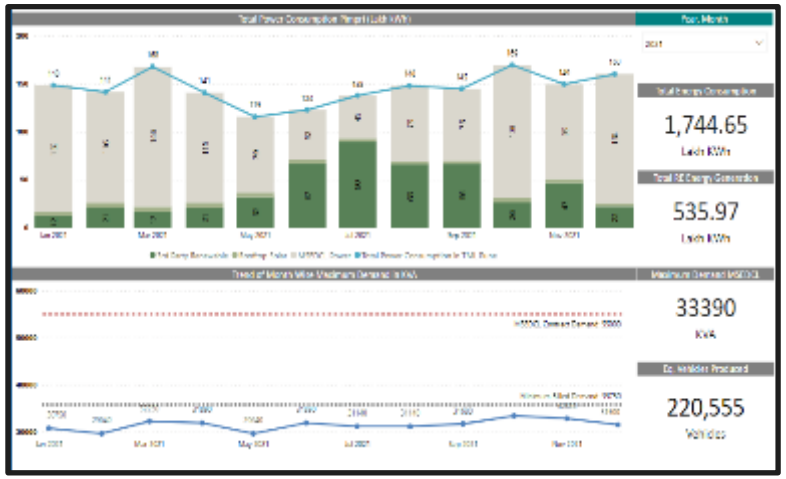
**Optimization**

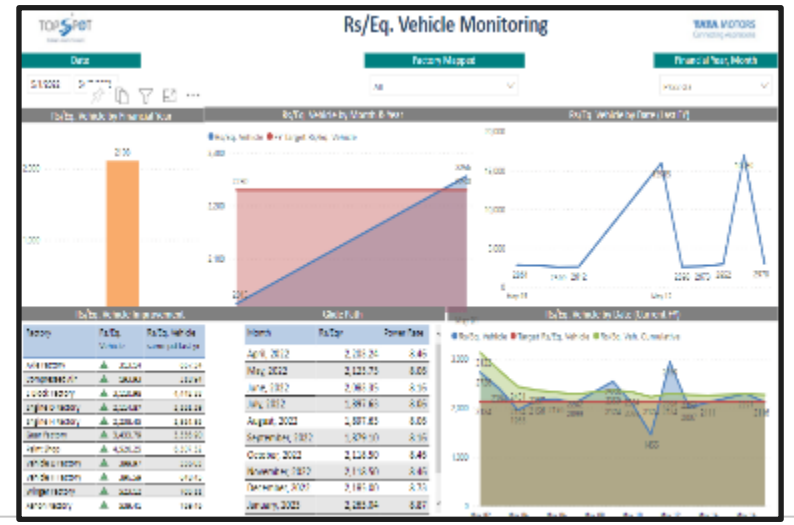
- Energy bucketing as per TOD MSEDCL & 3rd Party RE tariff
- Energy mix from available sources
- Cost of energy mix

# 6. Innovation 2 – Energy Mix – Cost Optimization at Tata Motors

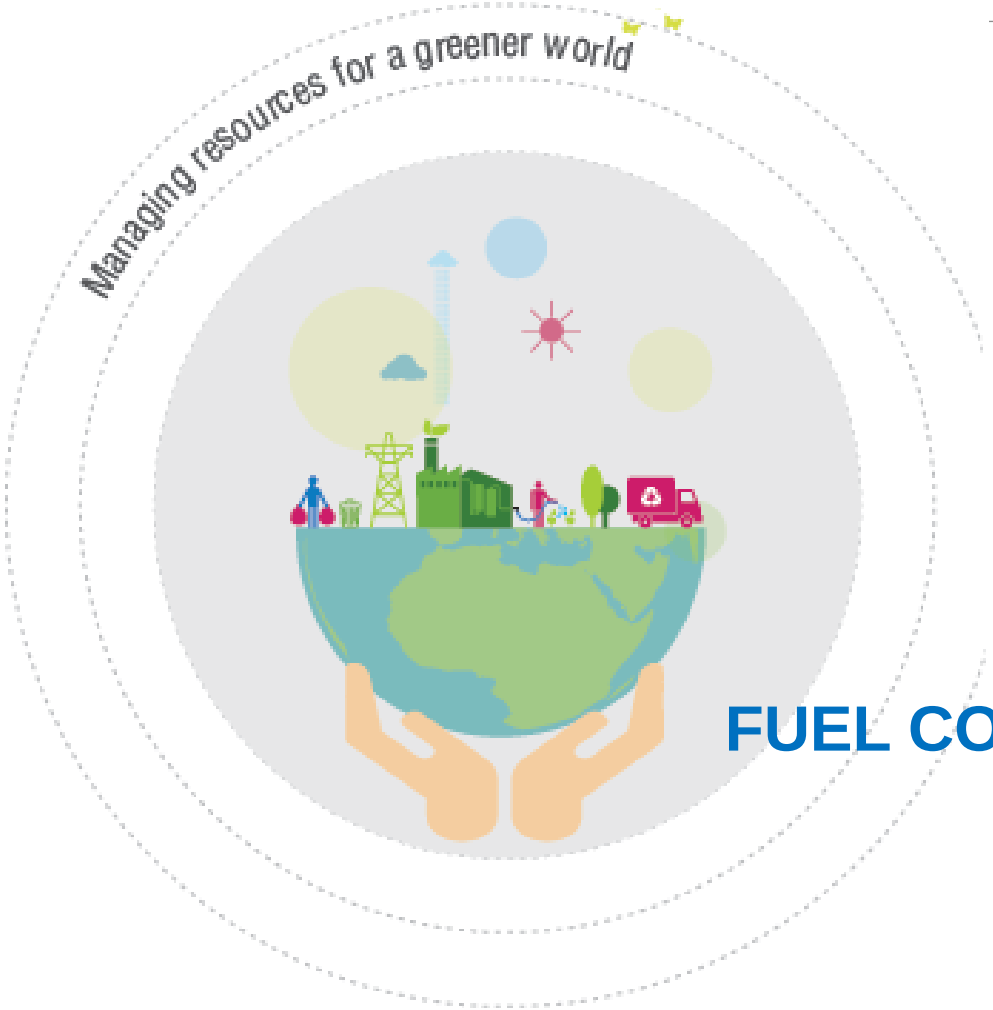
## –PROJECT GLIMPSES



## 6. Innovation 3 – Fuel Consumption Optimization In Paintshop By KAIZEN Activity




# INNOVATION 3

## FUEL COSUMPTION OPTIMIZATION IN PAINTSHOP BY KAIZEN ACTIVITY

# 6. Innovation 3 – Fuel Consumption Optimization In Paintshop By KAIZEN Activity

## CV Pune : Improvement Projects 1: J11 /J12 Paint Shop Kaizen

**Focus Area: J11 Paint Shop**

**Scope:**
Fuel(CNG) consumption reduction and cost reduction by process optimization

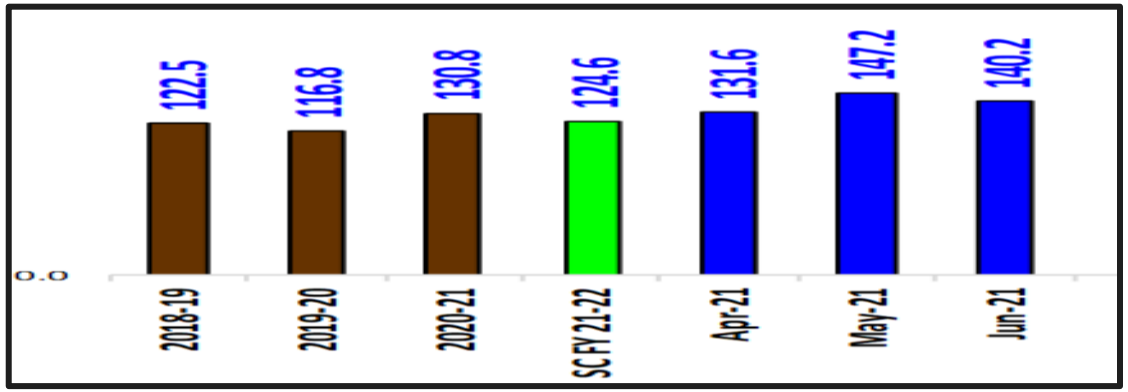
**Highlights of Improvements:**

- **PTCED oven temperature** optimised from **188 to 183 C** in keep up zone with TTR confirmation and Product and Process Quality confirmation
- **Sealant oven temp optimised** from **160 to 140 C** with Process and Product Quality confirmation.

**Results Achieved:**

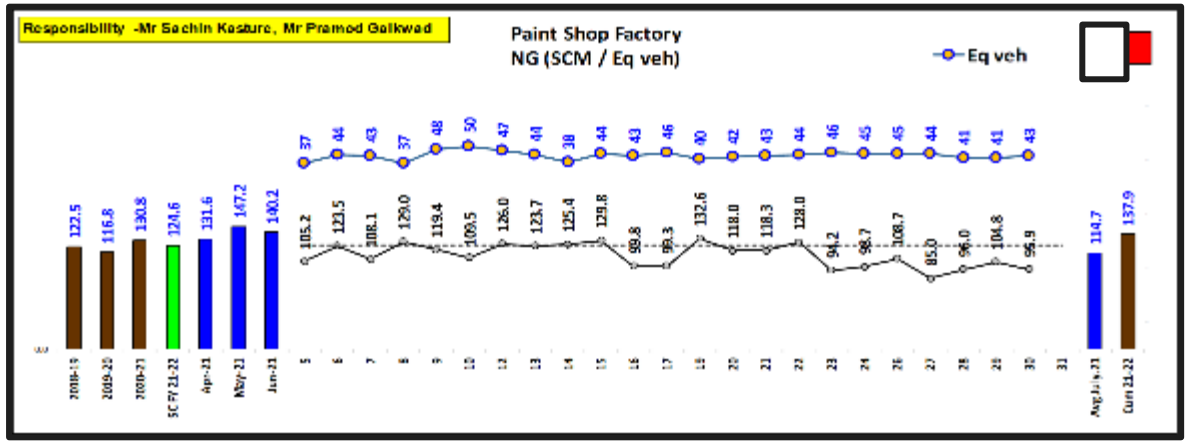
| Parameters | Before KAIZEN- Avg. Jun | Target | After KAIZEN Avg. Jul | % Improved |
|---|---|---|---|---|
| CNG consumption in SCM/Eq. Veh | 140.2 | 124.6 | 122.67 | 12.5 % Reduction |
| CNG Consumption in SCM/PTCED Cycle | 22.3 | 20.3 | 20.3 | 9 % Reduction |
| CNG Consumption in SCM/Total cycle | 9.6 | 8.4 | 8.4 | 12.5 % Reduced |

**Before KAIZEN**




Paint Shop CNG consumption SCM/Eq Veh Avg. per month.

**After KAIZEN**



# 6. Innovation 3 – Fuel Consumption Optimization In Paintshop By KAIZEN Activity

## – PTCED Line :- Hot water generator and CED Oven

**Before**

1) Hot water generator Setting :- **120 Degree**
2) CED Oven Keep up Temperature **188 Degree** centigrade

After

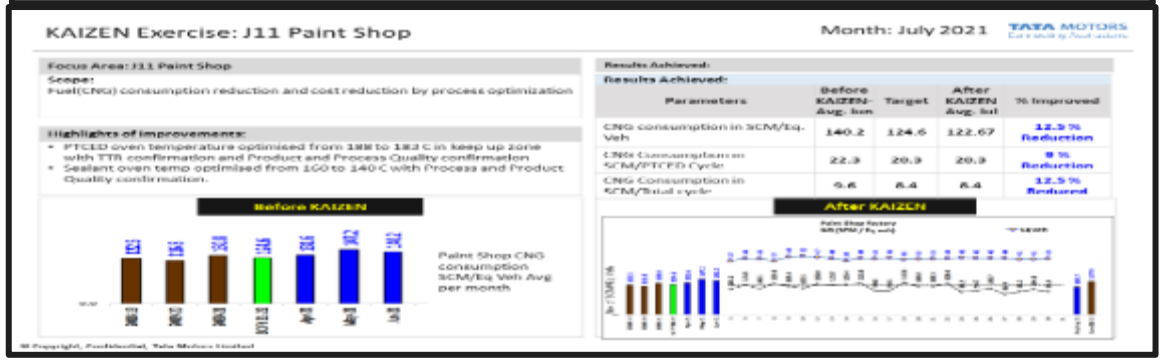
1) HWG Return temperature optimised from **120 to 115**
2) CED oven TTR Optimised .
3) CED Oven Keep up zone temperature reduced from **188 to 183**.

**Saving :-**

- 304 SCM /Day .
- Saving in Rs. Lakhs :- 29.87 Lakhs ( Considering Avg Rate of 42 Rs/SCM).
- Implemented Month : July 2021

Kaizen Major Activity Result Analysis Summary - July-2021

| System | Before Consumption M3/Hr | After Consumption M3/Hr | Saving in M3/Hr | Saving in SCM/Hr |
|---|---|---|---|---|
| PT-HWG | 33.2 | 29.68 | 3.54 | **9.19** |
| CED Oven | 47.10 | 42.95 | 4.15 | **10.78** |
| Sealer Oven | 26.12 | 19.28 | 6.84 | **17.76** |
| Total | 106.4 | 91.91 | 14.53 | 37.73 |



# 6. Innovation 3 – Fuel Consumption Optimization In Paintshop By KAIZEN Activity

## – Project : Sealant Oven

**Before**

1) Sealant oven earlier Temp was 160 Degrees centigrade.

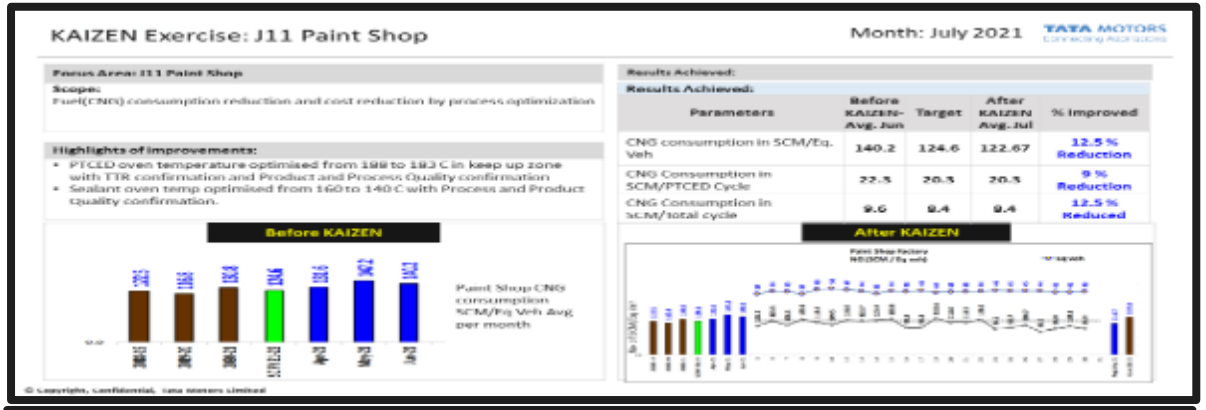
1) Sealant oven baking window was 120 degree 10 Min.


**After**

1) Sealant oven temperature reduced from 160 to 140 degree centigrade during Kaizen activity considering existing models .
2) Baking window optimised to 110 degree for 10 min.
3) All models sealant beads Pregl baking condition checked.
4) All models underbody Prejel baking condition checked.

Kaizen Major Activity Result Analysis Summary - July-2021

| System | Before Consumption M3/Hr | After Consumption M3/Hr | Saving in M3/Hr | Saving in SCM/Hr |
|---|---|---|---|---|
| PT-HWG | 33.2 | 29.68 | 3.54 | **9.19** |
| CED Oven | 47.10 | 42.95 | 4.15 | **10.78** |
| Sealer Oven | 26.12 | 19.28 | 6.84 | **17.76** |
| Total | 106.4 | 91.91 | 14.53 | 37.73 |




**Saving :- 256 SCM /Day .**

Saving in Rs. Lakhs :- 25.16 Lakhs ( Considering Avg. Rate of 42 Rs/SCM)

Implemented :- July 2021

## 6. Innovation 3 – Fuel Consumption Optimization In Paintshop By KAIZEN Activity

### – Kaizen Benefits

| Sr.NO | Project | Saving Per Day SCM |
|---|---|---|
| 1 | PTCED Oven Temp optimization. | 304 scm/day |
| 2 | Silent Oven Temp optimization | 256 scm/day |
| Total | Total saving by Kaizen activity (10%) | 560 scm/Day |

# 7.Energy Saving Projects

# – Energy Saving For Pre Honing Washing Machine

Recirculation pump for pre honing washing machine were continuously ON.



## Calculation for 1 machine

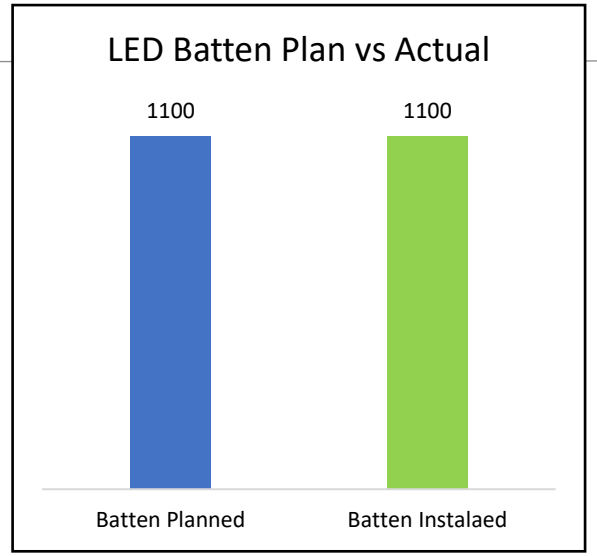
| ENERGY CONSUMTION BEFORE | ENERGY CONSUMTION AFTER | NET ENERGY SAVING/DAY/MACHINE | ENERGY SAVING/MONTH/MACHINE (25 WORKING DAYS) | ENERGY SAVING/YEAR/MACHINE | ENERGY TARRIF | SAVING IN RS/MACHINE/YEAR |
|---|---|---|---|---|---|---|
| 131 KWH | 51 KWH | 80 KWH | 2000 KWH | 24000 KWH | Rs 8 | Rs 1,92,000 |

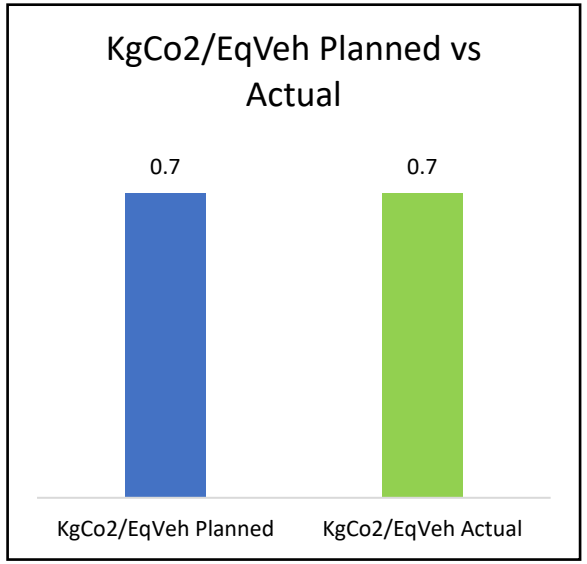
# –LED BATTEN XENON/LCV (1100 Nos)

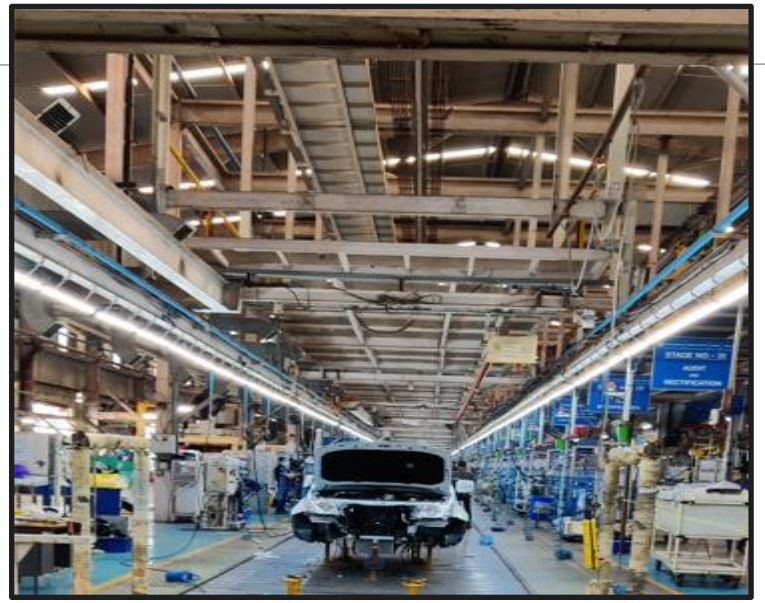
| Exesting Lighting | | | |
|---|---|---|---|
| | Qty | Kwh/Day | Kwh/Year |
| Twin 56 watt | 275 | 154 | 46970 |
| T5 216 watt | 227 | 490 | 149547.6 |
| Urja 144 watt | 207 | 298 | 90914.4 |
| **Total** | **709** | **942** | **287432** |

| Praposed Batten Lighting | | | |
|---|---|---|---|
| | Qty | Kwh/Day | Kwh/Year |
| Batten 36 watt | 1100 | 396 | 120780 |
| **Total** | **1100** | **396** | **120780** |

| | |
|---|---|
| Kwh Saving | 166652 |
| GHG KGco2/EqVeh | 0.69 |



Installation Glimpses

# –ELECTRICAL TO NG CONVERSION AT H7 CRANKSHAFT WASHING MACHINE

- **Opportunity**
- H7 Crankshaft washing machine running on electrical heating with per day consumption of 180 kwh/Day.
- **Action**
- Conversion of H7 Crank shaft washing machine Electrical to NG by using in-house material.

In-house NG Conversion completed in July21.

| Parameter | Electrical Heating | NG Heating |
|---|---|---|
| **Fuel** | Electricity | Natural Gas |
| **Per day Consumption** | 180 kwh/Day | 20 SCM/Day |
| **Per Year Consumption** | 54900 kwh | 6100 SCM |
| **Cost of fuel** | 9.3 Rs/Kwh | 38 Rs/SCM |
| **Per Year Operation Cost** | 5.10 Lakh | 2.31 lakh |
| **Rs Saving Per Year** | **2.79 lakh** | |
| **GHG Emmision Tco2e** | 45.567 | 12.48 |
| **GHG Scope 2 Reduction Tco2e** | **33.087** | |

- **Total Kwh saving per Year- 54900 kwh/Year**
- **Total Scope 2 GHG Tco2 (Electrical)– 45.56**
- **Total Scope 1 GHG Tco2 (NG)-12.48**
- **Total GHG Reduction (Scope 2 – Scope 1) – 33.08**

## 8. Utilization of Renewable Energy Sources

Renewable Energy

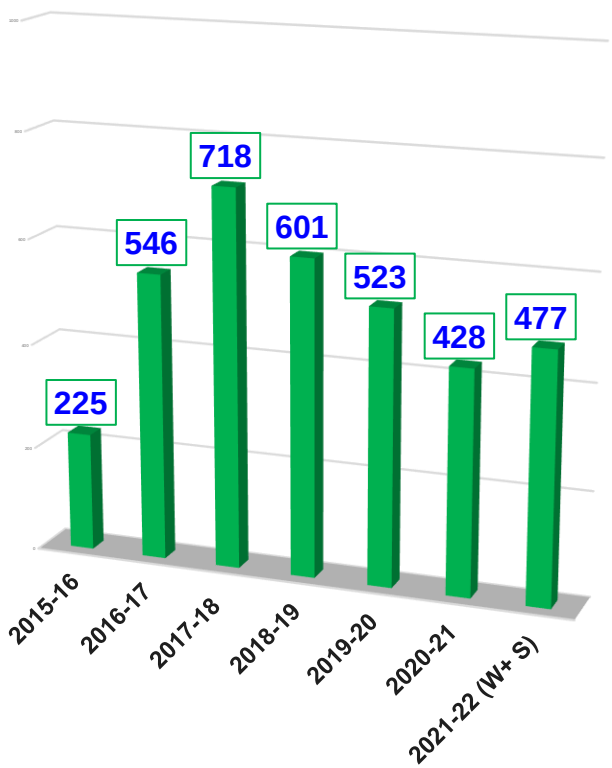
## 8. Utilization of Renewable Energy Sources

| Technology | Type of Energy | Onsite/ Offsite | Installed Capacity (MW) | Generation (million kWh) | % of overall electrical energy |
|---|---|---|---|---|---|
| Wind & Solar Power | Electrical | Offsite | 21.95MW + 18 MW + 17MWp | 35.55 | 71.53 % |
| Rooftop Solar PV | Electrical | Onsite | 4.8 MWp | 4.42 | 8.89 % |

| Technology | Type of Energy | Onsite/ Offsite | Installed Capacity | Usage (million kCal) | % of overall thermal energy |
|---|---|---|---|---|---|
| Solar Water Heating System | Thermal | Onsite | 36,250 LPD | 463 | 2.06 % |

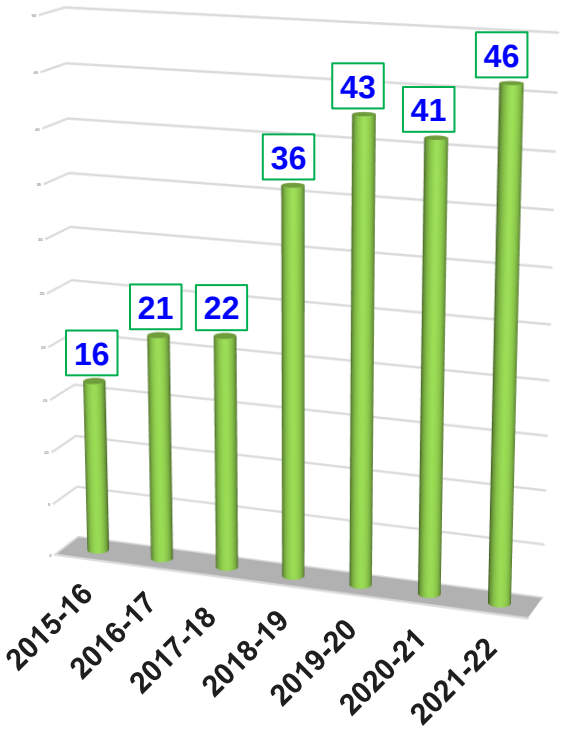
# 8. Utilization of Renewable Energy Sources

## Open Access RE Power (Wind & Solar) Usage (Lakh KWh)




Wind Power Usage (Lakh KWh)

## Roof Top Solar Power Usage (Lakh KWh)




Roof Top Solar Power Usage (Lakh KWh)

## 9. Waste Utilization and Management

Waste Utilization and Management

## 9. Waste Utilization and Management

| No | Type of waste generated | 2019-2020 | 2020-2021 | 2021-2022 | Disposal method |
|---|---|---|---|---|---|
| | | Quantity of waste generated (MT/year) | Quantity of waste generated (MT/year) | Quantity of waste generated (MT/year) | |
| 1 | Grinding sludge | 116.485 | 87.83 | 109.10 | Landfill after treatment |
| 2 | Phosphating sludge | 32.870 | 13.14 | 24.83 | Landfill after treatment |
| 3 | Paint sludge hazardous kachara | 316.840 | 234.55 | 265.35 | Incineration |
| 4 | Waste oily Scum | 3.760 | 15.14 | 32.08 | Incineration |
| 5 | Spent Resin | 1.520 | 0.86 | 0.35 | Incineration |
| 6 | Asbestos | 0.024 | 5.75 | 5.52 | Landfill |
| 7 | Glass wool | 1.410 | 0.75 | 1.96 | Landfill |
| 8 | Chimney soot | 0 | 0.33 | 0.00 | Incineration |
| 9 | FRP Waste | 4.230 | 0.72 | 1.26 | Landfill |
| 10 | Shot blasting dust | 15.960 | 7.94 | 6.90 | Landfill after treatment |

## 9. Waste Utilization and Management

| No | Type of waste generated | 2019-2020 | 2020-2021 | 2021-2022 | Disposal method |
|---|---|---|---|---|---|
| | | Quantity of waste generated (MT/year) | Quantity of waste generated (MT/year) | Quantity of waste generated (MT/year) | |
| 11 | ETP-Industrial sludge | 133.290 | 355.95 | 862.84 | Landfill after treatment Through Authorised MPCB |
| 12 | ETP-Domestic sludge | 2.500 | 10.02 | 13.70 | Landfill after treatment |
| 13 | Nickel + Al catalyst | 0 | 0.38 | 0.9 | Landfill |
| 14 | ERC pattern waste | 31.140 | 14.82 | 10.16 | Incineration |
| 15 | HFO sludge | 0 | 0 | 0 | Incineration |
| 16 | Door, Roof liner | 15.040 | 4.8 | 3.58 | Landfill |
| 17 | Broken Tube lights | 1.020 | 0.99 | 1.12 | Landfill after treatment |
| 18 | Paint sludge - MPCB Regd. Re-cycler | 44.834 | 61.91 | 50.06 | Recycle |
| 19 | Paint sludge - MPCB Regd. Re-cycler | 100.800 | 84.76 | 119.54 | Recycle |

# 9. Waste Utilization and Management

## key initiatives taken for enhancing waste utilization.

**1.Paint sludge converted in to usable Paints.**

**2.VFH (Value From Hazardous waste)**

- Effective Segregation
- Elimination of waste at generation source
- Use of waste for value Creation
- Reuse and Recycle the waste

**3.WCEP (World Class Environment Practice)** – 4 Year Action plan.

**4.Biogas Plant -** Entire canteen waste is converted into biogas.

**5.Compost Pit for Canteen waste treatment –** (excess canteen waste if any)

**6.ZLD – Zero Liquid Discharge plant –** (Treated water used for garden & horticulture water demand. )

**7.Solid waste Segregation**

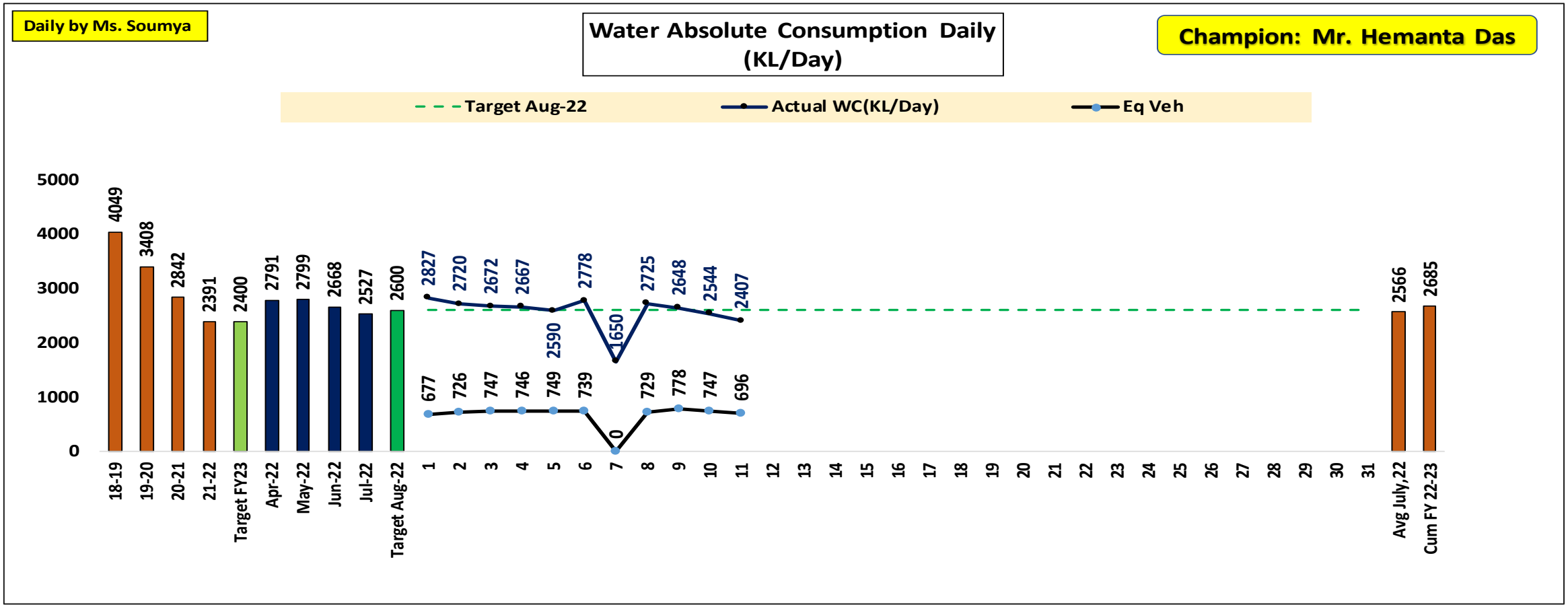
**8.OCEMS** – on line continuous effluent monitoring system for ETP & STP

## 10.Water Consumption Status

# 10.Water Consumption Status

Daily by Ms. Soumya

Champion: Mr. Hemanta Das



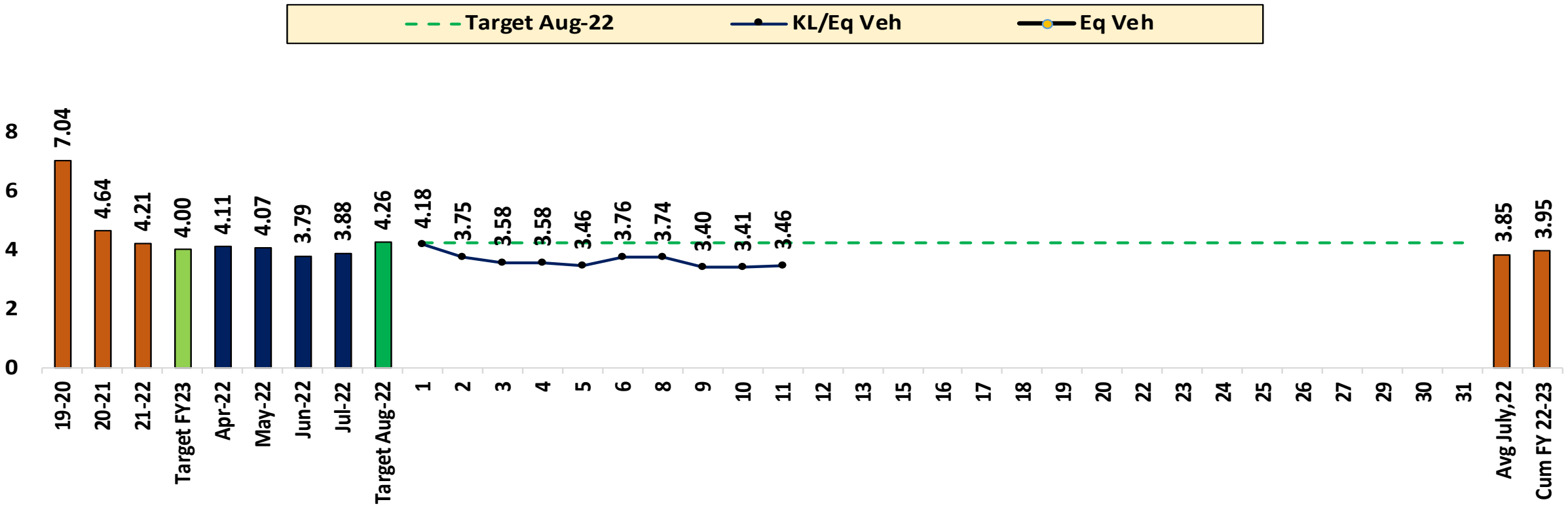

CFT formed for Water consumption reduction at plant Level.
2.5 KM Old underground headers line replaced with above ground.
IoT base Consumption monitoring is planned for individual block.

# 10.Water Consumption Status

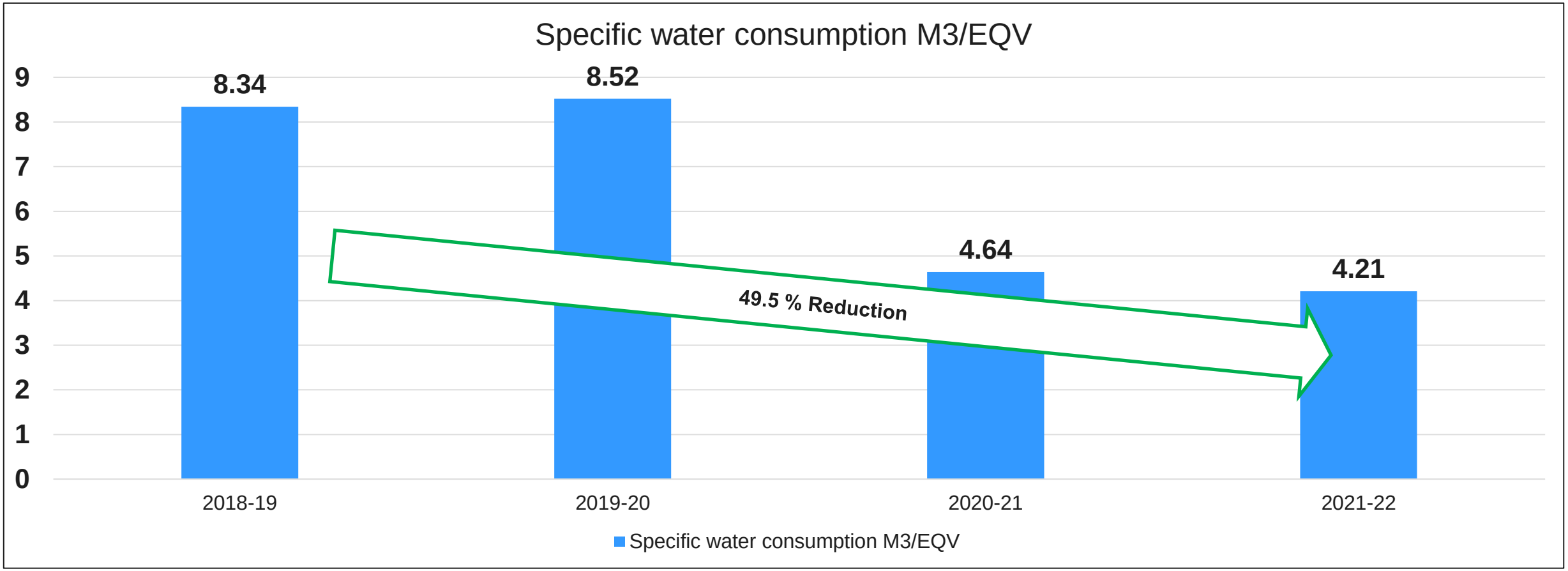
Daily by Ms. Soumya

## Water Consumption Daily (KL/Eq Veh)

Champion: Mr. Hemanta Das

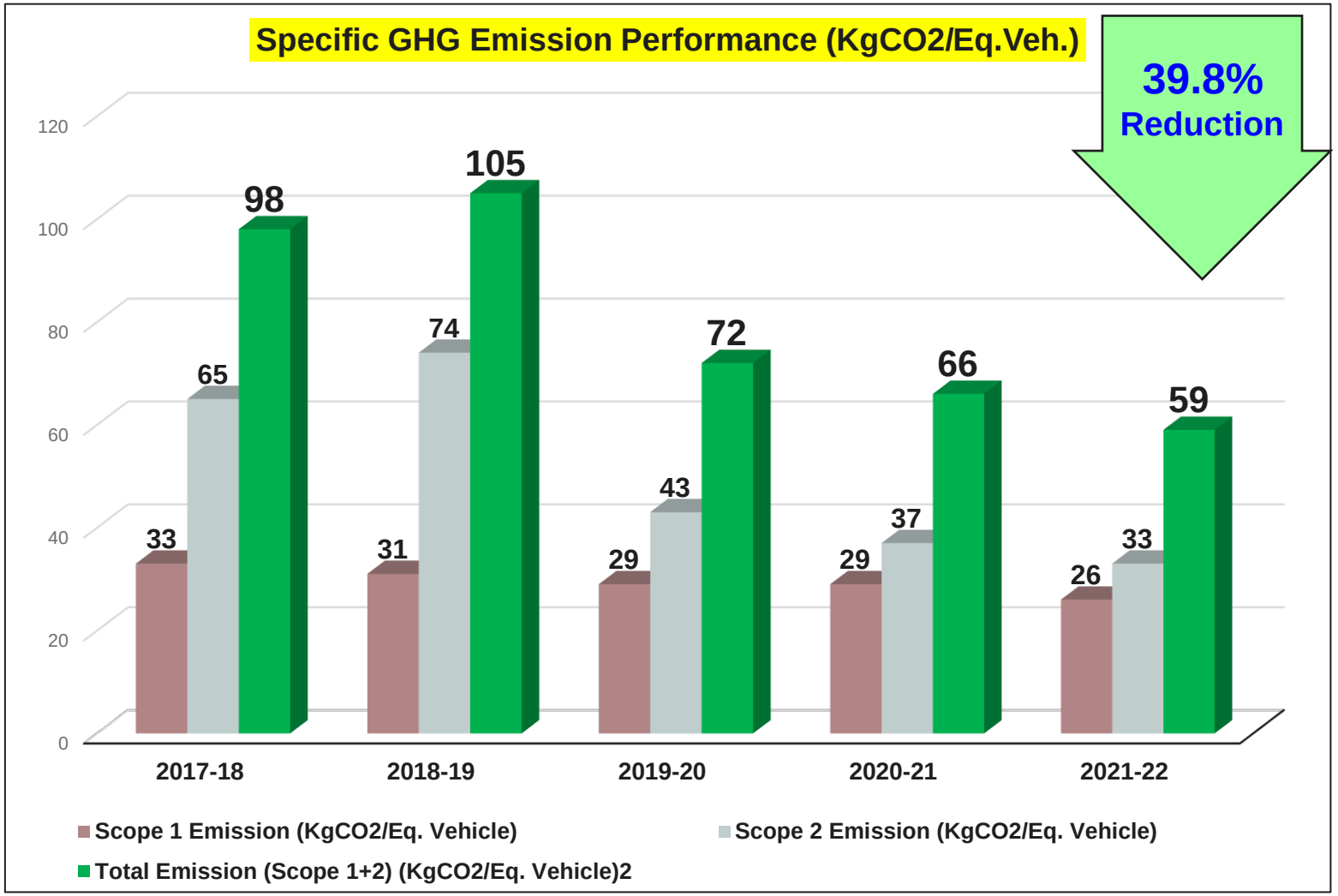


## 10.Water Consumption Status



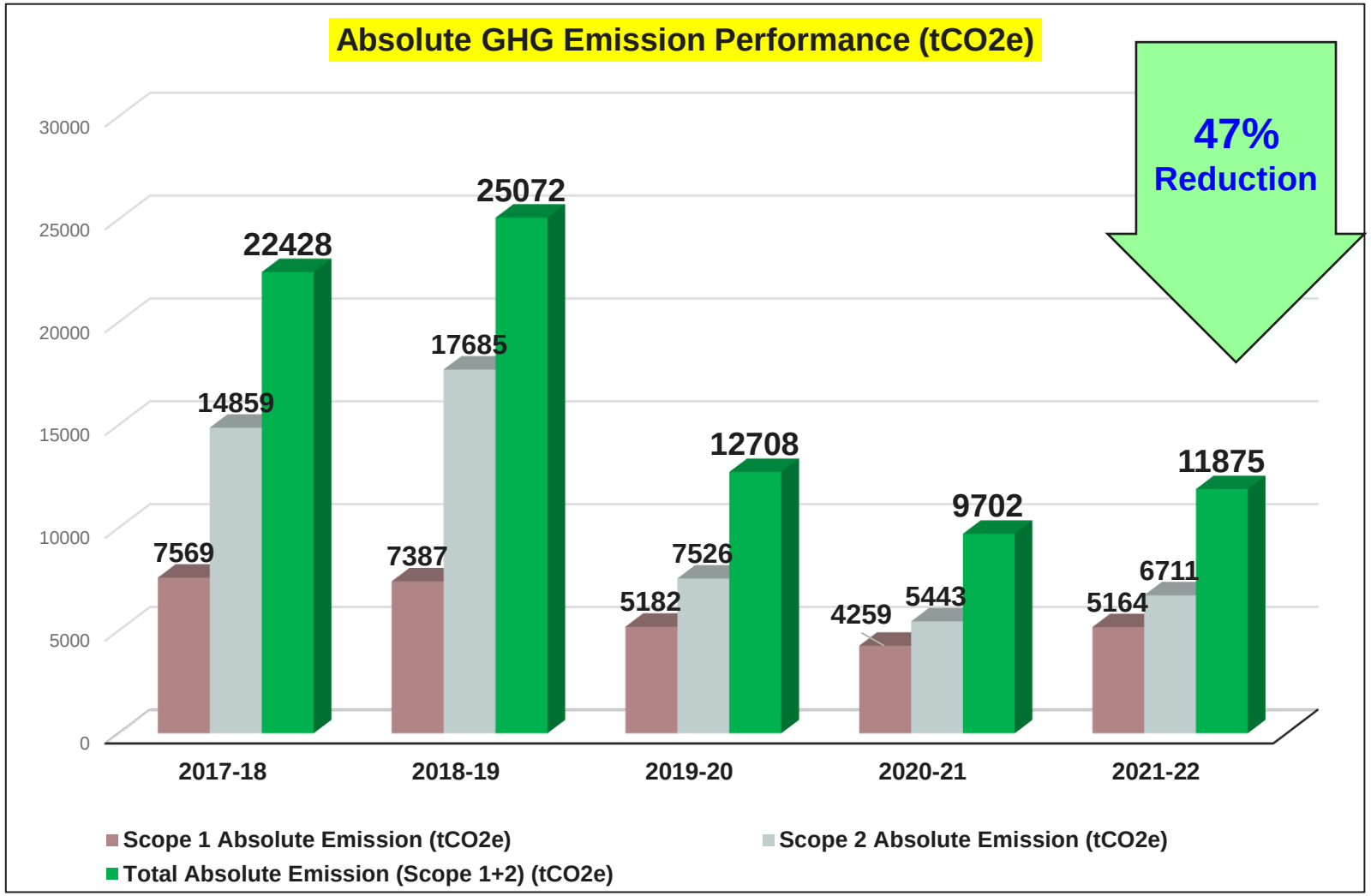

New Facility added for BS6 in the year 2019-20

## 11. GHG Inventorisation




| Scope | Emission Sources Considered |
|---|---|
| Scope 1 Emissions | Fuel consumed for<br>- Process Heat Generation<br>- Process Use<br>- Canteen<br>- Engine Testing<br>- Power Generation<br>- Internal Vehicle movement |
| Scope 2 Emissions | Purchased Electricity excluding renewable energy |
| Scope 3 Emissions | WIP |

# 11. GHG Inventorisation

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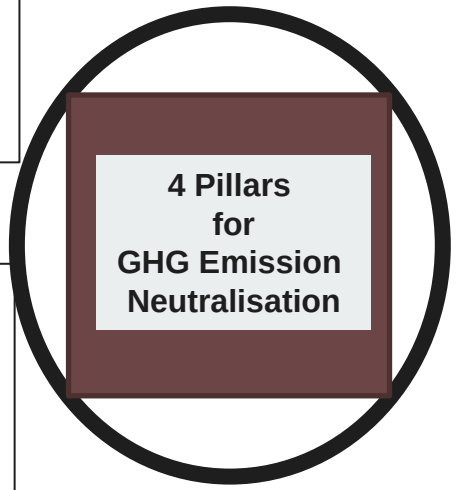
| Scope 1 Emissions | Fuel consumed for<br>- Process Heat Generation<br>- Process Use<br>- Canteen<br>- Engine Testing<br>- Power Generation<br>- Internal Vehicle movement |
| Scope 2 Emissions | Purchased Electricity excluding renewable energy |
| Scope 3 Emissions | WIP |

# 11. GHG Inventorisation : Action Plan for $CO_2$ Emission Reduction:-

## 4 Pillars of Neutralising GHG emission

- **Green Power Purchase**
  - \+ Quick gain
  - \+ Manage Business variability
  - \- Recurring add-on Power Purchase expenses

- **EnCOn Projects for Power consumption reduction**
  - \+ Mid & Long term gain
  - \+ Continuous process
  - \+ Reduces Power consumption permanently
  - \+ Improves Operation Efficiency & reduces cost impact
  - \- Controlled by Idea generation & Technology availability /Maturity
  - \- Capex requirement




- **Captive RE / RE100** (Wind, Solar)
  - \+ Mid & Long term gain
  - \+ Reduces Power Purchase cost
  - \- Controlled by Regulation
  - \- Capex requirement

- **EnCOn Projects for Fuel consumption reduction**
  - \+ Mid & Long term gain
  - \+ Continuous process
  - \+ Reduces Fuel consumption permanently
  - \+ Improves Operation Efficiency & reduces cost impact
  - \- Controlled by Idea generation & Technology availability /Maturity
  - \- Capex requirement

### Action Plan for $CO_2$ Emission Reduction:-

Maximise use of Renewable Energy (Wind Power & Solar Power) with in regulatory framework

1) Captive Wind Power through Open Access

2) Third Party Wind Power through Open Access

3) On-site Rooftop Solar Power Plant.

4) Science Base Target for $CO_2$ Emission Reduction

**Short Term Target :** As per MERC order and MSEDCL Circular, we are process to procure RE power to achieve the GHG emission target set at Plant Level , Company & Group Level.

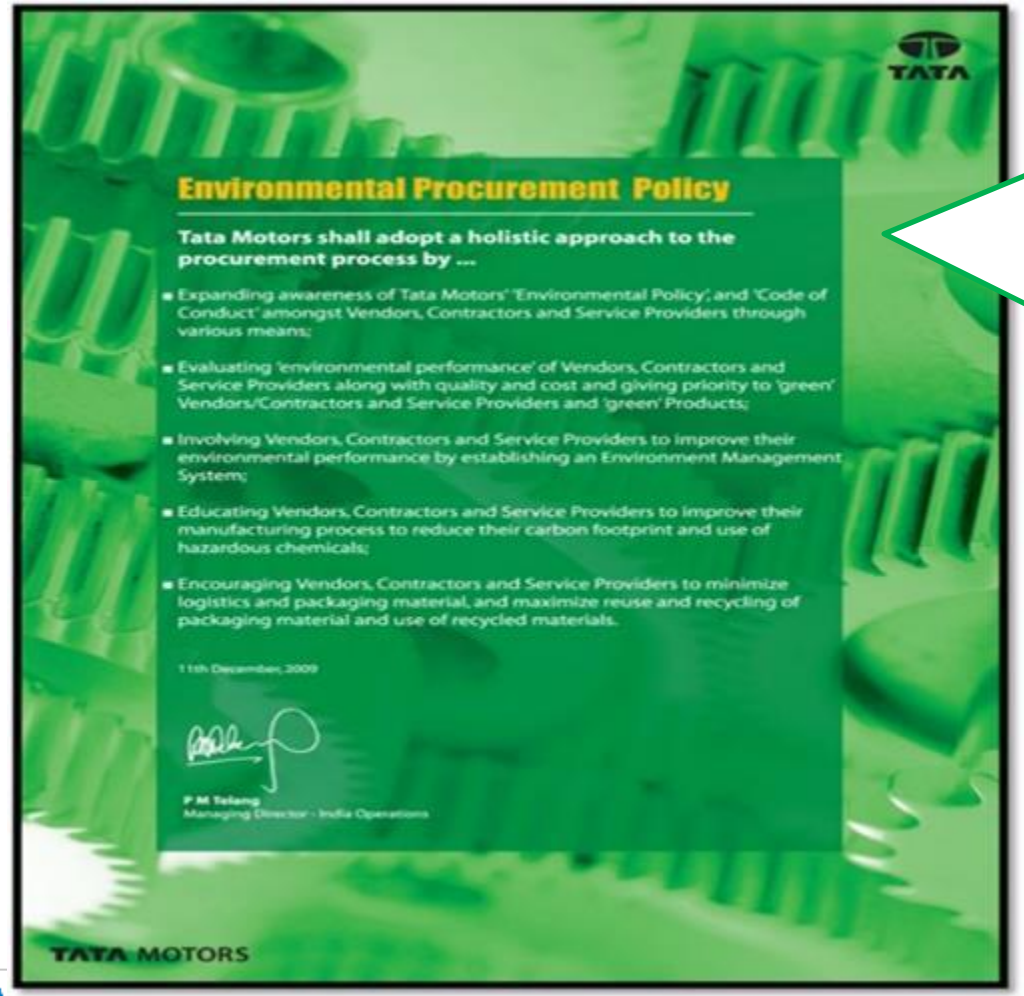
**Long Term Target :** To install Offsite 25MWp Group Captive Solar Power Plant.

## 12.GREEN SUPPLY CHAIN

# GREEN SUPPLY CHAIN

# 12. Green Supply Chain Management

## Green Purchase Policy :-

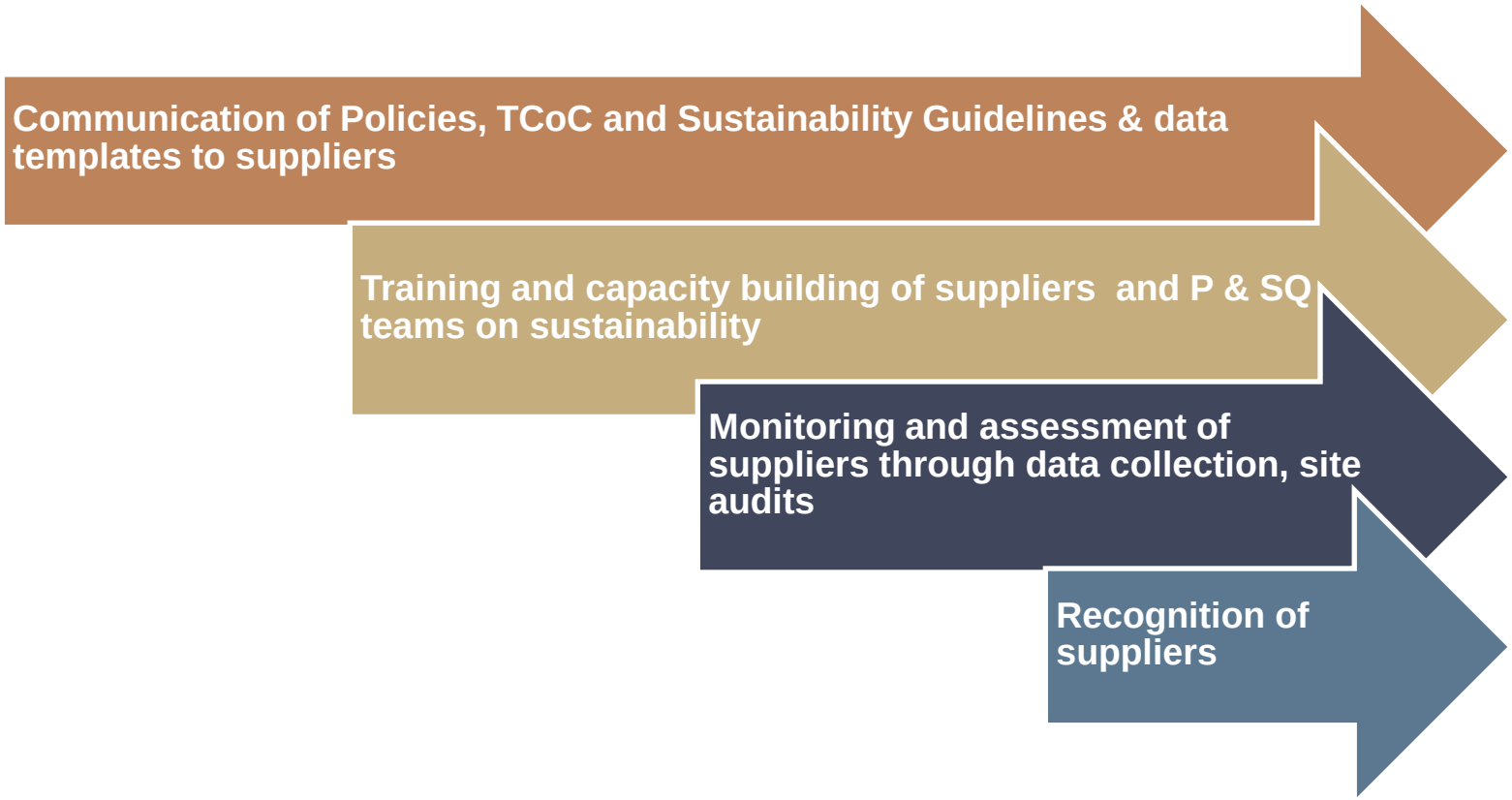



Our **Environmental Procurement Policy** aims at;

- Awareness of **TML Environmental Policy & TATA Code of Conduct** amongst suppliers;
- Environmental performance evaluation and priority to “Green Suppliers”;
- **Encouraging suppliers to improve environmental performance** and implement **EMS;**
- **Reduce carbon footprint** and use of hazardous substances;
- Minimize logistics and packaging material, Maximize reuse and recycling.

## 12. Green Supply Chain Management

# Supplier Evaluation/audit :-




**Sustainability Guidelines for Suppliers** were prepared covering key topics;

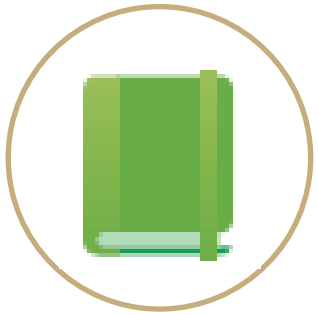
- ✓ Governance
- ✓ Legal Compliance
- ✓ Tata Code of Conduct
- ✓ Management System Certifications
- ✓ Environment & Climate Change
- ✓ Health & Safety
- ✓ Labor & Human Rights
- ✓ Transparency & Reporting

## 12. Green Supply Chain Management

## Supplier Evaluation :-GREEN CONSIDERATIONS IN CAPITAL EQUIPMENT PURCHASE

| Step 1 | Step 2 |
|---|---|
| **Request For Quotation**<br><br>Supplier submits following information for the proposed solutions<br>▪ Power Consumption<br>▪ Fuel consumption<br>▪ Air consumption<br>▪ Consumables required<br>▪ Green features :<br>▪ Hibernation mode if machine is non-operational<br>▪ Provision for monitoring of Power consumption and raising alarm in case power consumption is higher than set values.<br>▪ Cycle time | **Evaluation of equipment based on Green criteria**<br>▪ Machines are compared feature to feature and if any of the feature is missing supplier is asked to include the feature and send a fresh offer.<br>▪ Once both the machines are at par on the feature then energy requirement , green features are compared and evaluation made. |

## 12. Green Supply Chain Management



Green Procurement Policy

Education and awareness

Resource Conservation through SCM Systems

Efficiency Improvement Program for Suppliers

Resource Intensity Reduction in Supply Chain

**Baseline and target for reduction of Supplier's Resources Consumption**

**Year on Year Reduction Targets for suppliers :**

| Parameter | Short Term | Medium Term | Long Term |
|---|---|---|---|
| Energy, Water, Waste | 3% | 5 % | 5-10 % |

## 12. Green Supply Chain Management

### Supplier Evaluation/audit :-

Every year workshops on "Sustainable Supply Chain Initiative" are organized for our suppliers across locations, to create awareness on the importance of sustainable value chain and to communicate our Sustainability Guidelines and Baseline data template. Till FY 2021, we have organized around 32 workshops, covering 600 plus suppliers.


Workshop @ Pune


Workshop @ Lucknow


Workshop @ Jamshedpur

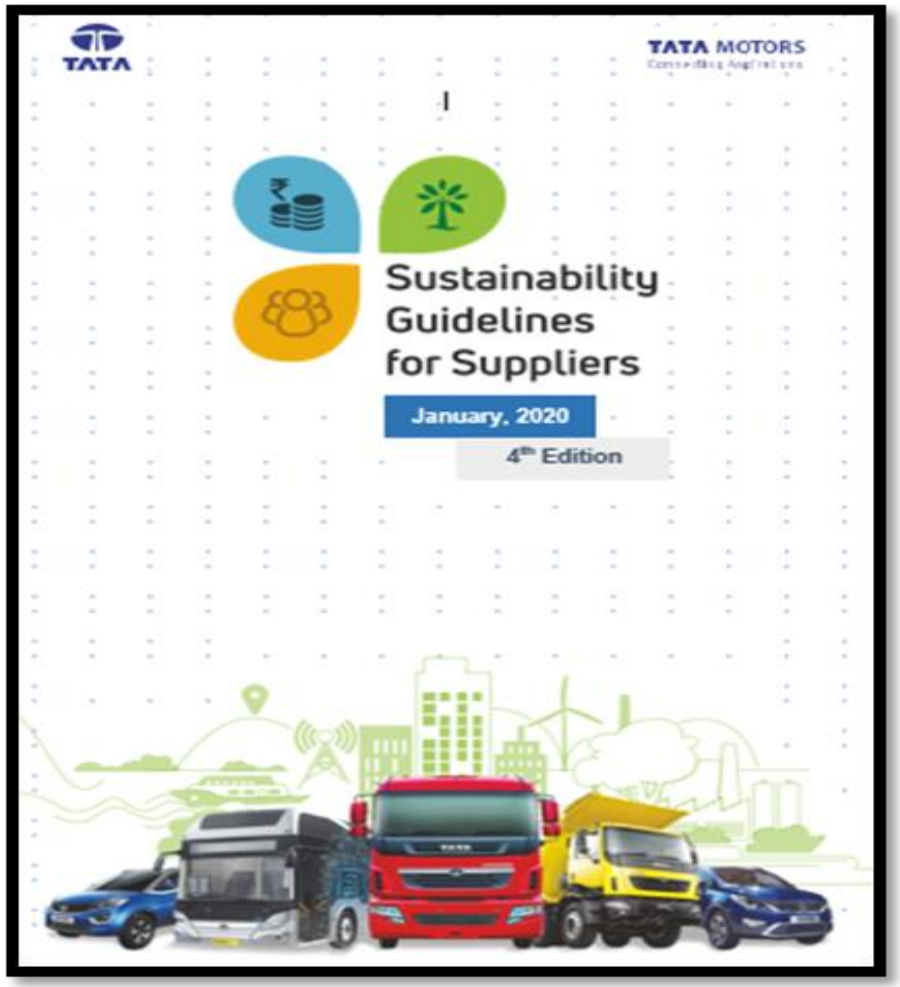

Workshop @ Pantnagar

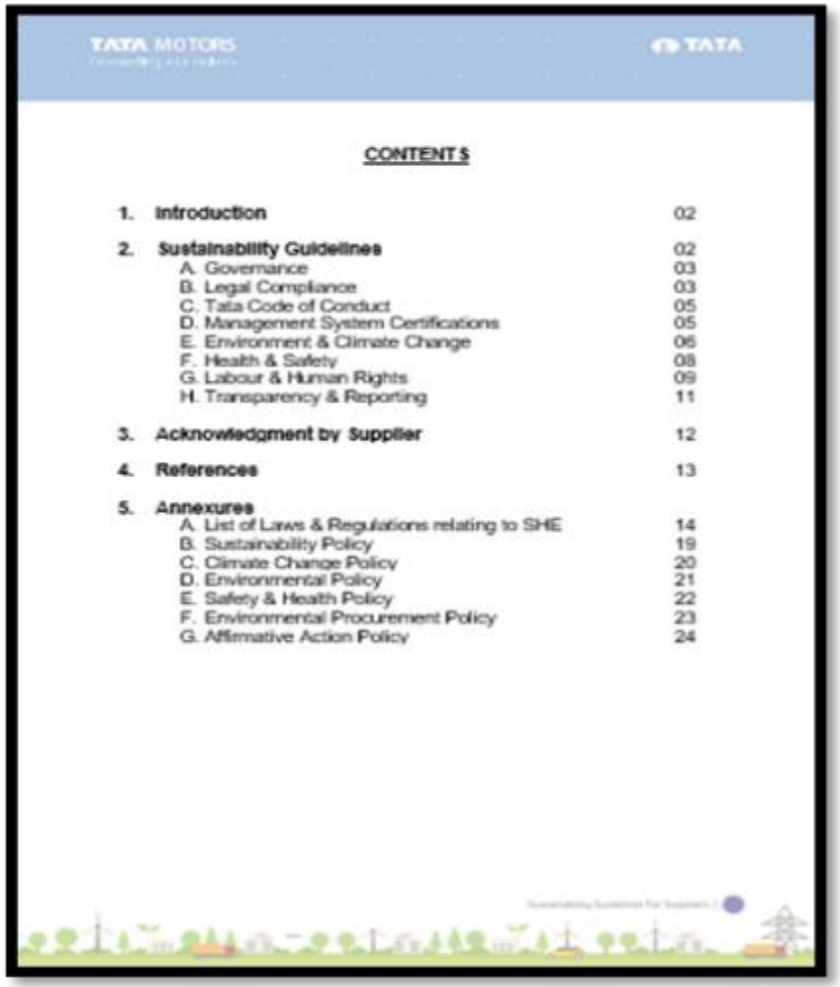

Workshop @ Pune


Workshop @ Dharwad

## 12. Green Supply Chain Management

# Sustainability Guidelines for Suppliers :-



## 12. Green Supply Chain Management

### Suppliers Evaluation/audit:-

Supplier site assessment involves verification of backup documents for data shared in baseline data template and a site round. Observations made during the assessment will be subsequently shared with supplier for closure. Based on criticality of observations, supplier will be categorized under RED, YELLOW, GREEN or BLUE band. In FY 2021, due to COVID-19 scenario, virtual assessments were carried out.

Child labor Prohibition Act displayed @ supplier site, Jamshedpur

Rain water harvesting @ supplier site Jamshedpur

Female workforce @ supplier site, Dharwad

ETP @ supplier site, Sitarganj

Designated fuel storage @ supplier site, Lucknow

Safety curtains @ supplier site, Pune

## 12. Green Supply Chain Management

# Benefits Achieved :- Rooftop Solar Power Generation Plant

Solar Panels @ supplier site, Dharwad

Roof top solar supplier site, Gurgaon

Roof top solar supplier site, Pune

**More Than 2MWp Roof Top Solar at Supplier END**

Roof top solar @ supplier site, Pune

Roof top solar @ supplier site, Bangalore

Roof top solar @ supplier site, Pune

# Learning from ISO50001: 2018

In Dec-2020, we have transition from ISO:50001:2011 version to ISO:50001:2018 version.

The ISO 50001-2018 standard helped in emphasizes the need for awareness on below aspects.

- Future energy planning.
- Risk Identification and assessment.
- Understanding needs and expectations (Internal/External Stakeholder)
- Standardize process of evaluation of legal and other requirement.
- External Issues / Internal Issues.

Summary-

One of the most valuable aspects of the energy management system is a structure that allows plant energy managers to share their challenges, successes, and concerns.

Sharing updates and best practices in an open forum provides fertile ground for identifying and leveraging opportunities especially with multiple plants in operation.

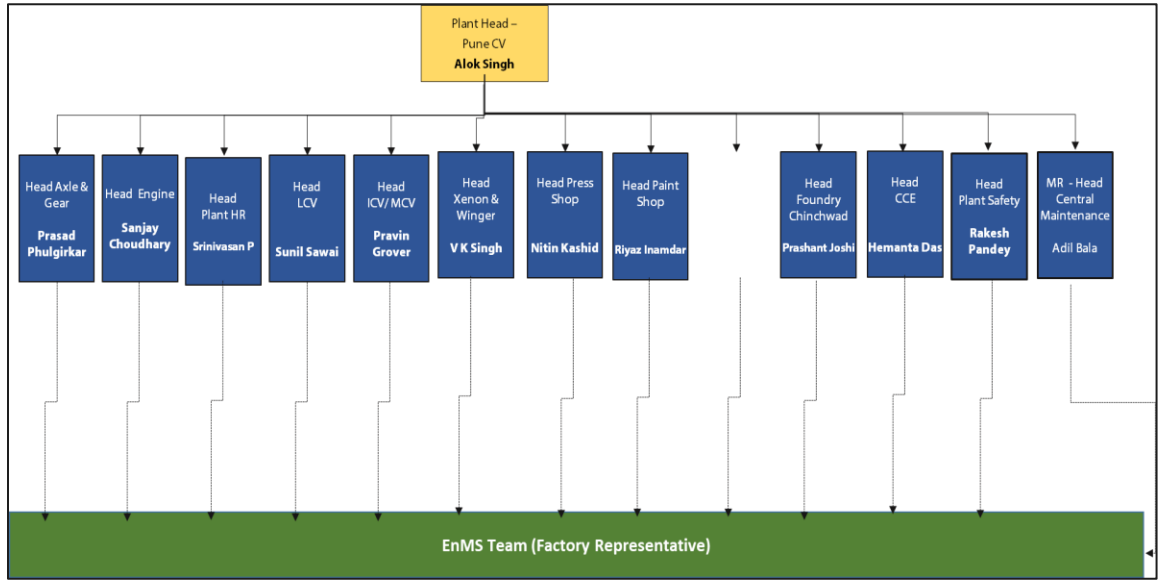
## 10. TEAM WORK

# Employee Involvement

## 11. Team Work, Employee Involvement & Monitoring

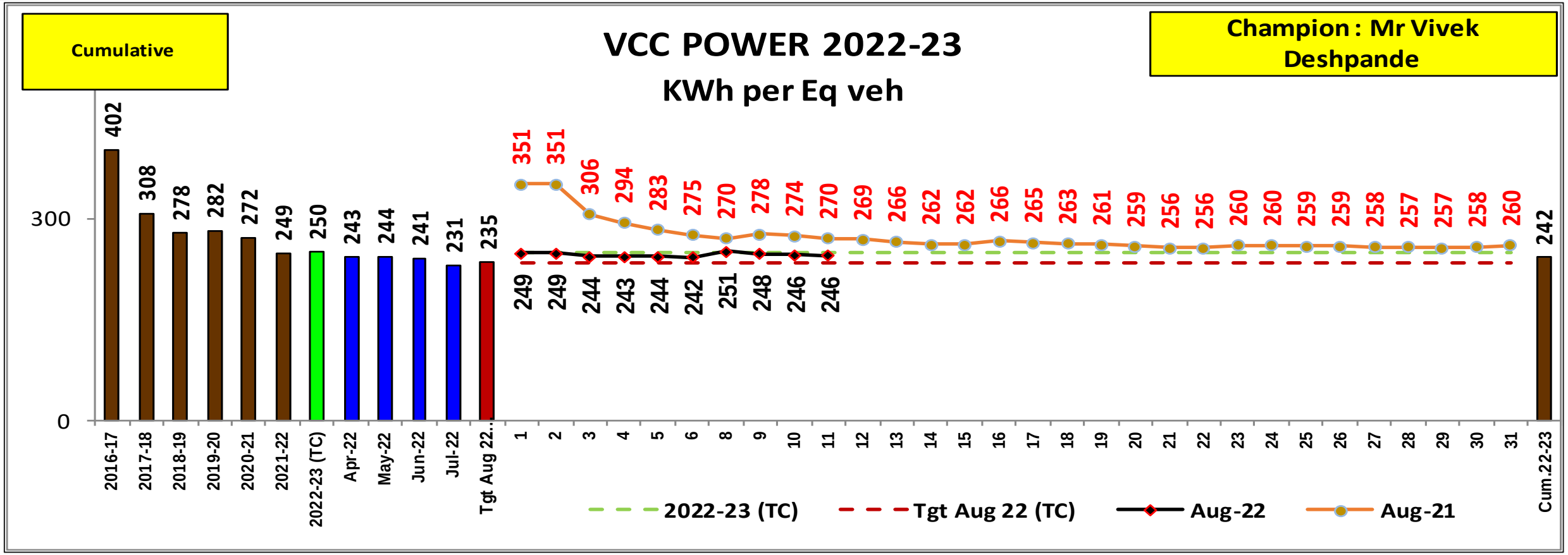
### 2.Review meeting chaired by Plant Head.

### Hierarchy of Energy Management System



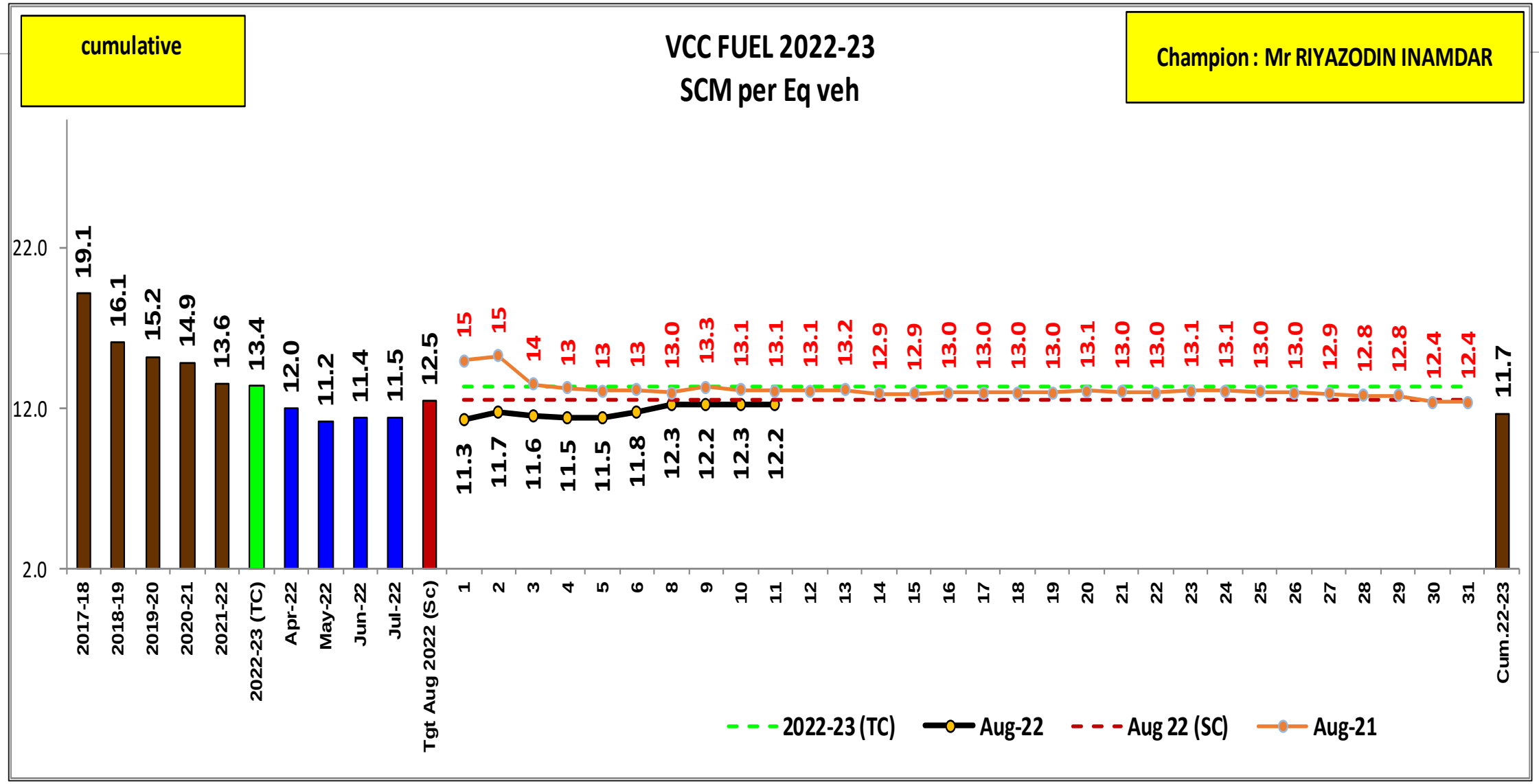

| ENERGY TEAM Factorywise Responsibilities & Authorities | | | |
|---|---|---|---|
| Champion (MR) | Mr Adil Bala | Chinchwad Foundry | Mr Pankaj Patil |
| Axle Factory | Mr Balasaheb Pawar | | Mr Sandip Takvane |
| Gear Factory | Mr Sanjay Dhake | | |
| | Mr Raju Ghadge | | |
| Engine Factory | Mr Girish Kulkarni | CC & E - Electircal Pimpri | Mr Rohan Shinde |
| | Mr Sanjay Gaikwad | CC & E - Electircal Chinchwad | Mr Vinod Yadav |
| | Mr Sunil Chavan | CC & E - Mechanical | Mr Mahindra Hingse |
| Press Shop Factory | Mr Pankaj Thaman | | Mr Shyam Mahindrakar |
| Paint Shop | Mr Sachin Kasture | CC & E - ETP, WTP & HAZ. WASTE | Mr Prashant Patil |
| ICV | Mr Yogesh Sakhare | PE | Mr Shrikant Bhide |
| LCV | Mr Dhananjay Shahane | ERC | Mr Mahesh Chougule |
| Winger | Mr Vijaykumar Mulay | TS | Mr Asit Pandya |
| Xenon | Mr Pankaj Joshi | Training | Mr Sushil Warang |
| Central Co-ordinator (Energy Cell, Utility & CMS) | Mr Hementa Das | | |
| | Mr Milind Mench | | |
| | Mr Vivek Deshpande | | |
| | Mr Arjunsingh Panwar | | |
| | Mr Mahesh Raste | | |

# VCC : Daily Power Performance Monitoring (Kwh / Eq Veh)



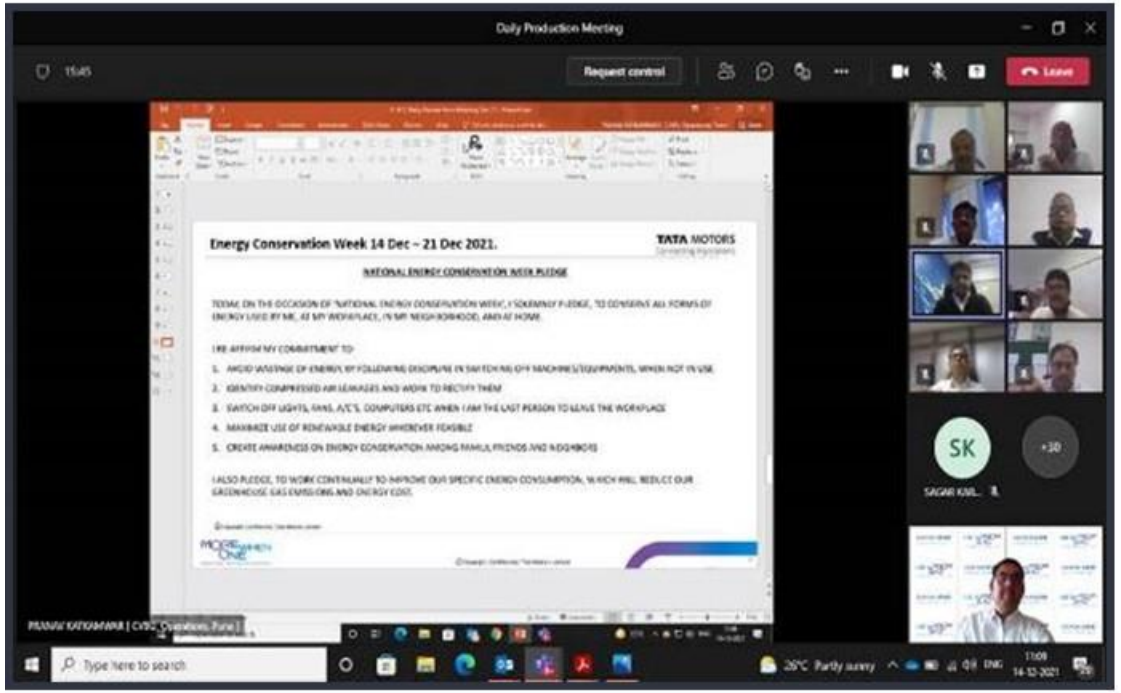

| DATE Aug-22 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ROLL OUT | 246 | 235 | 325 | 304 | 295 | 284 | - | 302 | 319 | 269 | 288 | 2,867 |
| EQ VEHICLES | 677 | 726 | 747 | 748 | 750 | 737 | 4 | 729 | 778 | 748 | 692 | 7,334 |
| Elect KWh | 1,36,489 | 1,46,882 | 1,42,439 | 1,46,082 | 1,47,920 | 1,38,393 | 34,468 | 1,41,948 | 1,43,668 | 1,38,080 | 1,30,384 | 14,46,754 |
| Comp air KWh | 32,199 | 33,926 | 33,323 | 34,171 | 34,702 | 33,966 | 13,777 | 34,618 | 33,527 | 34,157 | 36,263 | 3,54,630 |
| Total Elec + Comp air | 1,68,688 | 1,80,809 | 1,75,762 | 1,80,253 | 1,82,621 | 1,72,359 | 48,245 | 1,76,566 | 1,77,195 | 1,72,237 | 1,66,648 | 18,01,384 |

# –DWM - VCC Fuel (SCM / Eq Veh)



## 11. Team Work, Employee Involvement & Monitoring

### ENERGY CONSERVATION WEEK CELEBRATION




**National Energy Conservation Pledge By Plant Head, Factory Head, Functional Head and at Department and Shop Floor Level**

### Energy Oath glimpse.

## 11. Team Work, Employee Involvement & Monitoring

### ENERGY CONSERVATION WEEK CELEBRATION

***USS 171 Energy Conservation Suggestion Scheme Award declared during National Energy Conservation Month Celebration, 17 Dec 2021 to 20 Jan 2022.***

***Best Suggestion award is won By " Chinchwad Foundry "***
**Plant head Mr. Alok Singh handed over trophy to Mr. P P Joshi and Team from Chinchwad Foundry.**

***Contribution Award Winner :***
*1st Runner Up Winner – Gear Factory*
*2md Runner winner – Chinchwad Foundry .*
*3rd Runner Up winner – Engine Factory.*

***Plant Head Mr. Alok Singh appreciated Mr. Ashok Siddhabhatti for* taking Suggestion & KTL to Tata Group Level & National**

## 11. Team Work, Employee Involvement & Monitoring - IDEA GENERATION WORKSHOPS

| Approach | Method | Design | Procedure |
|---|---|---|---|
| • Energy Savings Idea Generation Workshop factory level & Plant Level FY 21-22. | ▪ GEAR Methodology<br>▪ Virtual Idea Generation workshop. | Tools Developed<br>▪ GEAR Tool<br>▪ Horizontal deployment of Good practices. | ▪ Factory Level & Plant Level Workshop Year Mapping Plan.<br>▪ Confirm Adherence of each factory as per planned.<br>▪ Create a Database of Generated Ideas<br>▪ Follow up of Ideas up to R stage. |

### Result

**Plant & Factory Level Idea Generation Workshop**

| Se No. | Factory | No. of Ideas Generated | Date |
|---|---|---|---|
| 1 | Plant Level | 14 | 07-Apr-21 |
| 2 | Press Factory | 30 | 20-Apr-21 |
| 3 | LCV Factory | 33 | 27-Apr-21 |
| 4 | Paintshop | 88 | 05-May-21 |
| 5 | Engine Factory | 35 | 09-Jul-21 |
| 6 | Axle Factory | 32 | 15-Jul-21 |
| 7 | Plant Level (Compressed Air) | 35 | 29-Jul-21 |
| 8 | Gear Factory | 30 | 13-Aug-21 |
| 9 | Plant Level (Fuel) | 18 | 17-Aug-21 |
| 10 | Winger Factory | 18 | 29-Sep-21 |
| Total | Total | 333 | |

- Workshop Conducted **@ 10 Nos.**
- No. of Ideas Generated **@ 333 Nos.**
- Potential Saving in ₹ Lakhs **@ ₹487 Lakhs**
- Total Realization YTD Mar 22 **-238 Lakhs**

| CVBU Pune | G | E | A | R |
|---|---|---|---|---|
| No. of Ideas | 333 | 87 | 38 | 28 |
| Annualized Saving (₹ in Crs) | 4.87 | 4.81 | 3.76 | 2.38 |

Factory Level Workshop

# – Energy Efficiency Training Program

## CII - ONLINE COURSE ON CERTIFIED PROFESSIONAL IN ENERGY EFFICIENCY ON 29 JUNE - 01 JULY 2021


| Nominations | | | | | | | |
|---|---|---|---|---|---|---|---|
| Factory | Employee Name | Ticket No. | Email ID | Contact Details | Cost Centre | Designation | Completion Remark |
| LCV | Mr Dhanajay Shahane | 224192 | dhananjay.shahane@tatamotors.com | 8605012045 | 1112382 | Deputy General Manager | Completed |
| ICV | Mr Santosh Londhe | 177683 | santosh.londhe@tatamotors.com | 9922437557 | 1119318 | Executive | Completed |
| Xenon | Mr Pankaj Joshi | 523229 | PSJ523229@tatamotors.com | 7276097967 | 1119328 | Senior Manager | Completed |
| CWD Fdy | Mr Sandip Takavane | 651909 | sandip.takavane@tatamotors.com | 9922930481 | 1118460 | Deputy General Manager | Completed |
| Maval Fdy | Mr Pramod Bhage | 102121 | pramod.bhage@tatamotors.com | 9922443903 | 1118914 | Senior Manager | Completed |

- **Total 5 People appear for the training.**
- **Total 5 People clear the exam after training.(Completed training successfully)**

## – 11. CII 21st National Award for Excellence in Energy Management 2021

**The 22nd edition of the CII National Award for Excellence in Energy Management 2021, which concluded on 27th August 2021, witnessed enthusiastic participation across our 7 plants. Three awards won by CVBU Pune**




## – 11. CII 21st National Award for Excellence in Energy Management 2020


Excellence in Energy Efficiency unit Award


TATA MOTORS CVBU Pune Won " **CII National Award for Excellence in Energy Efficiency Unit 2020**" and Prestigious " **CII National Energy Leader award 2020**"

CII National Energy Leader award

**CII 21st National Award for Excellence in Energy Management 2020**

# 12. Any Other Relevant Information

## Recognition / Awards


**2018**

**"CII - National Award for Excellence in Energy Management Award -2018"**

**TATA Motors Ltd., CVBU Pune Won the "CII- National Energy Leader Award -2018"**


**2019**

**"CII - National Award for Excellence in Energy Management Award -2019"**

**TATA Motors Ltd., CVBU Pune Won the "CII-National Energy Leader Award -**

**2017**

**TATA Motors Ltd., CVBU Pune Won the "CII- National Award for Excellence in Energy Management -2017" and declared as "Excellent Energy Efficient Unit"**


**"CII – Green Co Gold Rating Award -2017"**

**TATA Motors Ltd., CVBU Pune** Won the **"CII- Green Co Gold Rating Award-2017"** at Green Co Summit organized by Confederation of Indian Industries at Pune.

## 12. Any Other Relevant Information

### Recognition / Awards


**"RE Excellence End User Award 2018"**

**TATA Motors Ltd., CVBU Pune** Won the "**RE Excellence award – End User Category"** at REI summit organized by UBM group at Greater Noida.

**"BEE - National Energy Conservation Award -2017"**

TATA Motors CVBU Pune has been awarded the "Certificate of Merit" of National Energy Conservation Award 2017, in Automobile Manufacturing category by Bureau of Energy Efficiency (BEE), Ministry of Power, Government of India.


**"Golden Peacock Award for Energy Efficiency -2017"**

**TATA MOTORS CVBU PUNE Won the "Golden Peacock Award for Energy Efficiency" in**"19th World Congress on ENVIRONMENT MANAGEMENT"**,** On 7th July, 2017 in Hyderabad.

# 13. Long Term Vision on EE

Design

**LONG TERM SUSTANABILITY**

**(3 ACTION PILLARS)**

Technology

Operation & Maintenance

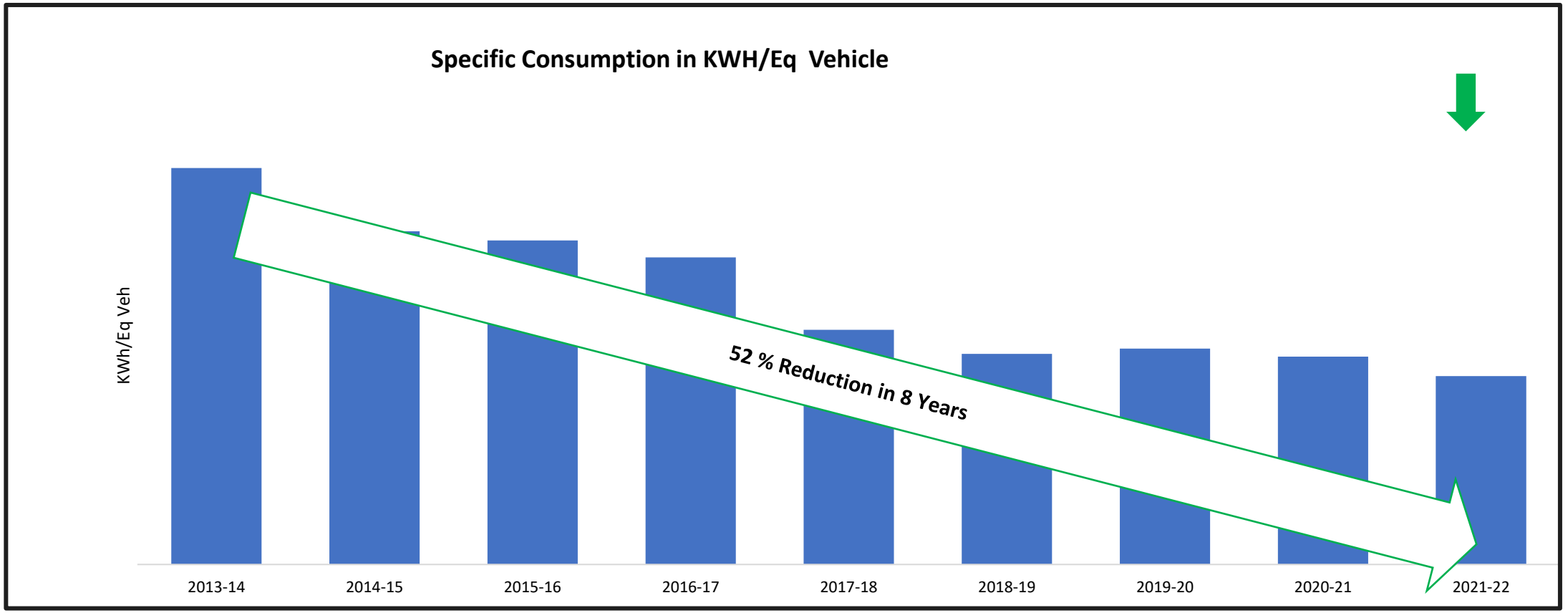
## 13. Long Term Vision on EE

### Long Term Vision on EE - Energy Efficiency:-

TATA Motors CVBU Pune Plant follows the ISO:50001 Energy Management System and will continue to refine all process to improve the Energy Efficiency.

We are following robust process of assessment of performance vis-à-vis comparative information / benchmark from different organisation and standards for.

- ❑ Optimise Resources
- ❑ Adapt Latest Technology
- ❑ Innovations
- ❑ Maximise Renewable Energy
- ❑ Science Base Target to Reduce Carbon Footprint


Specific Consumption in KWH/Eq Vehicle
KWh/Eq Veh
52 % Reduction in 8 Years
2013-14
2014-15
2015-16
2016-17
2017-18
2018-19
2019-20
2020-21
2021-22

# THANK YOU