Emission Solutions

National Award for Excellence in Energy Management 2024

Presenter Name- Murali Nagaraj / Abhijeet Parsewar

Sponsor Name- Rakesh Bhosale

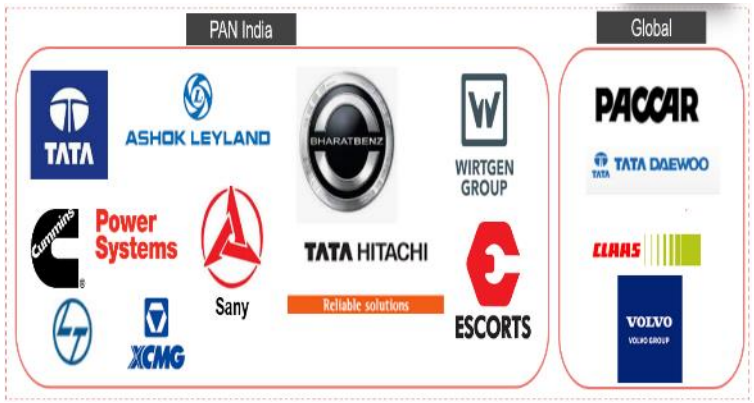
Team-Bhushan Dhaigude, Tejaswini Nayak, Vikas Panwal

10th Sep 2024

Presentation Index

Cummins Emission Solution India PCP2 Plant

Customers



People

- Total Strength : 800
- Contract and 3PL : 400

SME

- SME : Welding (6)
- SME : Controls (8)
- SME : Robotics (4)

Process

- SOT audits
- HSEMS Certification
- IATF Certification
- Skill Development and Evaluation
- Outbound 90% returnable,
- Inbound 45% Returnable packaging

Electrical Infra-

- Connected Load – 4569 KW
- Contact Demand -1000 KVA
- Renewable Capacity -1 MW

Manufacturing Technology

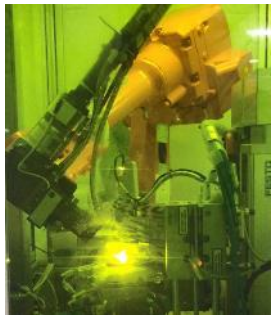
Final Assembly Line	: 3
Mixer Lines (Sub Line)	: 2
LV Line	: 1
Service Line	: 1
Total Annual Capacity	: 300K EGP

Cobot

Robot

Vacuum Manipulator

3D Scanner
Carl Zeiss



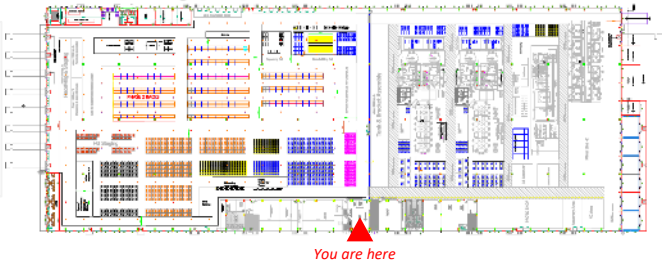
MIG, TIG &
Laser Weld

ASRS

Area Statement

Total	: 240K sq.ft.
Warehouse	: 130K sq.ft.
Manufacturing	: 110K sq.ft.

Plant Layout



Manufacturing Strategy

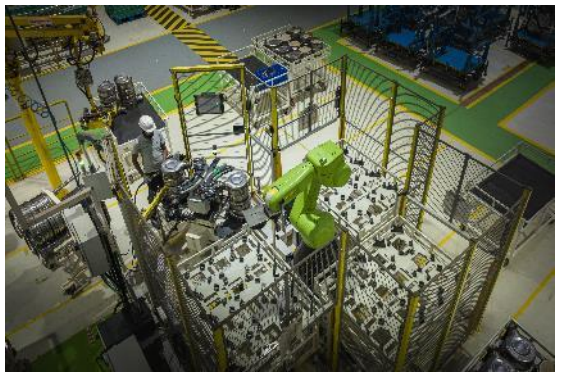
Modules DRT | Mixer | Stacking & Clocking | Final Assembly | Doser

Buy | Make

Size of Plant is 7 Acers

Xeriscape Garden

Dock Guardian /Barrier System



Stacking Clocking Robots

Vehicle Wheel Lock System

AMR

Cummins Sustainability Goals

OUR 2050 ASPIRATIONAL TARGETS

COMMUNITIES ARE BETTER BECAUSE WE ARE THERE

2050 TARGETS:

- ☐ Net positive impact in every community where we operate
  = Sum of environmental good > Local environmental footprint
- ☐ Near zero local environmental footprint

DOING OUR PART TO ADDRESS CLIMATE CHANGE AND AIR EMISSIONS

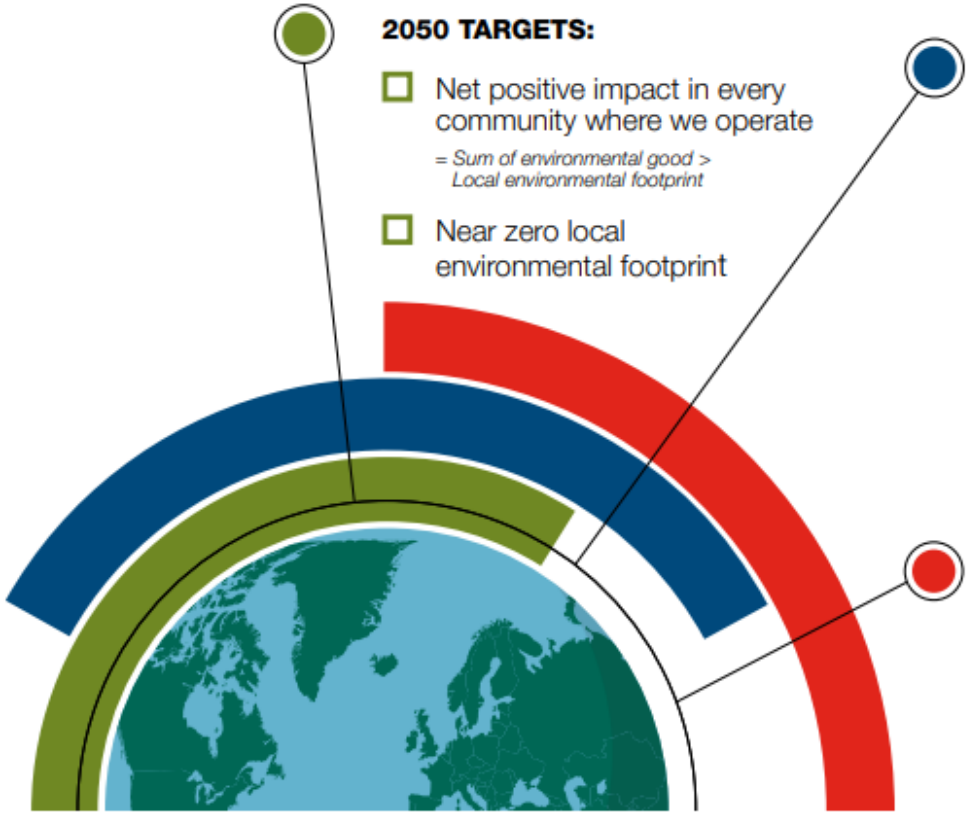
2050 TARGETS:

- ☐ Customer success powered by carbon neutral technologies that address air quality
- ☐ Carbon neutrality and near zero pollution in Cummins' facilities and operations

USING NATURAL RESOURCES IN THE MOST SUSTAINABLE WAY

2050 TARGETS:

- ☐ Nothing wasted
  - » Design out waste in products and processes
  - » Use materials again for next life
  - » Reuse water and return clean to the community



PLANET 2050

PROSPERITY | LEADERSHIP | ADVOCACY | NURTURE | ENVIRONMENT | TOGETHER™

NOTES
References to "facilities" relate to all consolidated operations and joint ventures subscribing to Cummins' Enterprise Environmental Management System.
Goals will be periodically assessed for progress and continued practicability.

OUR EIGHT 2030 GOALS

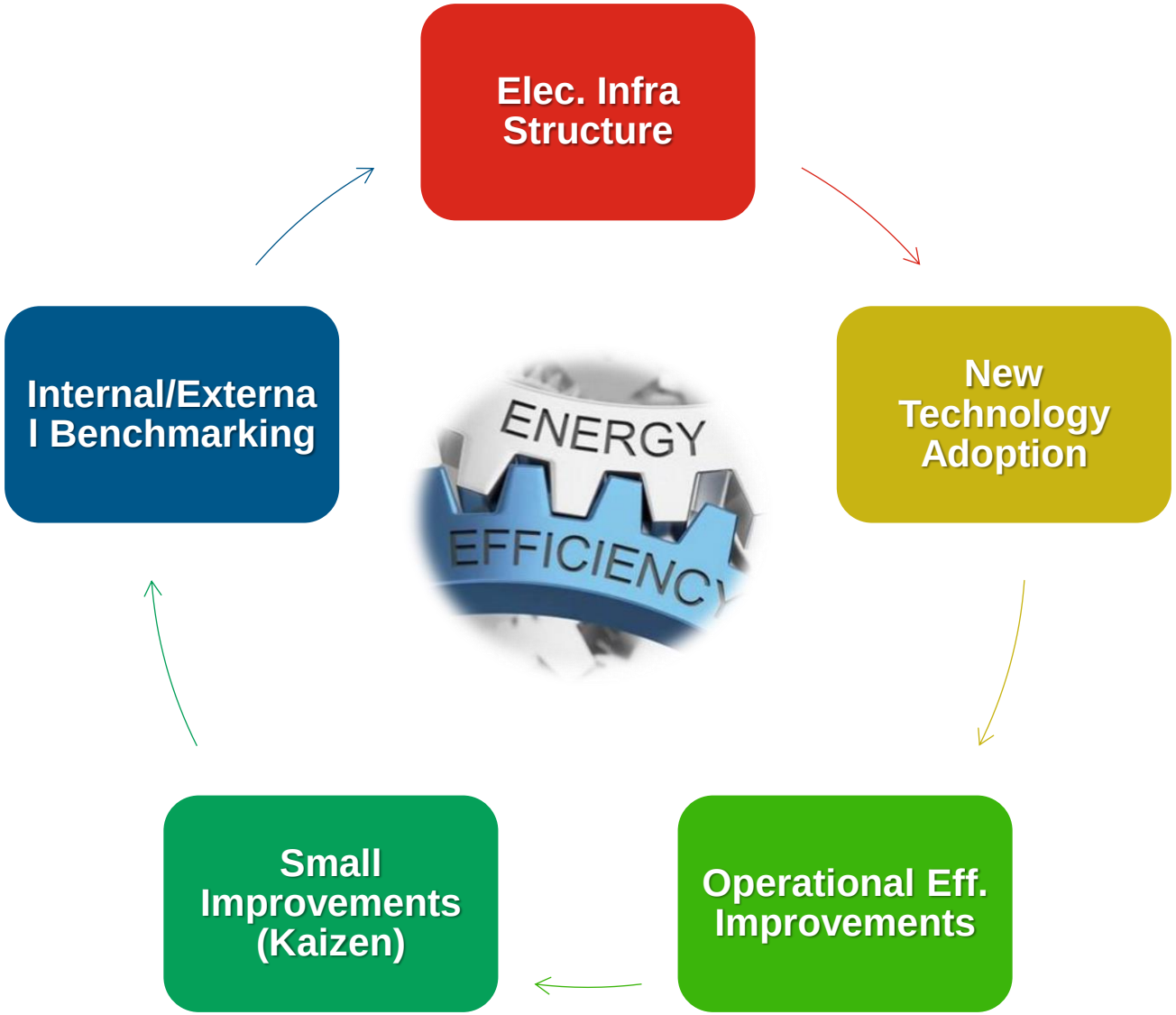
SCIENCE-BASED TARGETS

1. Reduce absolute greenhouse gas (GHG) emissions from facilities and operations by 50%.
2. Reduce scope 3 absolute lifetime GHG emissions from newly sold products by 25%.
3. Partner with customers to reduce scope 3 GHG emissions from products in the field by 55 million metric tons.
4. Reduce volatile organic compounds emissions from paint and coating operations by 50%.

CIRCULAR ECONOMY

5. Create a circular lifecycle plan for every part to use less, use better, use again.
6. Generate 25% less waste in facilities and operations as a percent of revenue.
7. Reuse or responsibly recycle 100% of packaging plastics and eliminate single-use plastics in dining facilities, employee amenities and events.
8. Reduce absolute water consumption in facilities and operations by 30%.

Energy Efficiency Methodology

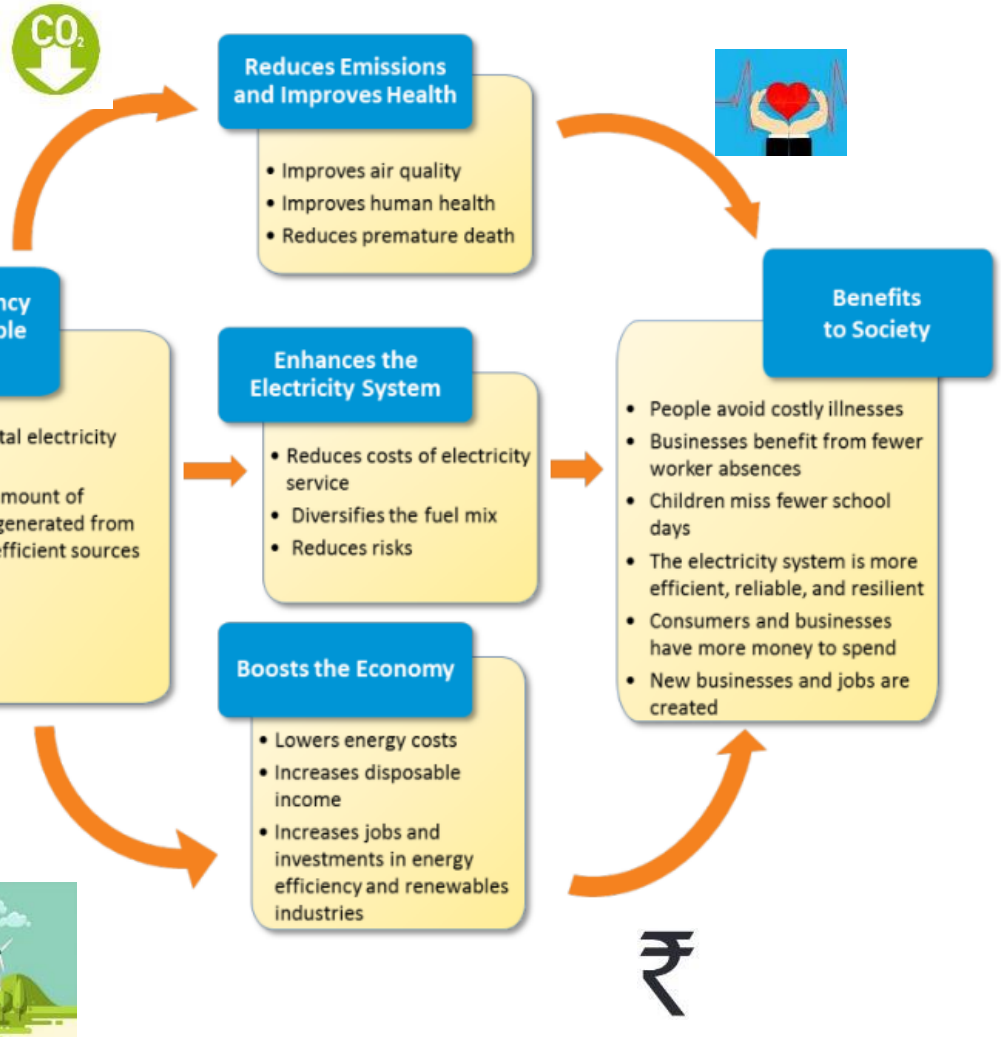


Energy Management and Energy Flow Diagram

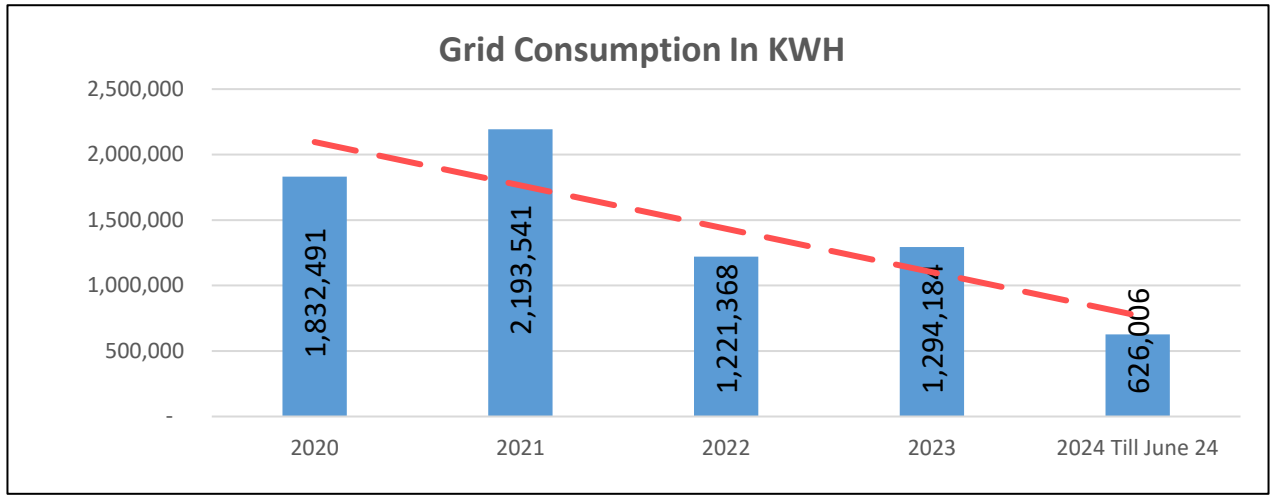
Electrical Power Sources

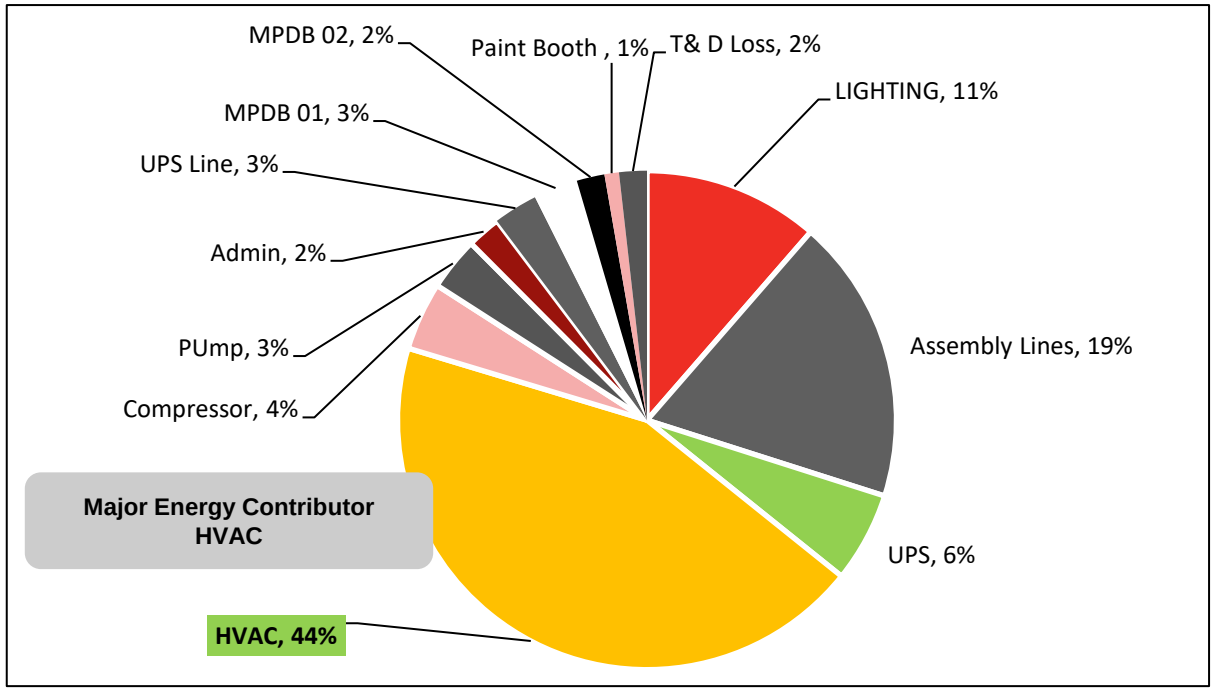
	Grid Power	Own Generated Power	Back Up Power
	Purchase Electricity Connecting Load 4569 KW Contract Demand 1000KVA	**Solar** Capacity- 1MW	**Diesel Generator** Capacity=2x1250 KVA
2019-20	Unit Rate 8.9 Rs./KWH	Unit Rate 6.4 Rs./KWH	Unit Rate 26.57Rs./KWH
2020-21	Unit Rate 9.04 Rs./KWH	Unit Rate 6.54 Rs./KWH	Unit Rate 26.89 Rs./KWH
2021-22	Unit Rate 10.20 Rs./KWH	Unit Rate 7.7Rs./KWH	Unit Rate 27.24 Rs./KWH
2022-23	Unit Rate 11 Rs./KWH	Unit Rate 7.7 Rs./KWH	Unit Rate 30.67 Rs./KWH
2023-24	Unit Rate 12 Rs./KWH	Unit Rate 7.7 Rs./KWH	Unit Rate 35.67 Rs./KWH

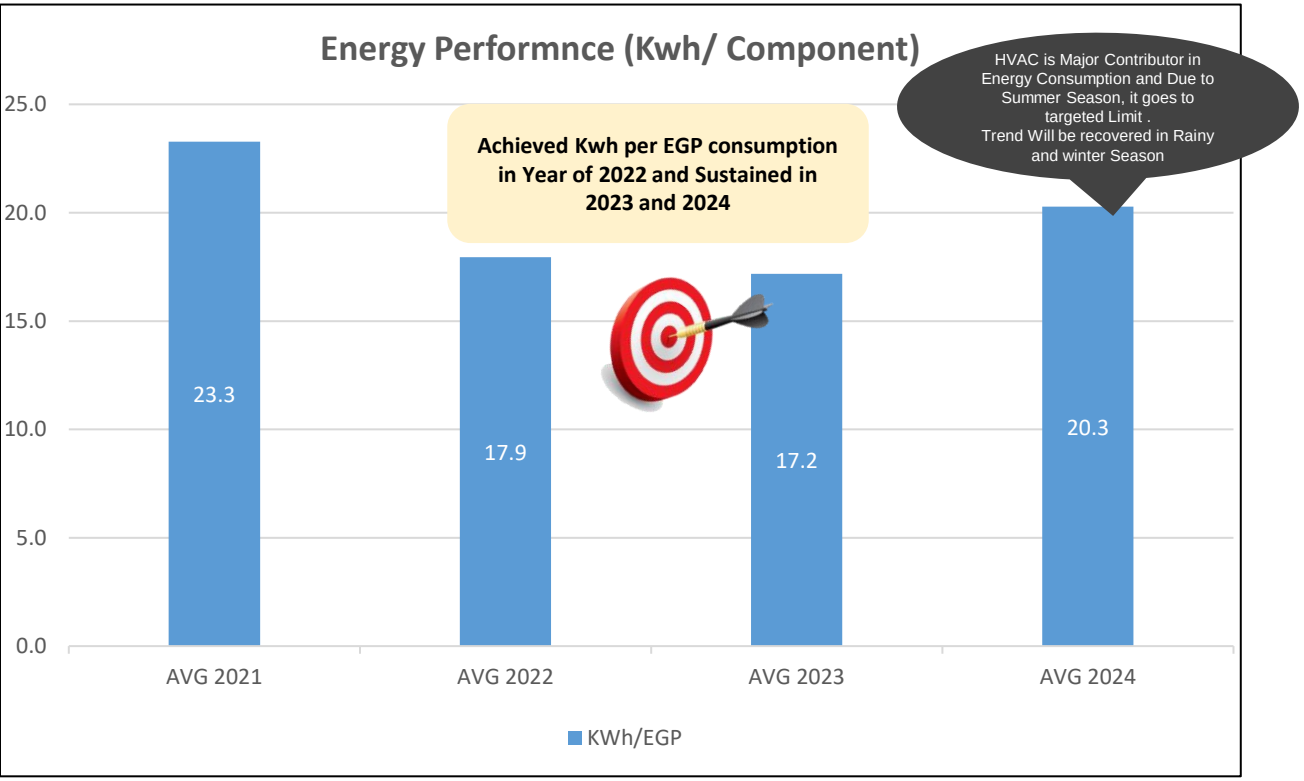
Why Energy Management ?



Energy Trends and Overview



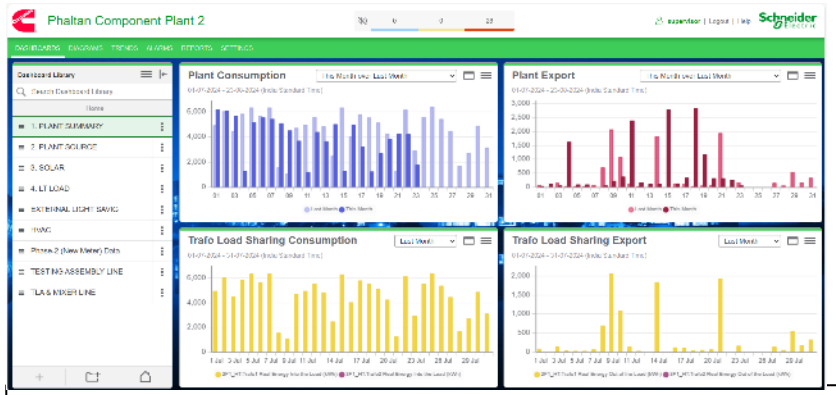


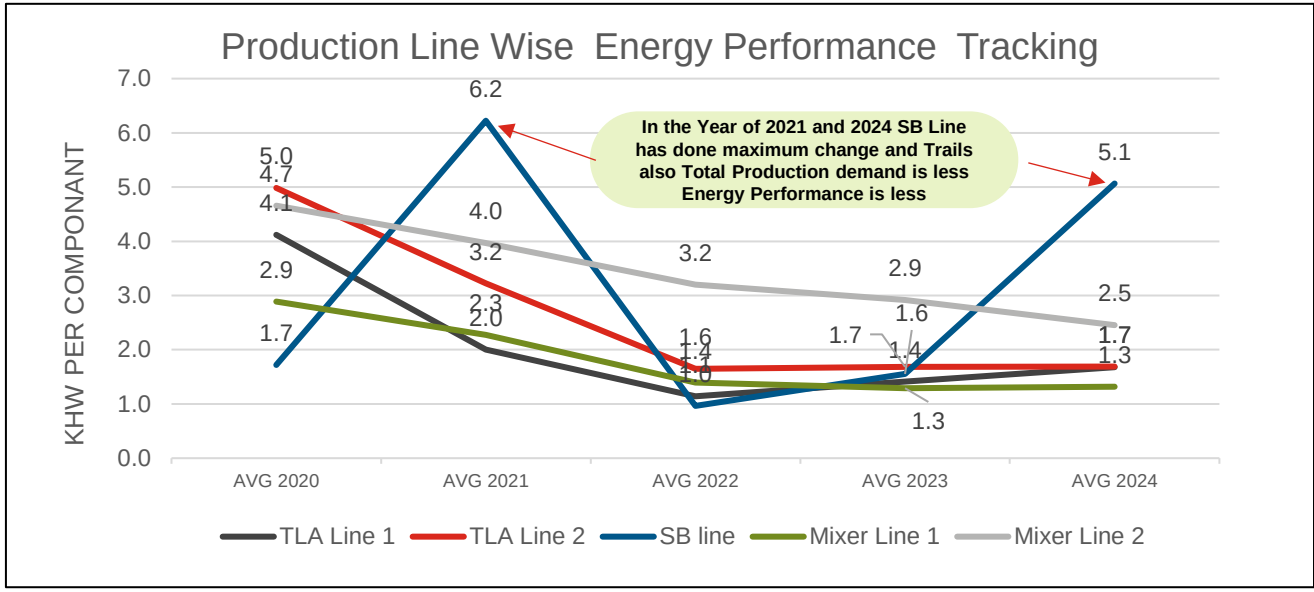


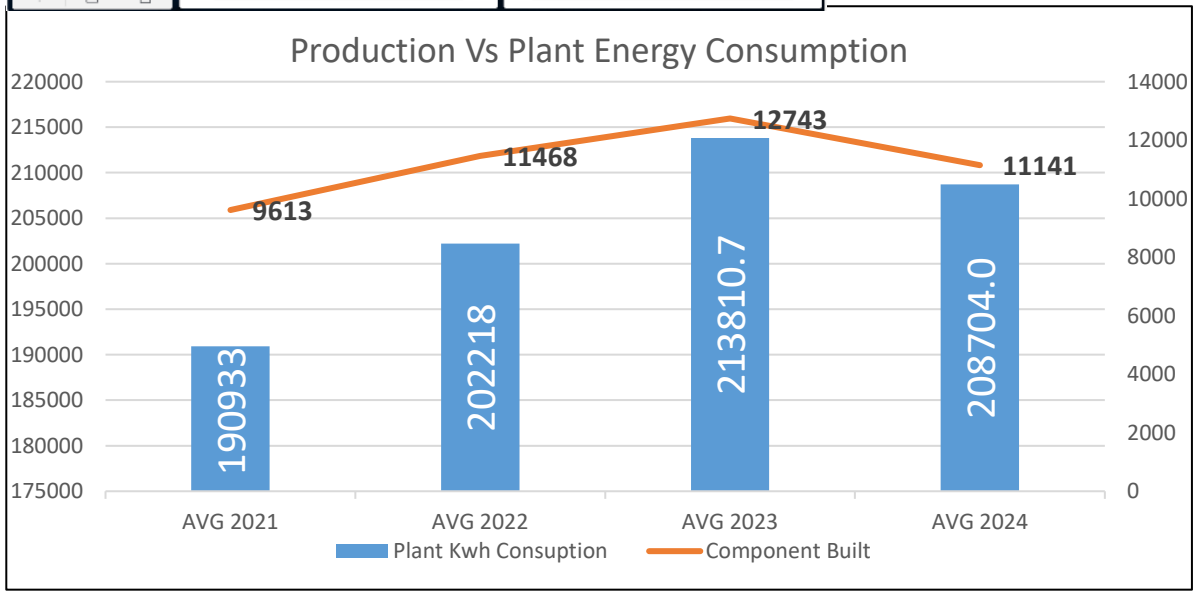
Energy Tracking At Each Level

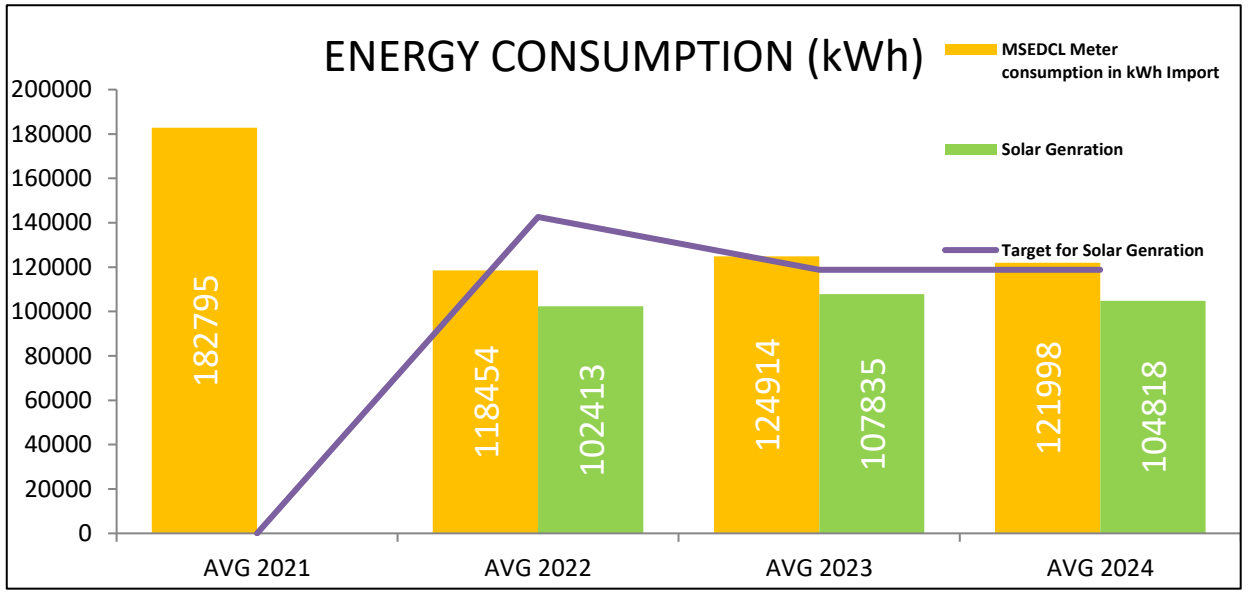
- We have Schneider make energy management system with up to 12th level of metering (150+ Metering Devices)to do micro level analysis of energy consumption.

- We have 3 main Assembly line(TLA 1, 2 and SB Line) and 2 Sub Line (Mixer 1 and 2)
- Energy consumption monitoring done every levels like lines and other areas and suitable action taken in accordance to meet energy performance target









Energy Conservation Drive and Formation OF Energy Committee

Energy Treasure hunt Drive

Plan for energy treasure hunt for PCP2. - Message (HTML)

File Message Help Tell me what you want to do

Delete Respond Sensitivity Share to Teams Quick Steps Move Tags Editing

Sensitivity Teams Quick...

Plan for energy treasure hunt for PCP2.

BD Bhushan Dhaigude

To Abhijeet Parsewar; Sudhakar Haval; Ajit Talekar; Akash B Karche; Pushpa Kanase; Amir R Tamboli; Adinath A Bhabad; Yogesh B Khaire; Rutuja Bobade

30-09-2021

Retention Policy Default 3 Years Delete (3 years, 6 ı Expires 30-03-2025

Dear all,

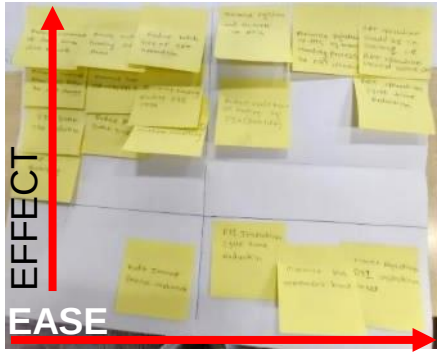
We have planned for energy treasure hunt for PCP2. I will share check shortly

Date- 03-10-2021

Time -9.30 AM to 10.30 AM

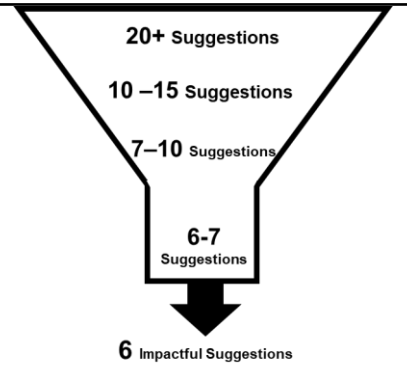
Regards,
Bhushan Dhaigude

Prioritizing the idea/suggestion



Nos. of suggestion collected

Shift operation optimization & saving in power consumption
Solar power generation utilization
Additional HVLS fan for better ventilation(To reduce HVAC outdoor heat load in NPD)
Admin Indoor AC units ON OFF control thorugh sensor
UV filming for all windows at south & east sides
Power management-Isolation for unused lights and light fittings shifting above duct area
Power management-Cyclic Timmer installation for canteen AC, Fresh Air & exhaust fans
Installation of Motion sensors and Pull Cord (Admin Building Ground Floor & First Floor)
Reduction in HVAC consumption by 5% as compair to 2021
Planned to Install digital timers -Compressor exhaust FANs , LT Room exhaust Fans, Admin Toilet Exhaust fans
Power quality improvement, Power factor improvement & maintain also reduce reactive power
Lighting circuit modification in machine shop
Windmill Implementation
100% LED for lighting
Sensor operated lights for washroom and admin passage
Astronomic timer for streetlight operation
Level sensors for water pumps operation
Solar Car and Bike parking shade
Presence for light operation inside rack
Efficient motor utilization /Replacement pf motor with IE
Solar heater for dishwashing process



RE: Energy Committee Meeting For PCP2 Plant.

BD Bhushan Dhaigude

To Shrihari Danekar; Atul Zanje; Santosh K Salunkhe; Vijay K Raut; Mayuri Jagtap; Varsha Kutwal; Shubham More; Sujata Madhav kar

Cc Abhijeet Parsewar; Harshvardhan Patil; Rakesh K Bhosale

Retention Policy Default 3 Years Delete (3 years, 6 months)

This is the most recent version, but you made changes to another copy. Click here to see the other

Thanks for joining meeting for energy committee ,

Team attendance
1. Vijay Raut
2. Dhanashri Kashid
3. Akshay Nikam
4. Nitin Shinde
5. Suraj Gaikwad.

Today's discussion points as below.

1. Overall energy consumption of plant.
2. Energy saving projects and current status.
3. Area wise energy consumption.

Energy Saving Year wise (Projects & Saving)

Year	Project Title	Status	Saving Realized (in Kwhr.)
2021	UV filming for all windows at south & east sides	Completed	**44,600 PA**
	Power management-Cyclic timmer installation for canteen AC, Fresh Air and exhaust fans		
	Installation of Motion sensors and Pull Cord for Lights(Admin Building Ground Floor & First Floor)		
	Reduction in Air compressor Power consumption By Leake Monitoring		
2022	1 MW solar power generation utilization	Completed	**22,00,000 PA**
	Additional HVLS fan for better ventilation (To reduce HVAC outdoor heat load)		
	Admin Indoor AC units ON OFF control thorugh sensor		
	Power management-Isolation for unused lights and light fittings shifting above duct area		
2023	1 MW solar power generation utilization (Continued)	Completed.	**13,00,000 PA**
	Admin Indoor AC units ON OFF control thorugh sensor Phase 2		
	Tubuler solar lights for warehouse phase 1		
	Power quality improvement, Power factor imrovement & mainatain also reduce reactive power		
2024	PCP 2 150 KWH solar project	Implementation InProgress	**Implementation InProgress Target to reduce : 14,00,000 PA**
	Tubular solar lights for warehouse phase 2		
	EC Fan Replacement for fume Extraction system AHU		
	Advance system for solar cleaning system to get maximum benefits for solar plant		
	Air Curtain for Manufacturing area rapid doors to optimise AC losses		
	Air Flow Management by automatic isolation		
2025	Air Flow Management by automatic isolation	Next Year Planned Project	Next Year Planned Project
	Shop Floor Ac VRV System Modification		
	Shop Floor centralize Operation with Digitalization of Control		
	Power quality improvement, Power factor improvement & maintain also reduce reactive power Phase II		

Innovation- Sky pipe for sunlight Utilisation

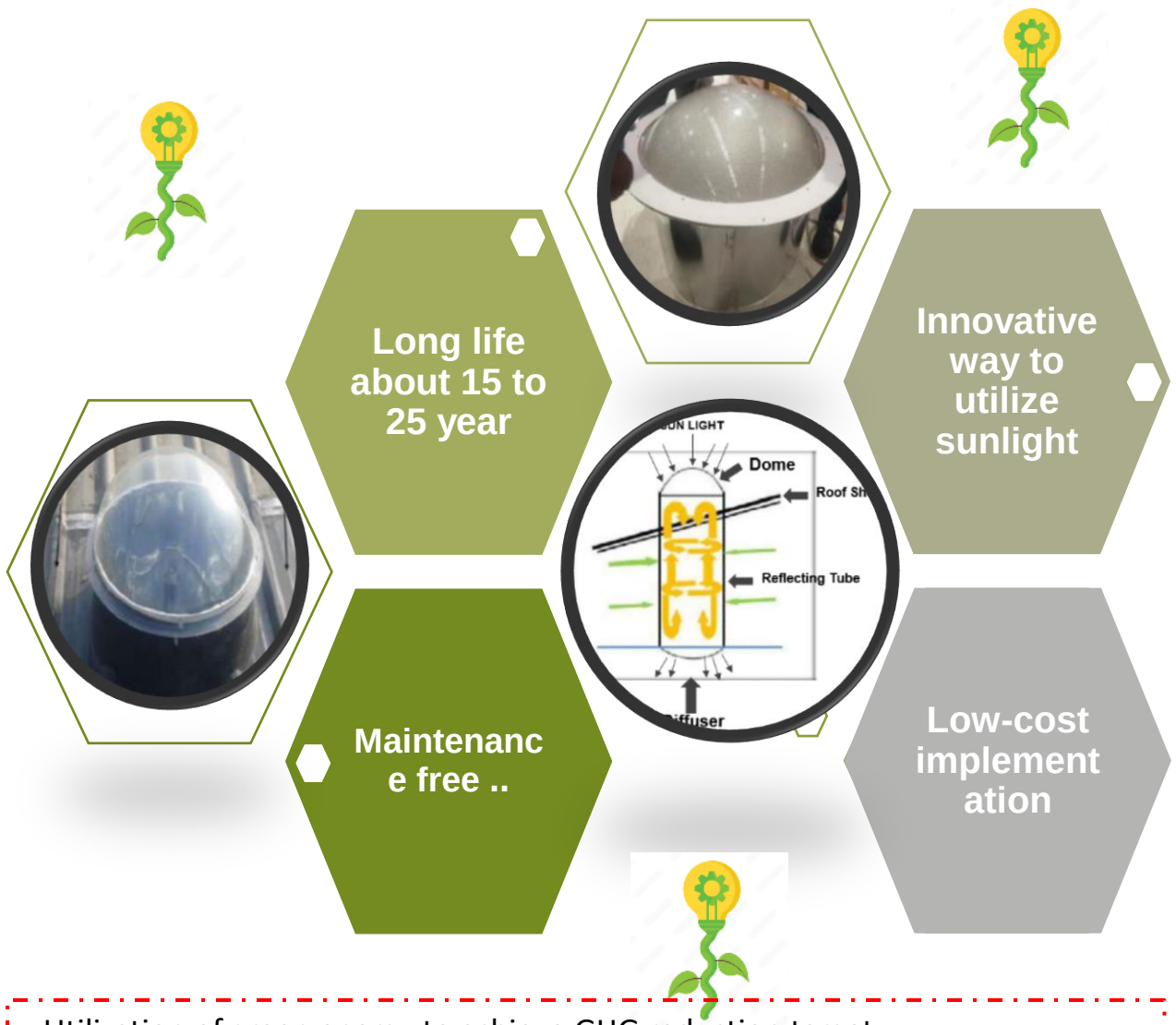
Natural sun light utilisation for lighting

Innovative concept to energy saving

Simple design and easy to install

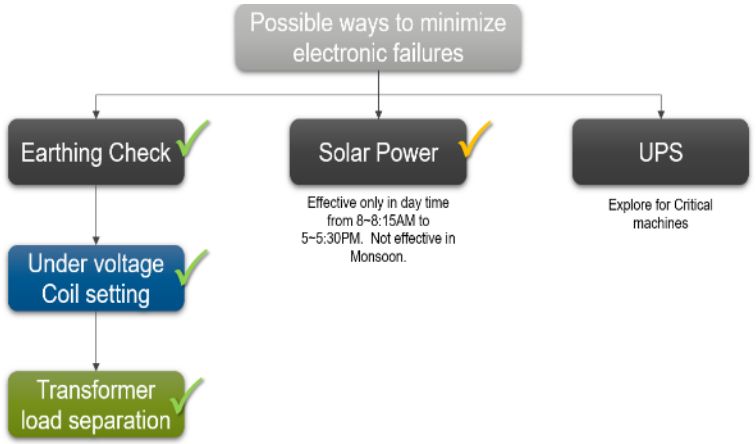
Due to sky pipe reflective surface sunlight can travel up to 6 to 10 meter

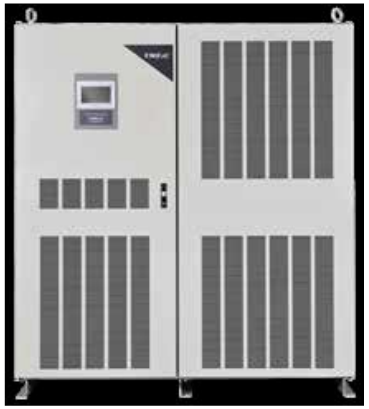
Maintenance free system



- Utilization of green energy to achieve GHG reduction target
- Annual Energy consumption saving - 24,600 Kwhr units
- Annual Cost saving - 2.25 Lac Rs.

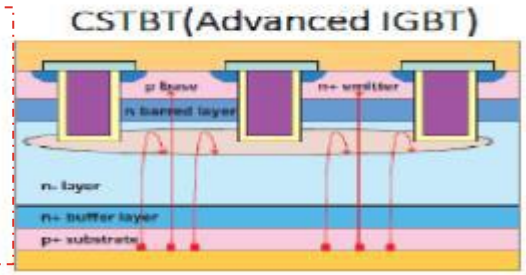
Project Title – Power back up to assembly line through UPS System

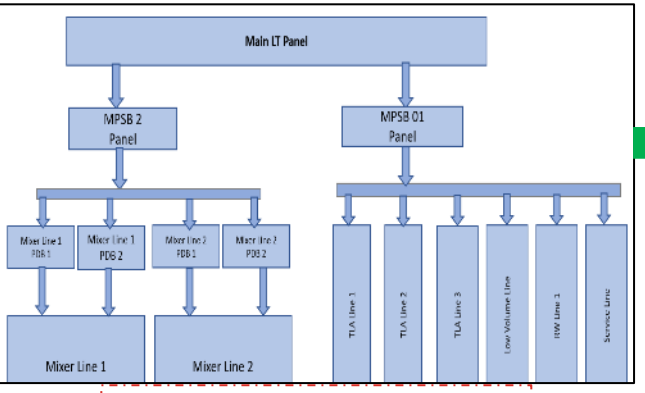




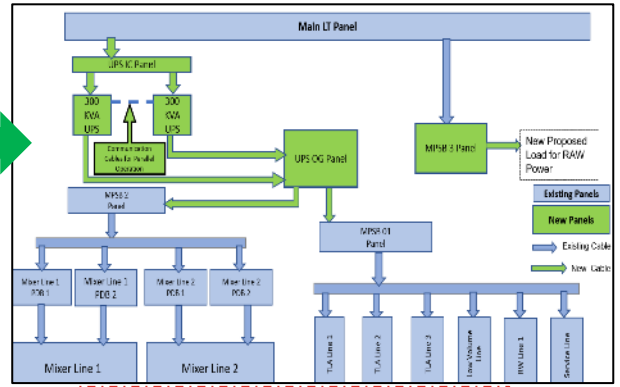
TMUPS

Transformer Less technologies Used UPS .
Parallel Operation of Booth UPS
CSTBT-Carrier Stored trench bipolar Transistor
Lower voltage stress on power semi-conductors devices.
Reduction of noise and electromagnetic interference.
Higher efficiency (lower losses).
Higher system reliability and compactness.





Power Flow Chart Before



Power Flow Chart After

Month	Date	Description of Power failure	Reason
Jan-21	10-01-2021	Grid Failure shutdown taken for PT replacement	Planned
Jan-21	14-01-2021	Grid failure fluctuations from MSEDCL	From MSEDCL
Jan-21	21-01-2021	Grid failure fluctuations from MSEDCL	From MSEDCL
Feb-21	15-02-2021	Grid failure, fluctuations from MSEDCL	From MSEDCL
Feb-21	15-02-2021	Grid failure, taken shutdown for feeder changeover	Planned
Feb-21	15-02-2021	Grid failure, fluctuations from MSEDCL	From MSEDCL
Mar-21	05-03-2021	Under voltage tripping at main HT panel)(29KV)	AT PCP-2
Mar-21	06-03-2021	Grid failure, fluctuations from MSEDCL	From MSEDCL
Mar-21	19-03-2021	Grid failure, fluctuations from MSEDCL	From MSEDCL
Apr-21	07-04-2021	Grid fail due to Under voltage from MSEDCL	From MSEDCL
Apr-21	08-04-2021	HT panel tripping UV alarm from MSEDCL	AT PCP-2
Apr-21	20-04-2021	HT panel tripping UV alarm from MSEDCL	AT PCP-2
MAY-21	31-05-2021	Grid failure, fluctuations from MSEDCL	From MSEDCL

Summary:
Total failures: 13 times (Confirmed with other facilities)
- Planned : 02 times.
- Sudden tripping from common MSEDCL feeder: 8 nos.
- Tripping from PCP2 feeder: 03 times.
- Power Loss time (Minutes) : 150 minutes

Annual Cost Savings: INR ₹6860496/$92553

Innovative Projects – Conversion of EC Plus Fans from Conventional Blower(2024 Project Execution InProgress)

Innovation Type	
Process	**Design**

Environmental benefit				
Energy	Carbon	Water	Toxicity	Material

Project Background

1. PCP2 Having Fume Extraction System which Is contributing to the HVAC consumption.
2. And HVAC consumption is Major contributor for plant total consumption (About 45 % to 55%)

Project Timeline

Project Timeline	Ideation (Start)	Execution (End)
Plan	Mar - 2022	Jan - 2023

Replicability ✓

1. **Highly deployable** at any site Cummins & Non-Cummins with **AHU Facility.**

UNIQUE Features:

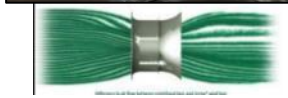
- Centrifugal type belt/pulley mechanism eliminated through the axially coupled motor.
- Static pressure loss was eliminated due to the unique axial flow design.
- Improved flow dynamics and direct drive have reduced the electrical load by 43%

Before

Before: restricted airflow dynamics

Conventional AHU Fan

After



Before: restricted airflow dynamics

Plant Site Photos of flow lines

Before

After

The Benefits!

1. Annual **Energy** Savings:

35,000 KWH!

2. Annual **Cost** Savings:

₹4,20,000

Project Title- Power quality improvement by active Harmonic filters

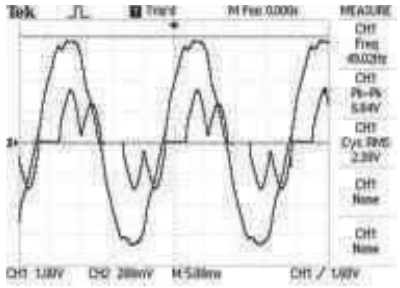
IEEE STD 519-2014

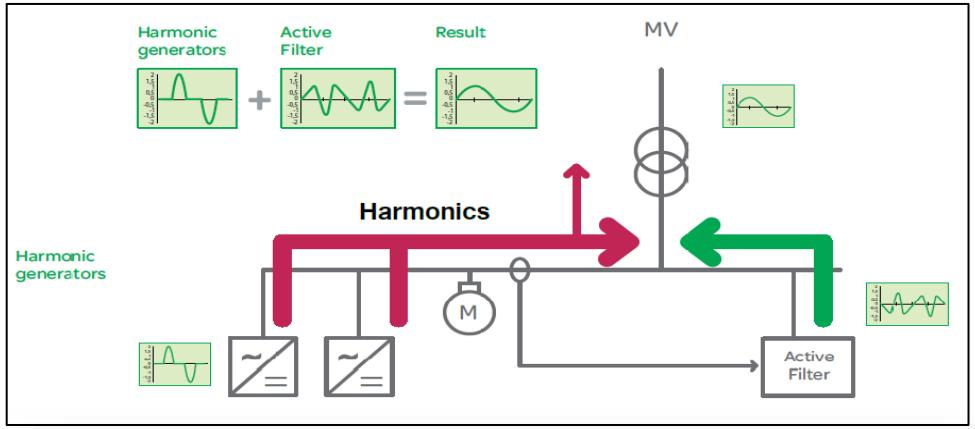
- At the PCC, system owners or operators should limit line-to-neutral voltage harmonics as follows:
  - Daily 99th percentile very short time (3 s) values should be less than 1.5 times the values given in Table 1.
  - Weekly 95th percentile short time (10 min) values should be less than the values given in Table 1.
- Notches limits moved to Annex C (Informative).

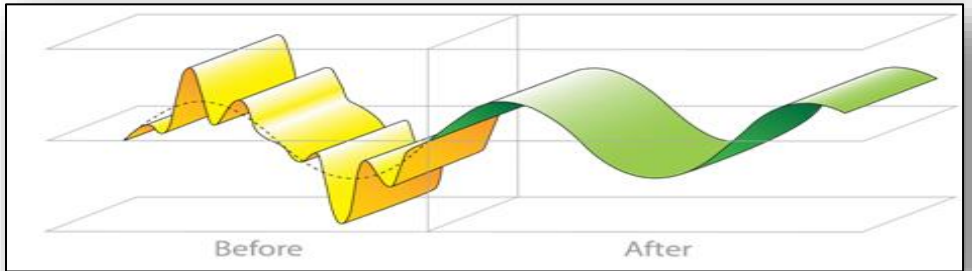
Table 1—Voltage distortion limits

Bus voltage V at PCC	Individual harmonic (%)	Total harmonic distortion THD (%)
$V \leq 1.0$ kV	5.0	8.0
1 kV < $V \leq$ 69 kV	3.0	5.0
69 kV < $V \leq$ 161 kV	1.5	2.5
161 kV < V	1.0	1.5[a]

[a]High-voltage systems can have up to 2.0% THD where the cause is an HVDC terminal whose effects will have attenuated at points in the network where future users may be connected.







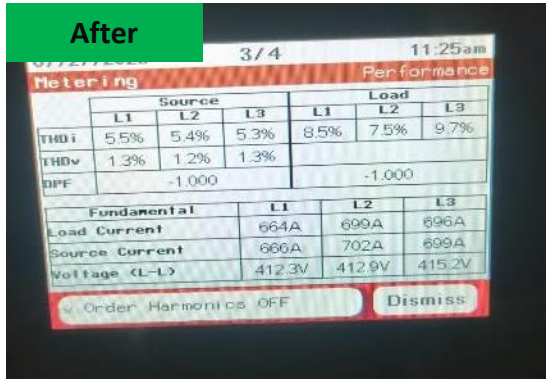
Project Background .

- **The harmonic level is about 30 to 40% and 5th order harmonic are detected.**
- **To mitigate harmonic level and power quality improvement Harmonic active harmonic filter installed.**

Before

Before: Harmonic Level is about 30% to 40%

After



After Active Harmonic Filter – Harmonic levels about 7% to 8%

User Benefits

- Reduction of the THDi in compliance with IEEE 519
- Load balancing
- Reduces capital expenditure cost of the electrical distribution network due to reduction in the oversizing of cables, transformers and other equipments.
- Safe and reliable AC power supply and distribution network
- Reduced overloading and overheating of the neutral conductor
- Nuisance tripping of protection circuit breakers avoided
- Reduction of the THD (V) due to cancellation of current harmonics
- Increased lifetime of distribution equipments
- Increas
- Increas
- Lowers
- Reduce

Power Quality improved in-terms of Harmonic Reduction

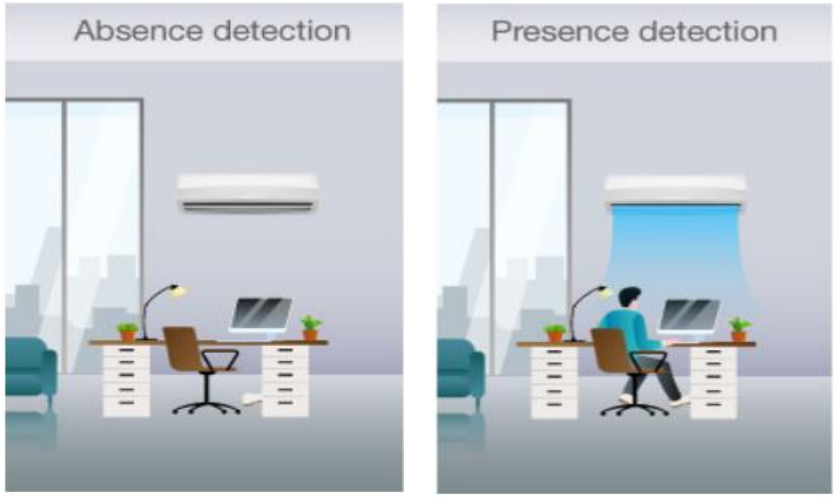
Occupancy Sensor for Admin Cassette AC Units

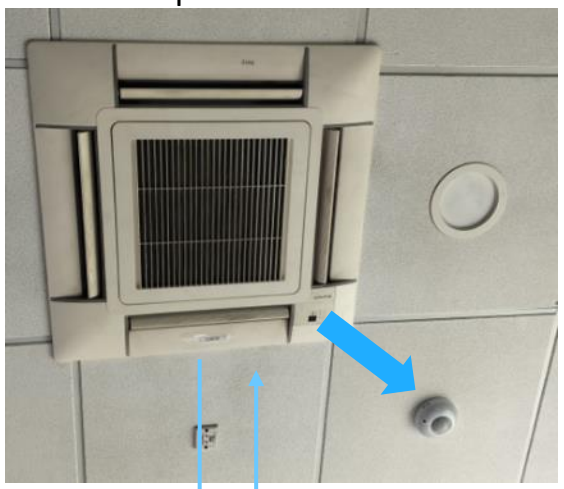
➢ Project Background-

- ✓ Earlier there was AC which are operated by wireless remote control, and it was observe that unwanted running of AC while no occupancy in the admin meeting rooms area.
- ✓ So, we implemented work with supplier & OEM to find out the solution for control .
- ✓ After multiple trails and demo, we finalized the one presence sensor which integrate with OEM AC unit & operate automatic operation of admin area AC when no one presence in meeting room based on timer setting which result significant reduction in Admin HVAC consumption.

➢ Benefits

- ➢ We have installed more than 35 Nos no's presence sensors at Admin meeting room for automatic functioning of AC Units
- ➢ Expected energy saving cost is 10% on Admin Energy cost i.e., 1.5 Lac / per annum





Presence Sensor

AC DC Relay Unit

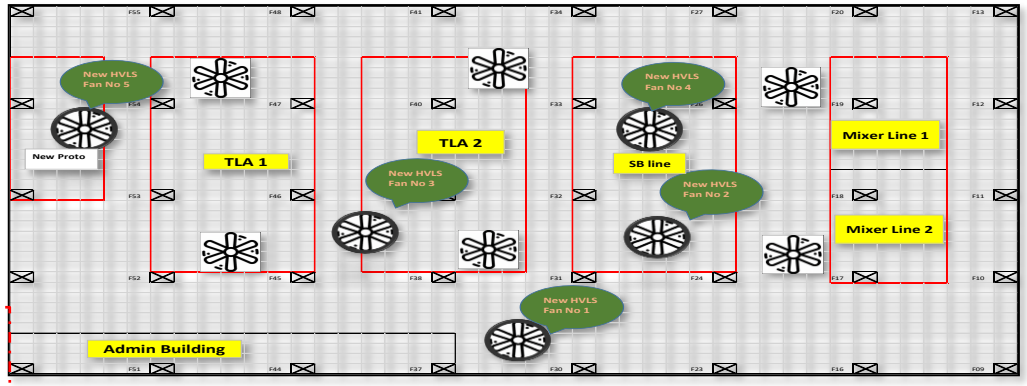
HVLS fans installed for HVAC load reduction and Better air ventilation

- **Project Background-**
- ✓ 40% energy consumption of plant is contributed by HVAC load so reduce this overall heat load HVLS fan introduce and installed in various area of plant.
- ✓ Total No of HVLS Fans installed in Plant – 20 Nos

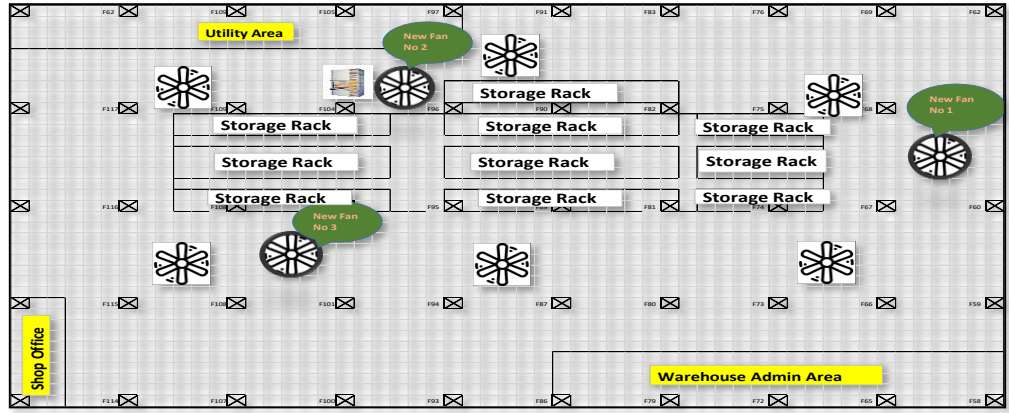
- **Benefits**
  - Having better Air ventilation considering welding operation in plant.
  - Reduce heat load which result 5-10% HVAC energy consumption reduced

Permanent Magnet Synchronous Motor Technology

Aircraft tech liquid cooled motors are meant to increase life of magnets, stamping and winding by keeping temp control



Shop Floor HVLS Fans Layout



Warehouse HVLS Fans Layout

HVLS fans installed for HVAC load reduction and Better air ventilation

➢ **Project Background-**

✓ 40% energy consumption of plant is contributed by HVAC load so reduce this overall heat load HVLS fan introduce and installed in various area of plant.

✓ Total No of HVLS Fans installed in Plant – 20 Nos

➢ Benefits

❑ Pull Cord Switches for Admin and Shop Office Area.

- ✓ Separate operating switch for every light
- ✓ Avoid common touch point
- ✓ Electricity saving by using pull cord switches is about 40K INR per annum.
- ✓ Easy to operate

❑ Cyclic Timer Installation for shop lights

- ✓ Automatic ON and OFF operation.
- ✓ Avoid common touch point
- ✓ Electricity Saving of 10% in lighting.




Overall Project Value & Till date savings against baseline

$ 625K USD

Capital Required
Few project funded by strategic Fund
Few Project funded by plant Expenses

2981291KWh

Energy Reduction
50% energy replacement by green renamable energy

3.5 CR INR/ 437K USD $

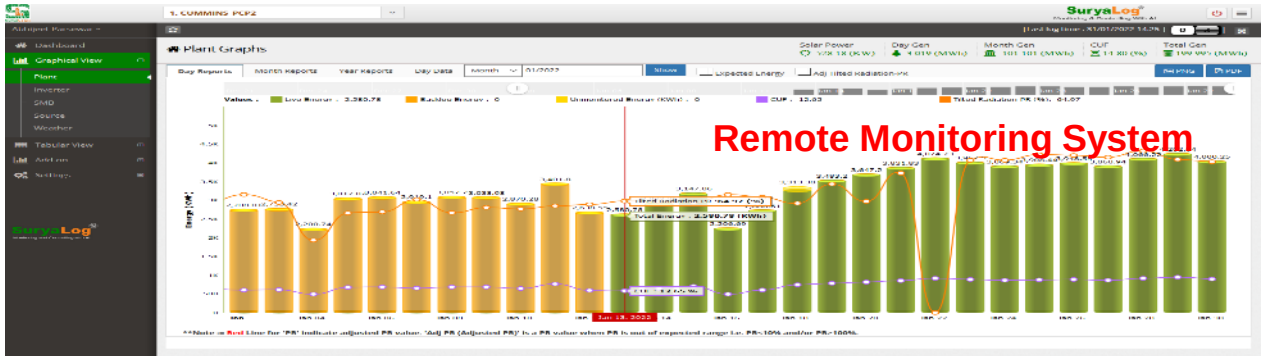
Cost Savings-
Till date cost Saving Achieved about 3.5 CR INR/437K USD.

CO_2 30%

GHG Reduction - 2023
**30% GHG Reduction against baseline 2021*

String Invertors , Modules and Walkways

Solar Project Inauguration by leader



SAFETY Feature

- Staircase For Access
- Walkway
- Lifeline
- Sky Light Protection
- Lightening Arrester
- Railing protection

Renewable Energy-Phased Adaptation (Solar Systems)

- We have roof of 240K sq ft availability out of which 120 K sq ft area is covered by phase 1(1 MW/850AC) solar plant with Poly Crystalline Technologies and net metering facility
- Now we have remaining half area further expansion.
- With consideration of plant load and permissible installation capacity by MSEDCL there was scope of 150 KW phase capacity and sane implementation in progress
- Timeline for phase 2 charging date is Oct 2024

Phase III
Solar expansion provision considered in Phase 2
Dependency – Payback (net metring)

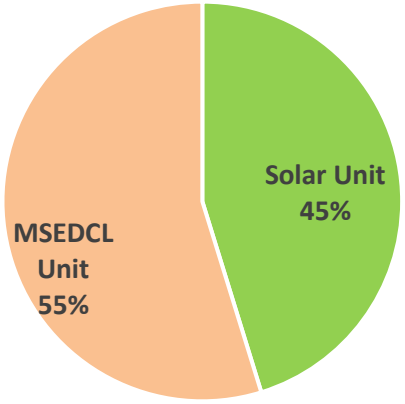
Phase II- Roof Top Solar
Capacity – 150 KW
With Continue Net Metering
Implementation InProgress
Expected Saving from Oct 2024

Phase I- Roof Top Solar
Capacity -1MW/850 KW (AC)
Net Metering
Charging Date –Nov 2021

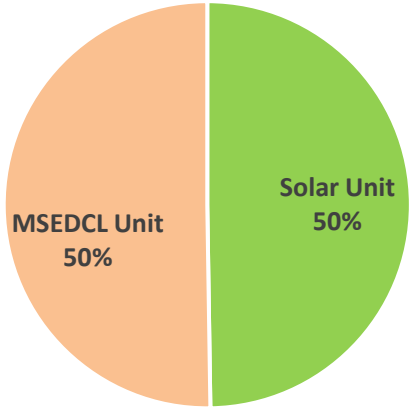
Utilization of Renewable Energy Sources (Onsite)

On Site Renewable Energy				
Year	Source	Installed Capacity	Total Genration in MWh	Constribution In Plant Total Consumption
2022	Roof top Solar	1MW	1221	↑ 45%
2023	Roof top Solar	1MW Continued	1293	↑ 50%
2024	Roof top Solar	1MW Continued	732	↓ 49%
		150 KW Impelmention In progress	0	

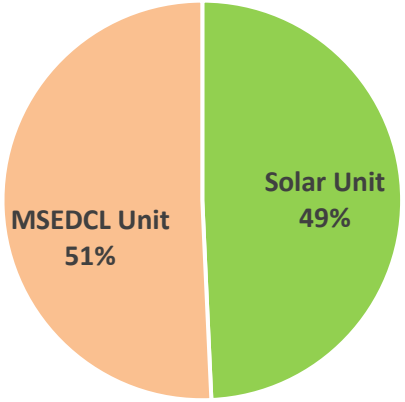
GREEN ENERGY CONTRIBUTION -2022



GREEN ENERGY CONTRIBUTION -2023



GREEN ENERGY CONTRIBUTION -2024



Environment

Reduce carbon footprint & energy cost of PCP-2 plant by Installing GRID Connected Rooftop Solar PV system of 1000 Kwp Capacity

BT Leader: Ghanendra (GK) Sharma

❖ Project Objective

✓ Reduce carbon footprint & energy cost of PCP-2 plant.

✓ To achieve environmental goals & contribute to company's 2030 goals & in PLANET 2050 strategy.

❖ Project Benefits

✓ **Carbon Dioxide Reduction**: 145 metric tons CO2e

✓ **Electricity Generation in units** : 2,75,089 Kwh

✓ **Till date Energy Cost Savings**: INR ₹27,50,890/ $27601

✓ **50% of Plant power consumption requirement fulfill by solar project**

✓ **Reduction in Plant electricity bill by 10 Lac Rs /Month**

❖ Project Overview

✓ **Capacity:** 1000kWp / 850

Internally this was project was awarded under **"Business Impact"** award. Since the roofing and other utilities are built with pre-requirement of Solar Installation.

SAFETY Feature

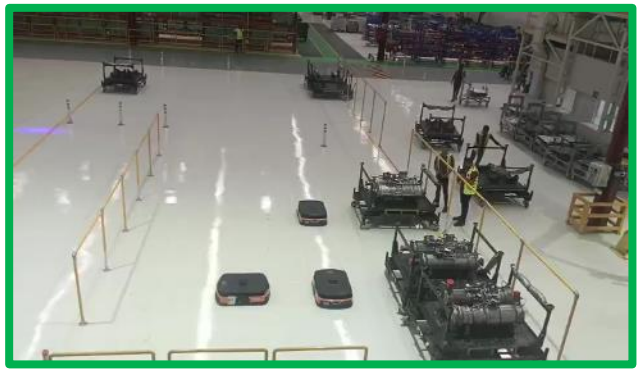
- Staircase For Access
- Walkway
- Lifeline
- Sky Light Protection
- Lightening Arrester
- Railing protection

- Neeraj Deshpande
- Abhijeet Parsewar
- Sudhakar Hawal
- Bhushan Dhaigude
- Somnath Mane
- Harshvardhan Patil
- Ajit Talekar
- Akash Karche
- Pushpa Kanase

Finish Good Handling across all assembly using AMR

Before process :

After process :



Solution

- Install and Implement AMR solution for Finish Good Handling across all assy. Lines, integrate Robot control solution to handle trolleys using HHT

Benefits

- Eliminate Powered Tow trucks and Skilled Manning.
- Minimize material handling at multiple locations.
- Eliminate Risk at Warehouse between multiple PIV's

Support required

- Waiting for Material receipt.

Read Across Project	No
Site/Contact	PCP2, CES

Resource Plan

- Site Coordinator: Mangesh Erande
- Project Leaders: Murali Nagaraj
- External Supplier : HIKROBOTICS

Benefits

Total Headcount Reduction	Social Distancing Benefit Y/N	Ergo Impact 1/3/9	Quality & Cleanliness Impact 1/3/9	Total Annualised Saving $
4	Y	3	1	$64,800

Costs

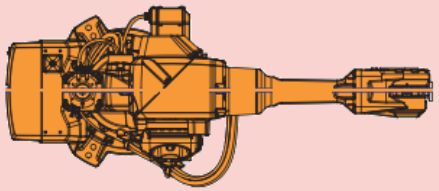
Capital Costs (Equipment)	External Costs (integrator)	Internal Hrs needed
~$270,000	$16,000	120

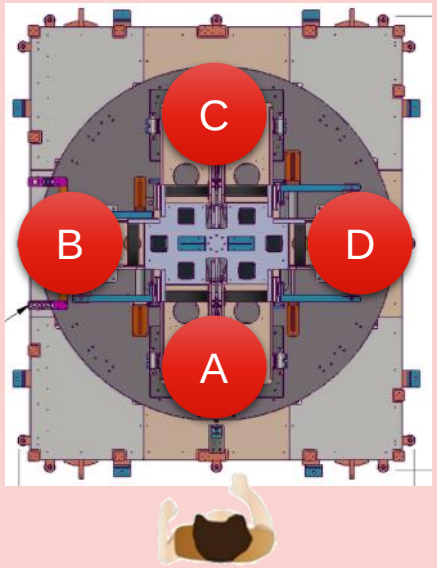
ROI - Timing

Cost to saving ratio $
4.6 Y

Stacking Clocking 45 Deg Upgrade in TLA line

Before

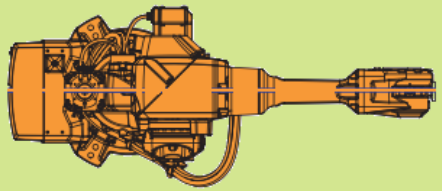


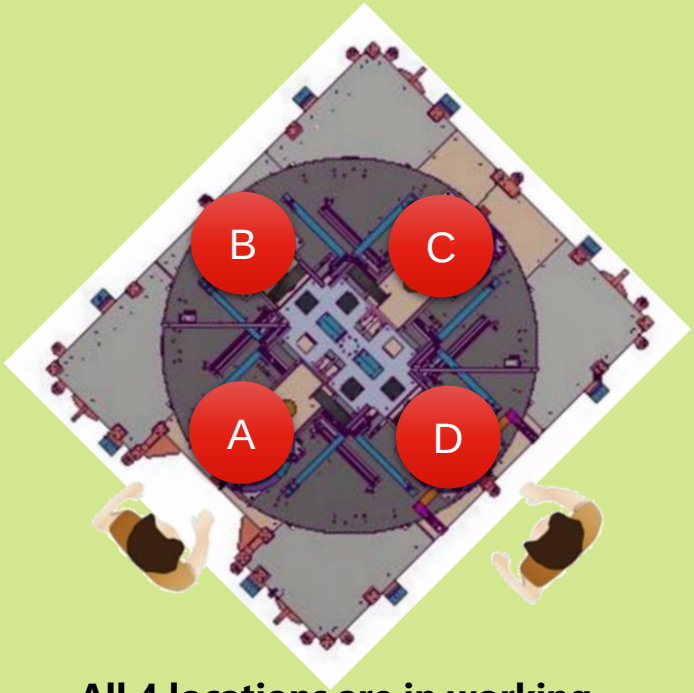


Only 2 Locations are in working

- Robot works on Point C
- Operator works on Point A
- Point B+D are Idle

After





All 4 locations are in working

- Robot works on Point B + C
- Operator 1 works on Point A
- Operator 2 works on Point D

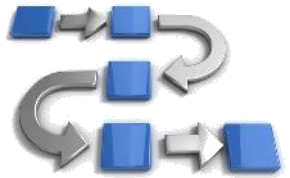
Change management milestones:

Before	After
Angle Adjustment done by Robot Arm	Angle adjustment done by Servo Table
Camera Installed on Robot Arm	Camera Installed on Gantry system
Module orientation done by Robot using offline table	Eliminated Module orientation process
Location B & D for different model	Location B & D are re-designed to replace with same model fixture

Benefits realized:

180 Parts/Shift/Side which is, +30%.

Close loop feedback In Vision system



Process step reduced

Improved Angle Accuracy

Case study presented in National Conference of Quality Concert Won

Innovation in CES World, RFT and Uptime front need to be added

8. GHG Inventorisation PCP-2

Destination Zero
Achieve Net Zero Emissions by 2050

ENERGY SOURCES

LOW CARBON FUELS

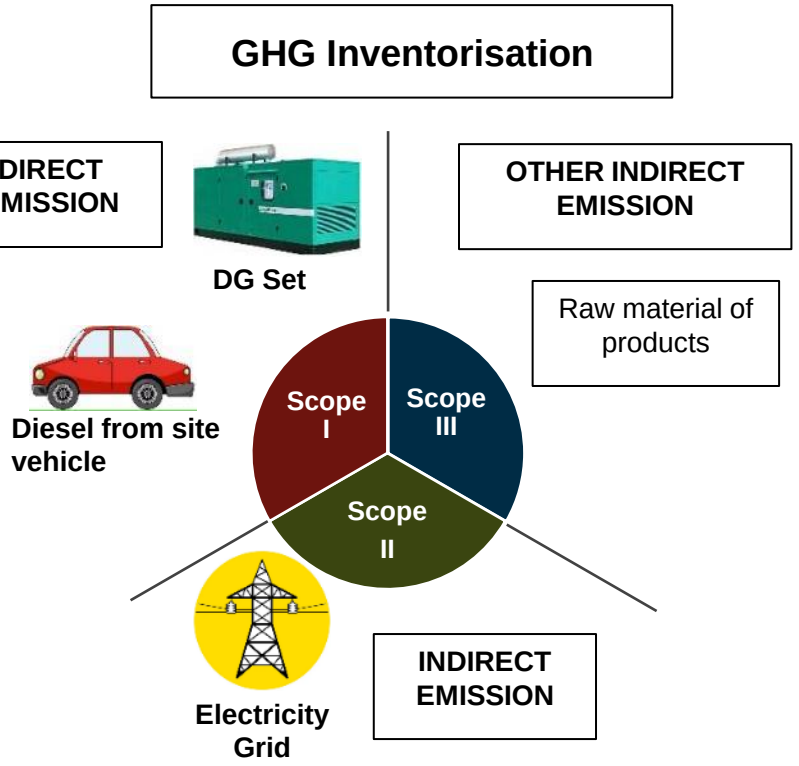
GREE E

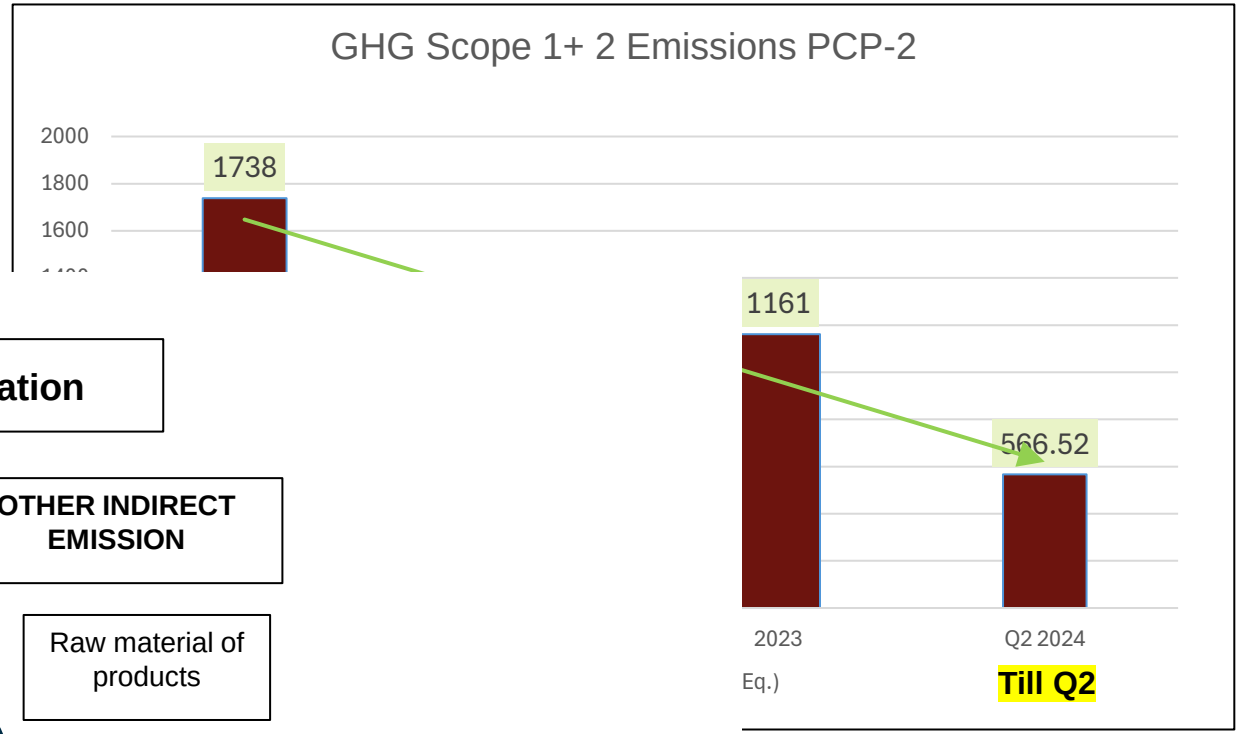
ADVANCED ENGINES

H

Consistent Rep

- Years of re Reports, E
- Carbon Discl platforms
- Task Force Disc
- Sustainabi
- GRI Content Index and Data Book (2019)

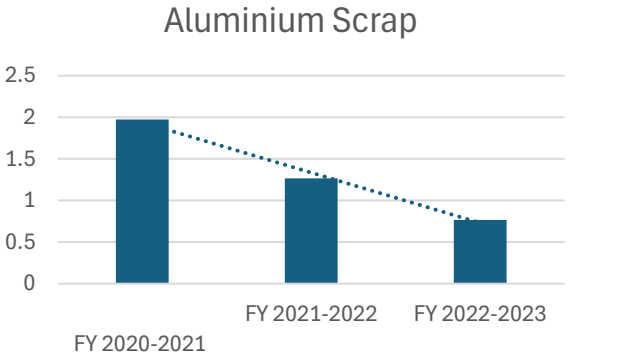




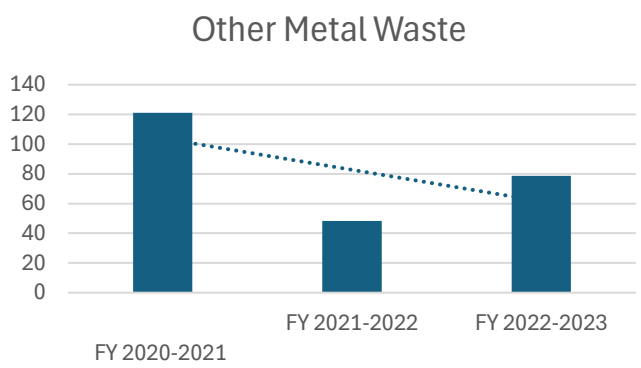
2030 Goal	2050 Goal
50% Reduce GHG Baseline 2019	Net Zero Emission

9. Waste Utilization & Management PCP-2

Waste Generation in PCP-2					
Sr.No	Type of Waste Generated	FY 2020-2021	FY 2021-2022	FY 2022-2023	Disposal Method
1	Aluminium Scrap	1.975	1.265	0.765	Recycle to Authorized Vendor
2	Plastic, Rubber & Electrical	38.55	46.875	45.21	Recycled to Authorized Vendor
3	Corrugated Waste	133.38	160.395	186.185	Recycle to Authorized Vendor
4	Wooden Scrap	129.95	108.45	148.25	Recycle to Authorized Vendor
5	Other Metal Waste	121.14	48.225	78.755	Recycle to Authorized Vendor
6	Paper Waste	0	1.375	2.765	Recycle to Authorized Vendor

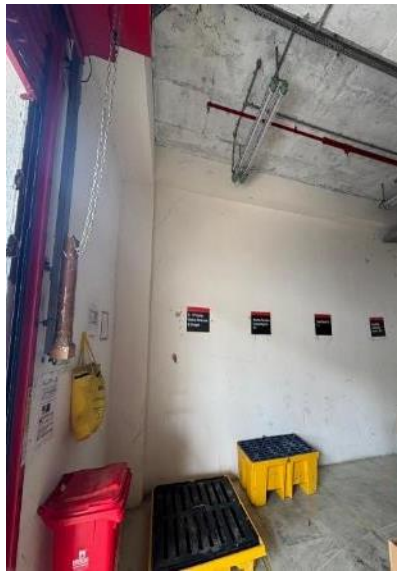


Decrease in Aluminum Scrap generation 38%



Decrease in Metal Scrap generation 65%

PCP-2 is Zero Waste to Landfill



Waste Storage in PCP2

10. Green Supply Chain Management PCP-2

Cummins Commitment

Protect the environment and conserve natural resources

Supplier Code of Conduct

As our global reach grows, so does our responsibility to ensure our actions around the world reflect a commitment to the environment.

We expect Cummins suppliers and their subcontractors to comply with all applicable environmental laws, regulations and standards.

It is important that suppliers manage compliance, minimize environmental impact and drive continual improvement of environmental compliance. Suppliers must maintain documentation to be able to respond to requests for information including but not limited to resource consumption, emissions, compliance, environmental risks and liabilities and other environmental sustainability metrics.

Suppliers should have procedures for notifying community authorities in case of an accidental discharge or release of hazardous materials into the environment, or in case of any other environmental emergency.

Suppliers should implement an audit program for compliance to applicable environmental regulations and standards, including a means to ensure corrective actions and avoidance of recurrence.

Green Procurement Policy

HEALTH AND SAFETY

24.1 All Products shall be packed with such material which shall not cause any adverse impact on environment. Plastic bags less than 50 Micron thickness or such other specification as may be prescribed from time to time shall not be used for packaging and the Supplier shall make its best efforts towards use of recyclable packaging material. Supplier shall ensure due compliances of all applicable legislations with regard to packaging, including but not limited to Plastic Waste (Management and Handling) Rules as amended from time to time.

24.2 No Banned chemical/ material should be used in the manufacture of Product/s. Eco-friendly chemicals should be used for surface coating. Product/s supplied including the packing materials should be free from asbestos and radioactive material as per Cummins prescribed standards.

24.3 Volatile Organic Compound (VOC) certificate, 16 points Material Data Safety Sheet (MSDS) of the chemicals should accompany each consignment of the chemicals, if supplied. MSDS must clearly mention the ingredients of the chemical supplied, its safe handling process, actions to be taken in the event of spill over or accident and also its safe disposal procedure after use to ensure that the chemical does not cause any adverse impact on environment.

24.4 The drivers for the vehicle should have valid driver license, insurance papers, PUC certificate, vehicle fitness certificate and permit. Vehicle containing flammable substance should carry statutory documents and the driver should be endorsed to carry flammable liquids.

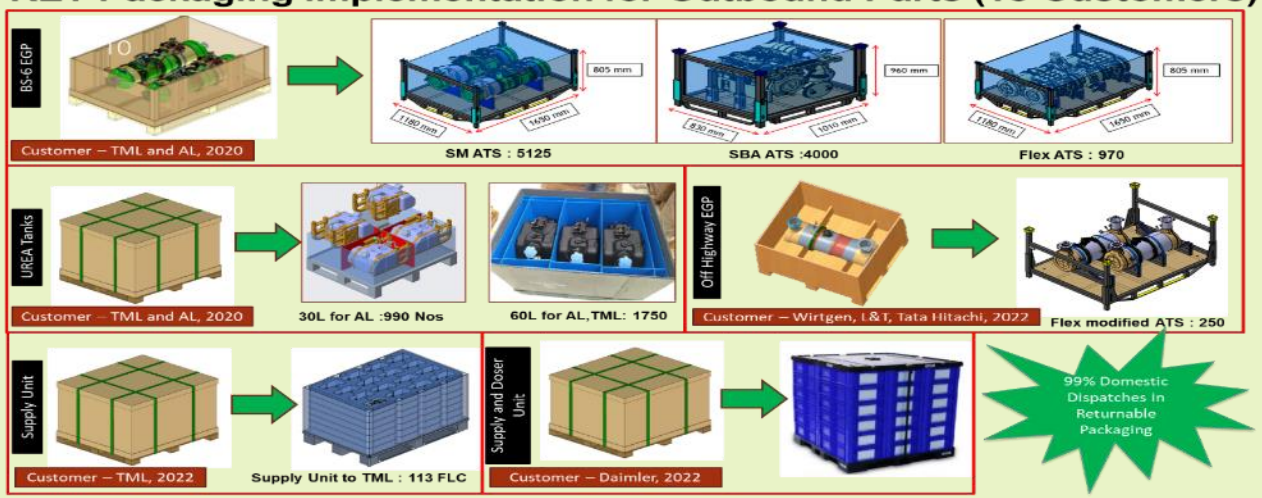
24.5 The Supplier is under a duty to ensure that the supplies do not present a health and safety risk when being properly used and agrees to indemnify and hold harmless Purchaser in respect of all claims arising in connection with the breach of this duty. In order to facilitate safe handling and use all packaging containing Products must be clearly labelled to identify the contents and any hazards they present, and supplies must be similarly marked and accompanied by sufficient literature and information to enable their safe handling, use and disposal.

Packaging Projects

Returnable Implementation for In-bound Parts (From Suppliers)

Returnable Packaging Projects Implemented from the Supplier's End

RET Packaging Implementation for Outbound Parts (To Customers)

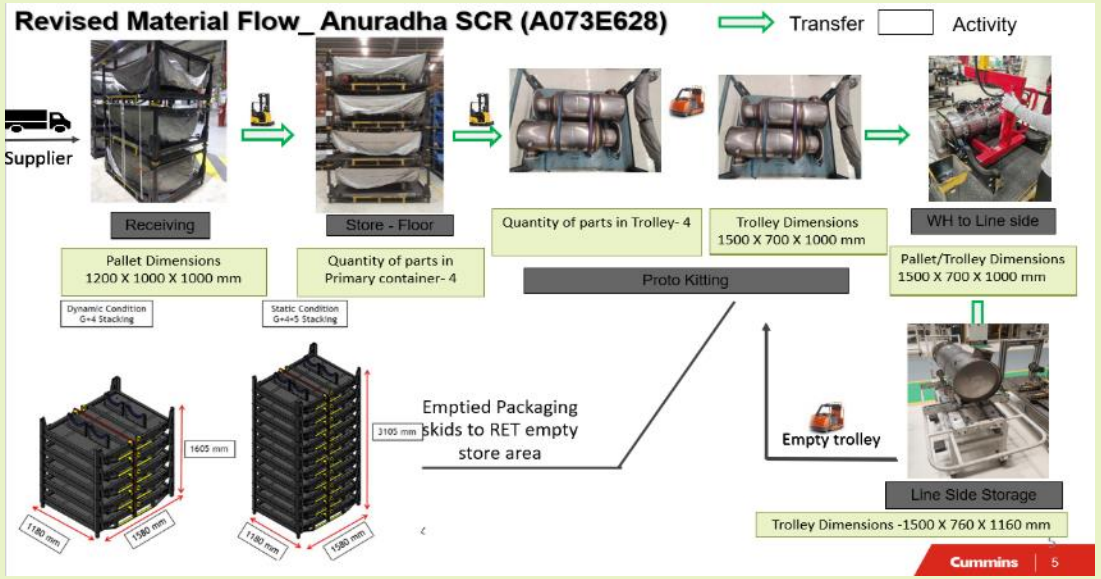


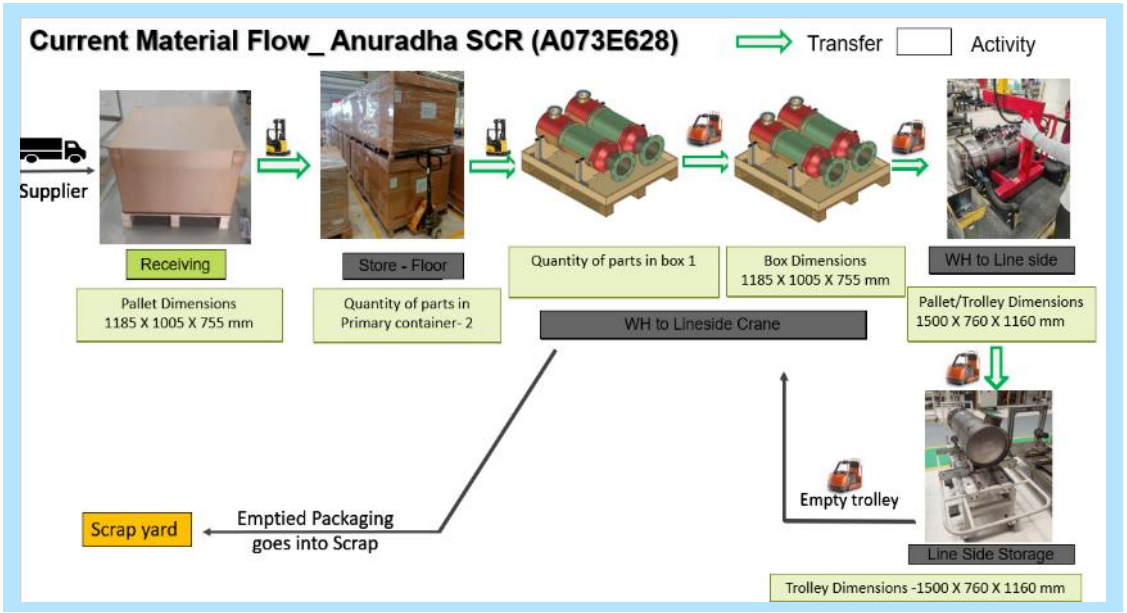
Returnable Packaging Projects Implemented from the Cummins End to the suppliers

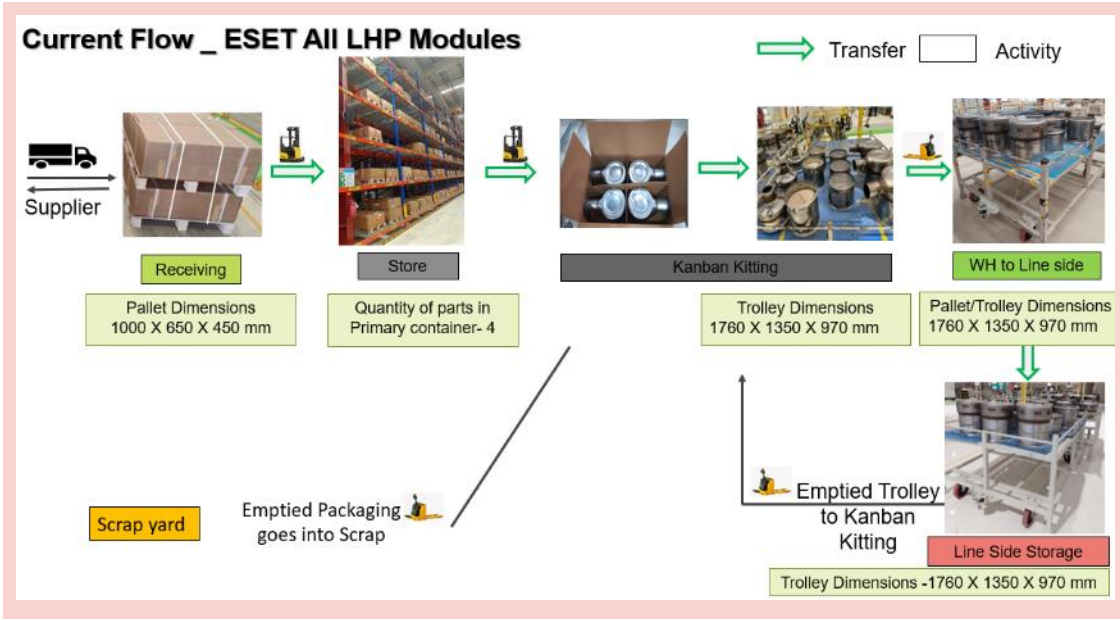
10. Green Supply Chain Management

Sr No	Supplier Name	Scope	Annual Waste Reduced (tons)	Implementation plan
1	ESET	Revati and Anuradha SCR	20	Aug-24 (Last Week)
		All other LHP Modules	130	Oct -24
2	Vitesco	All domestic sensors	30	Sept (First Week)
3	KUS	Off highway DEF Tanks	25	Sept-24
4	Victora	MY24	New Program	Oct-24

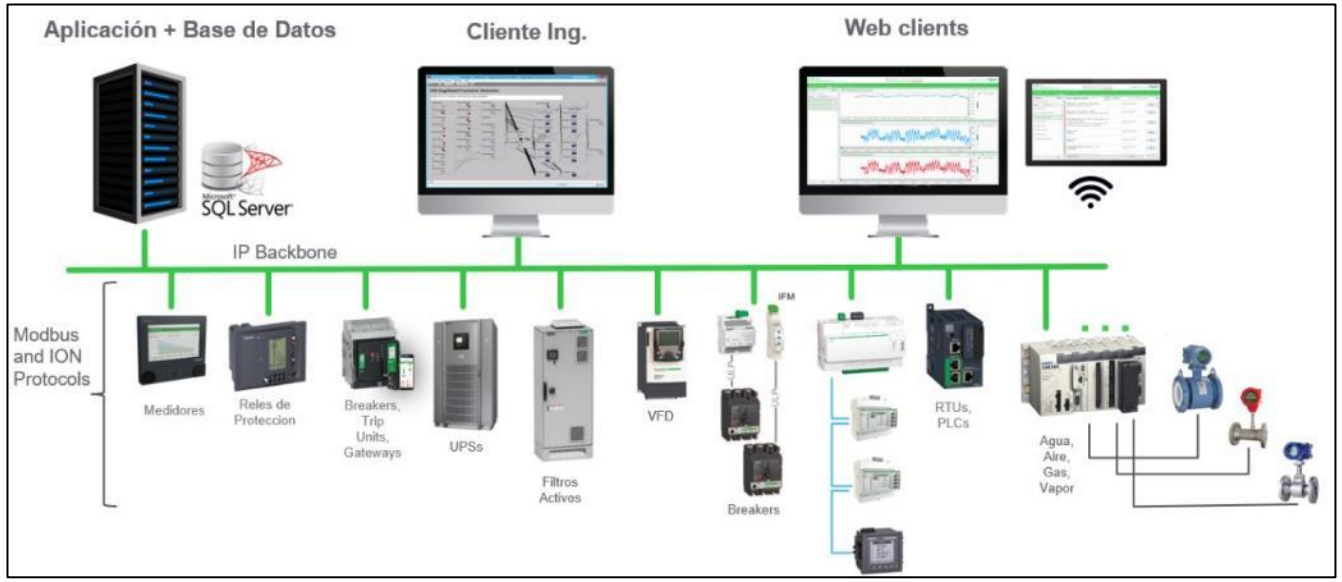
Project Example



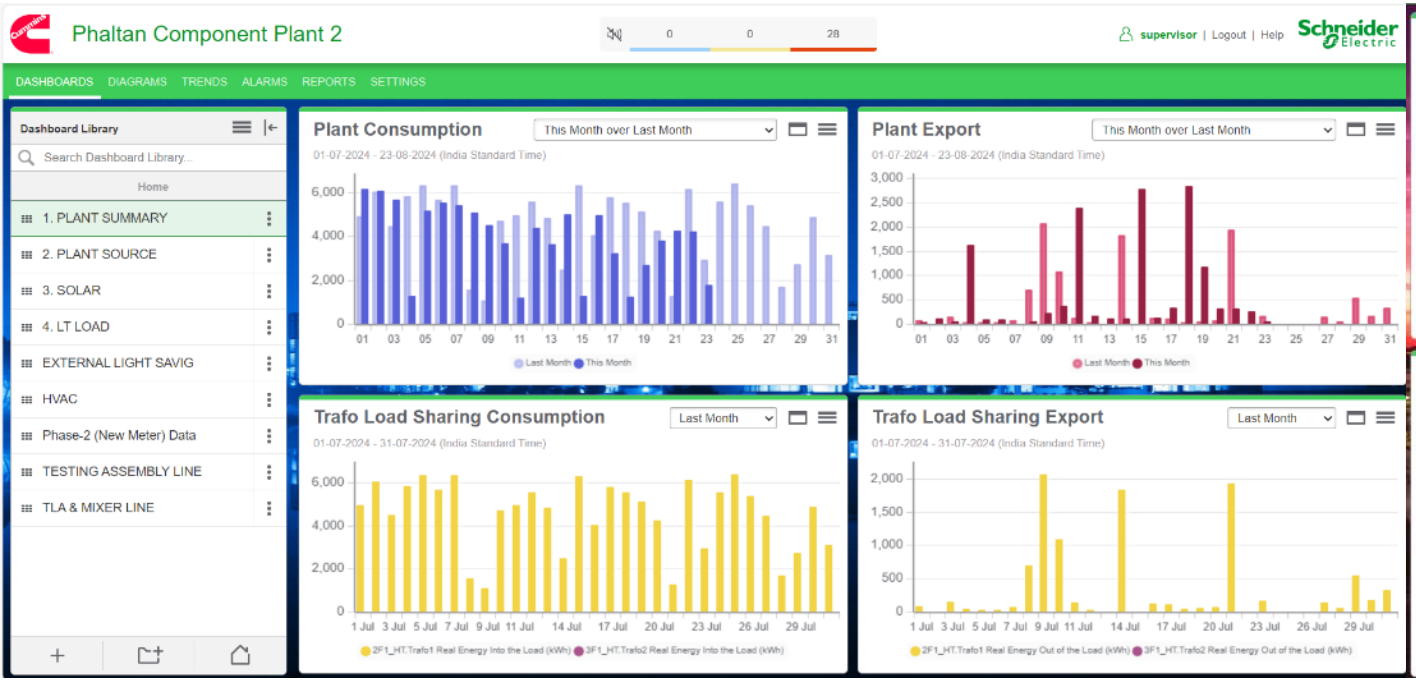


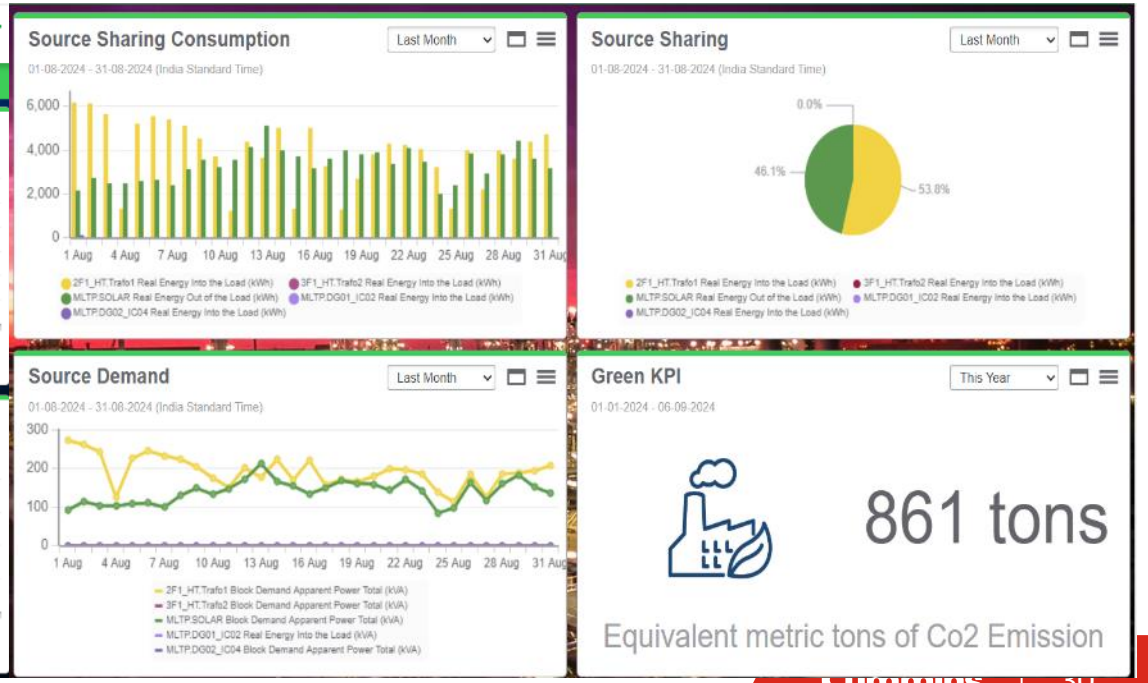


11. EMS system & Other Requirements **(Smart Sensors)**



- Help keep people and assets safer
- Optimize business reliability and continuity
- Maximize operational lifecycle efficiency
- Simplify compliance





12. Cummins DESTINATION ZERO PCP-2

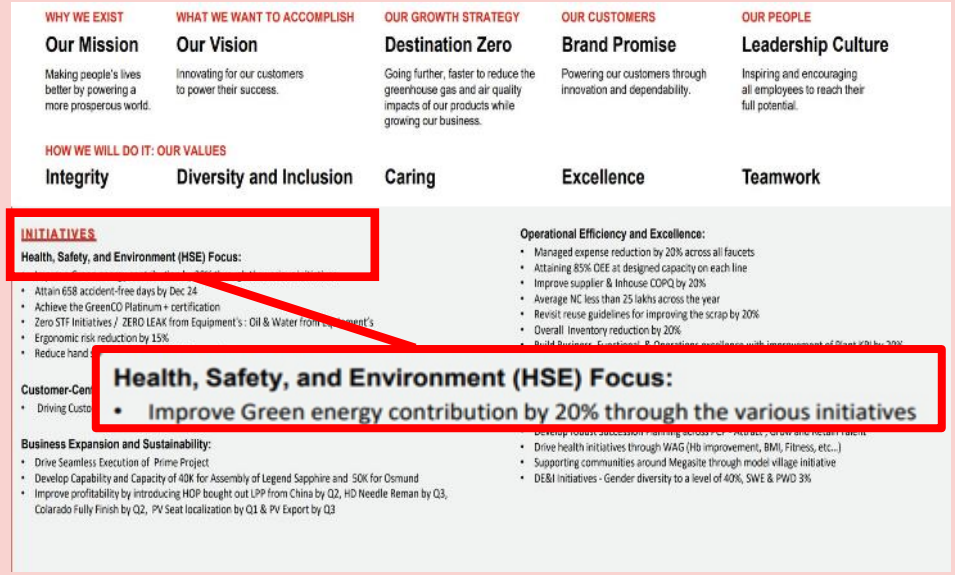
2030 Global Goals

OUR EIGHT 2030 GOALS

SCIENCE-BASED TARGETS

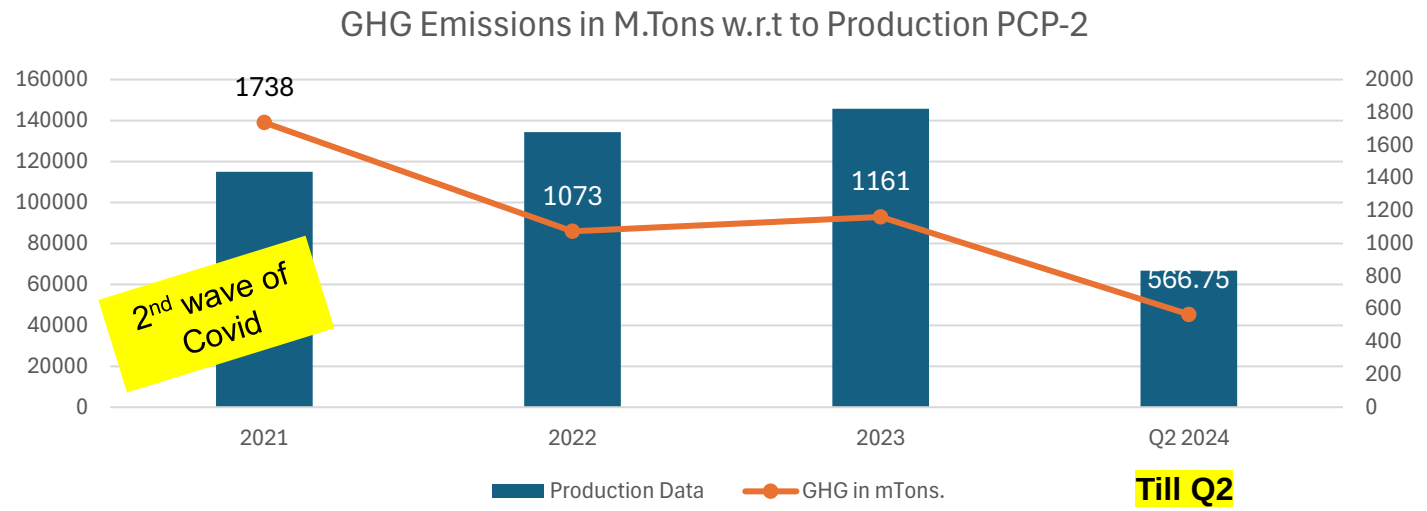
1. Reduce absolute greenhouse gas (GHG) emissions from facilities and operations by **50%**.
2. Reduce scope 3 absolute lifetime GHG emissions from newly sold products by **25%**.
3. Partner with customers to reduce scope 3 GHG emissions from products in the field by **55 MILLION METRIC TONS**.
4. Reduce volatile organic compounds emissions from paint and coating operations by **50%**.

2024 Plant Goals



Towards NET Zero Emissions by 2050

Plant Results Y-On-Y Basis



The Road Map

Global Goals : Achieve Net Zero Emission by 2050 - Destination Zero → Global Goals : Achieve 50% reduction in GHG by 2030 from facilities & ops → Plant Specific Goals : Based on the Baseline yr reduce 50% by 2030 → Plant Goal for 2024-25 : Reduce GHG by 20% w.r.t previous year → Plant Specific Monthly Goal : Reduce 7.5% GHG emission as of Dec'23

Q+A

Thank You