



ENERGY EFFICIENCY & MANAGEMENT CARRIAGE WORKSHOP LALLAGUDA, SOUTH CENTRAL RAILWAY

Presented By:

R MALLIKARJUNA IRSEE, Deputy Chief Electrical Engineer

T.V. MURALIDHARAN, Assistant Divisional Electrical Engineer

K S RAJAGOPALAN, Senior Section Engineer

About Carriage Workshop

- The Carriage Workshop of South Central Railway located at Lallaguda, Secunderabad was established in 1893 as the Locomotive, Carriage and Wagon Workshop of the Nizam State Railway (NSR).
- The Government of Hyderabad took over direct control of the Railways in 1930 and renamed it as the Nizam Guaranteed State Railways (NGSR).
- The Lallaguda Workshop complex is one of the oldest surviving examples of modern Industrial Architecture in the Twin Cities.
- It signaled the beginning of major industry in the state. A few structures in use today date from the time of the workshop's initial commissioning. The precinct provides us with a glimpse of not only the industrial advances made over more than a century but is also a repository of heritages from a bygone era.
- Restored wagons, coaches and a variety of artefacts relating to railway history have been preserved and quite a few are displayed at the site. Notable among these one finds a meticulously restored coach of 1886 vintage.



2746 Employees



ISO 9001

ISO 14001

ISO 50001

ISO 18001



Connected Load

18576 kW

The workshop is carrying out the works of Periodic Overhauling(POH) of various passenger coaches and special purpose vehicles such as Power Cars for EOG rakes, Tower Cars, DEMUs, EMUs, Saloons etc. with state of art technologies. It also performs Intermediate Overhauling (IOH) of Bogies for Passenger Coaches.



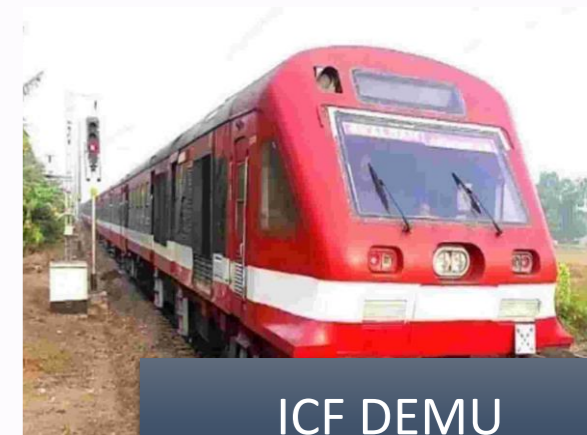
LHB COACHES



ICF MEMU COACHES



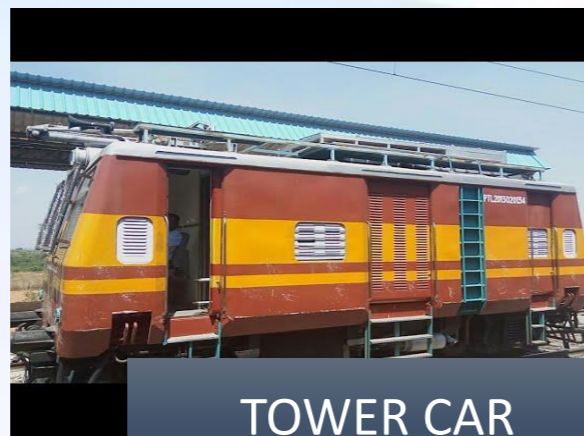
SG COACHES



ICF DEMU



POWER CAR



TOWER CAR

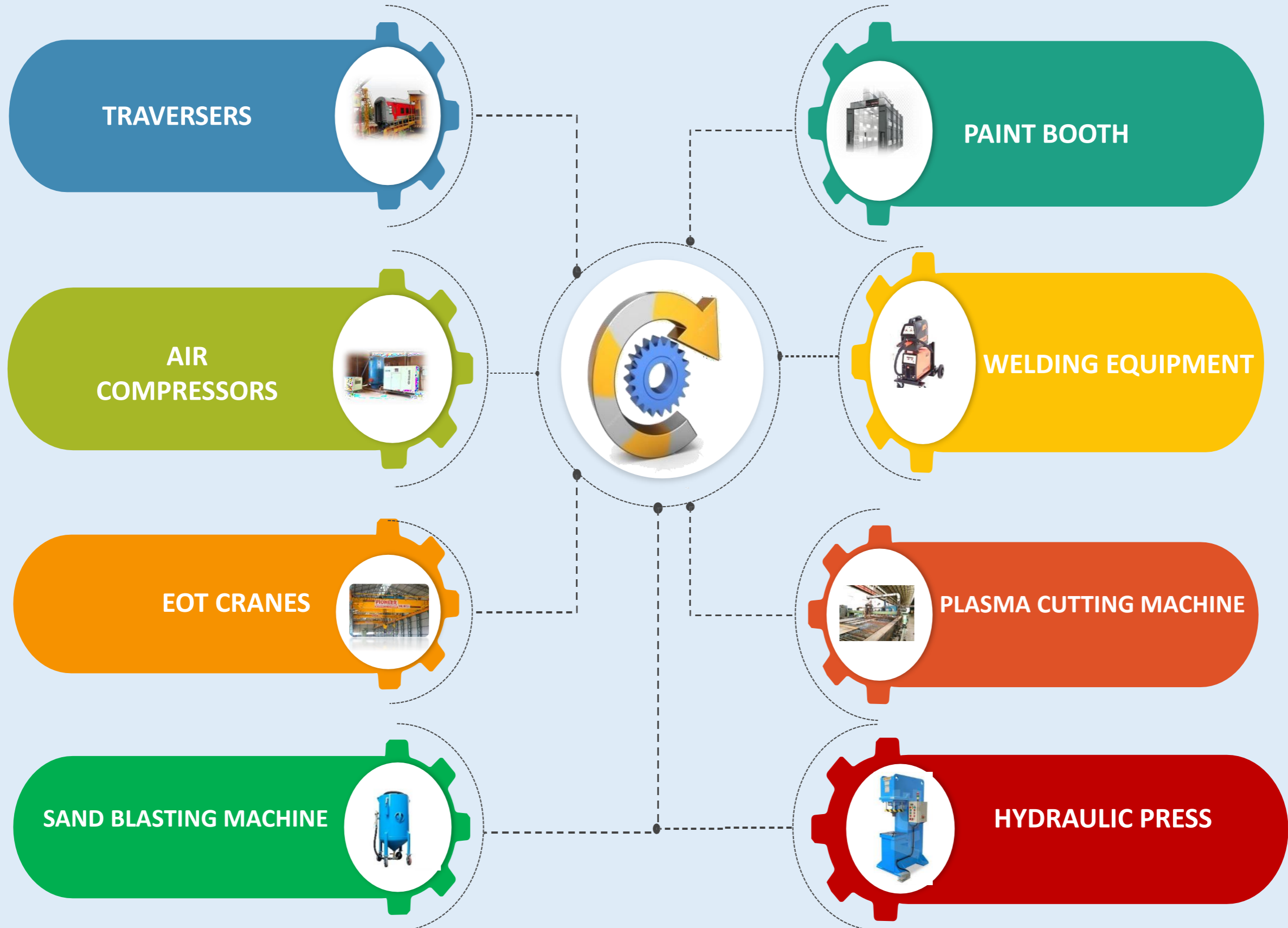


ACCIDENT RELIEF TRAIN



EMU

Major Process Equipment



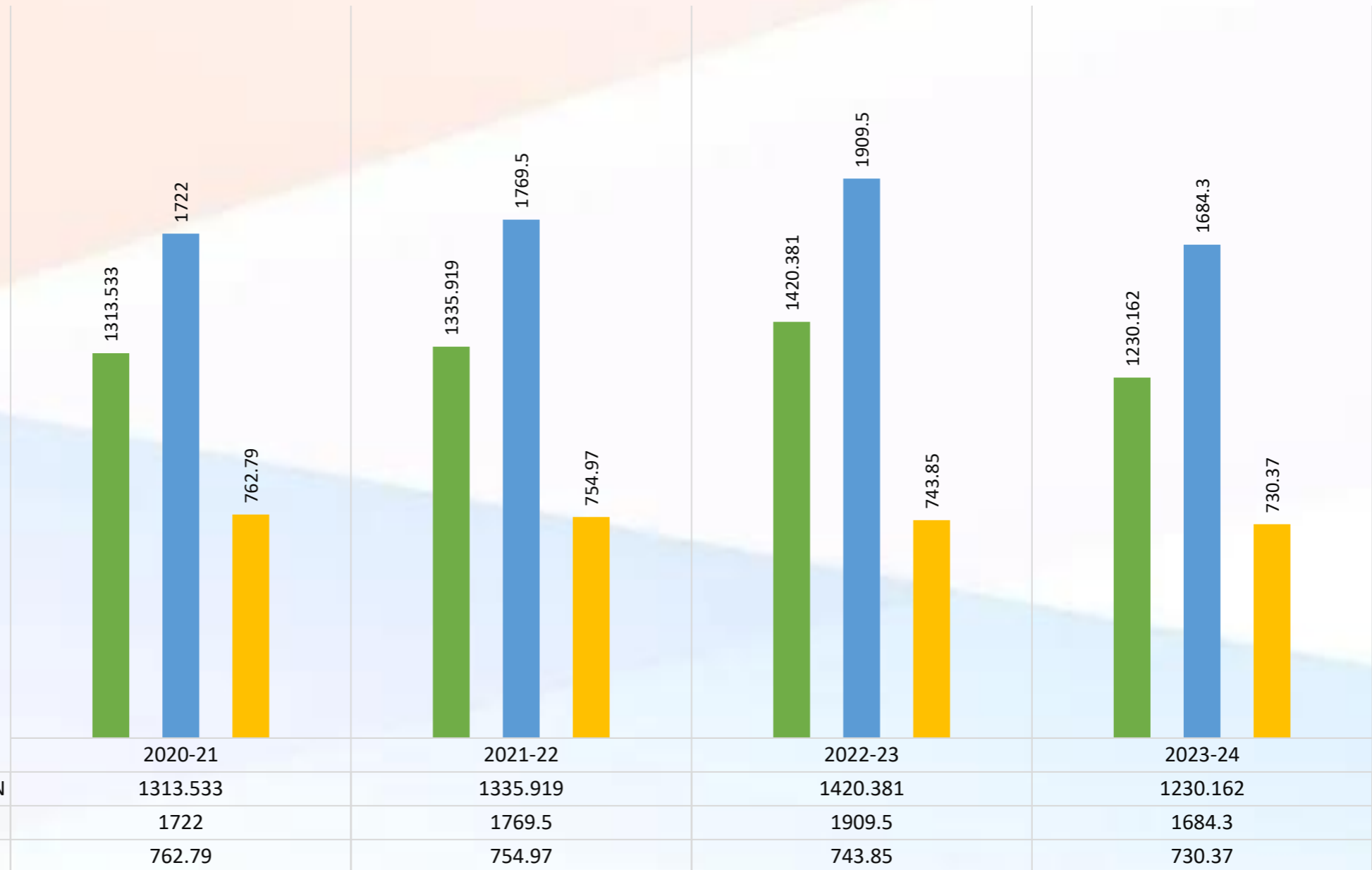
Energy Consumption Overview

Energy vs. Production Data			
	Electrical(kWh)	Out turn(ECU)	Specific Electric Consumption(kWh/ECU)
2020-21	1313.533	1722	762.79
2021-22	1335.919	1769.5	754.97
2022-23	1420.381	1909.5	743.85
2023-24	1230.162	1684.3	730.37

*ECU: Equated Coach Units

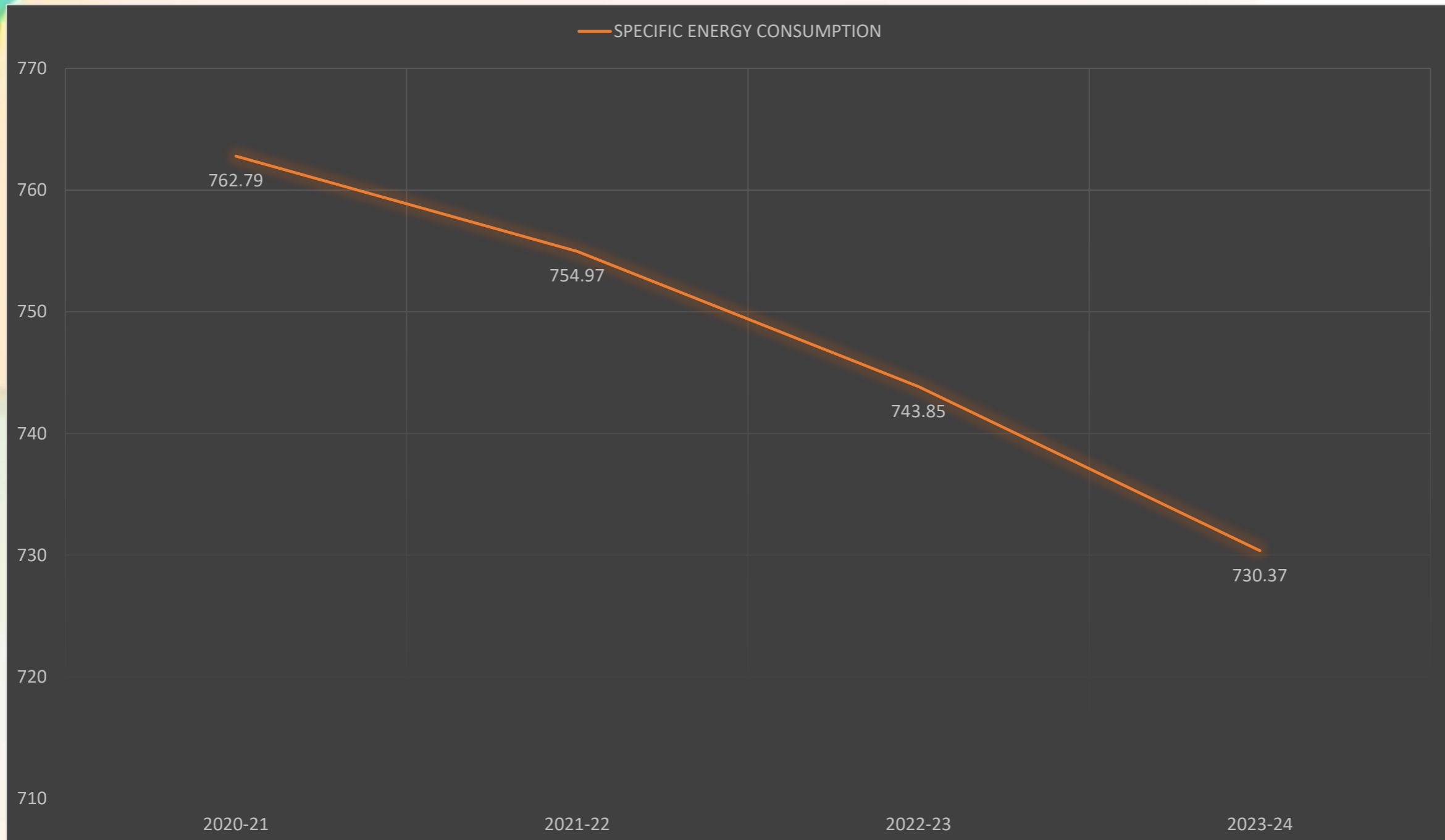
Energy Consumption Overview

■ ENERGY CONSUMPTION ■ OUT TURN ■ SPECIFIC ENERGY



ENERGY CONSUMPTION	1313.533
OUT TURN	1722
SPECIFIC ENERGY	762.79

Specific Energy Consumption

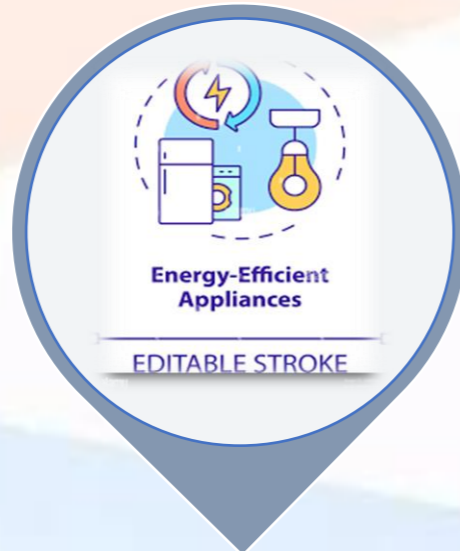


Reasons for Reduction in SEC

Installation of VVVF drives for all high power consuming induction motors on EOT cranes, traversers, dyno drives etc..



Adopting different energy saving technologies such as occupancy sensors for office rooms and toilets



Provision for IGBT based Regenerative test bench for 25KW Alternators



Provision of Energy Efficient equipment like
584 No's LED light fittings
285 No's of BLDC ceiling fans
34 No's of 5 star rated inverter Acs
73 No's of BLDC Air Circulators
20 No's of energy savers for welding plants.

Installations of Analog timers for street light circuits, submersible pumps & water coolers.

Reasons for Reduction in SEC

Adopting different energy saving technologies such as solar light pipes and solar water heaters



Conducting of Annual Internal energy audit and implementation of the recommendations



Ensuring proper operation of APFC Panels in 03 substations to minimize the Power losses.



Conducted IGEA- Investment Grade Energy Audit.

Conducting Awareness Campaigns and Energy Conservation weeks



Action Plan For Reducing SEC

- ❖ Monitoring of Energy Consumption section wise.
- ❖ Energy auditing of major load centres and pumping installations.
- ❖ 100% implementation of Energy Audit recommendations.
- ❖ Use of Solar panels for pumps.
- ❖ Natural light pipe system in select workshops and service buildings.
- ❖ Use of energy saver for Pumps, Lighting circuits, Air-Conditioning circuits, Machines in workshops etc.
- ❖ Provision of VVVF drives for Air compressors.
- ❖ Detecting and arresting of air leakages in the compressor pipelines.



Energy Conservation Project Summary 2021-24

Installation of VVVF drives for EOT cranes, Traversers and Air Compressors



Usage of Inverter based energy saving Welding plants



Replacement of all conventional fans lights and air circulators with 5 star rated equipment



Installation of solar street lights at all major areas



Energy Conservation project Summary 2021-24

S NO	DESCRIPTION OF THE ITEM	ANNUAL ENERGY SAVINGS(kWh)	INVESTMENT MADE (in million)	PAY BACK PERIOD (months)
1	Usage of Inverter based energy saving Welding plants. Qty:24 No's	63940.8	0.644	13
2	Replacement of all conventional fans with 5star rated BLDC fans. Qty:714 No's	37699	1.699	7
3	Replacement of all Conventional Air circulators with BLDC Air circulators. Qty:141 No's	27072	1.652	10
4	Provision of 100%LED light fittings instead of conventional Light fittings and adoption of Natural light pipe systems. Qty:1459 No's	28012	0.282	2
5	Placing of occupancy sensors for light control in Officers chambers, Conference rooms, Waiting Halls.	1344	0.0194	36

Utilization Of Renewable Energy Sources



Rooftop Solar Plant- A substation



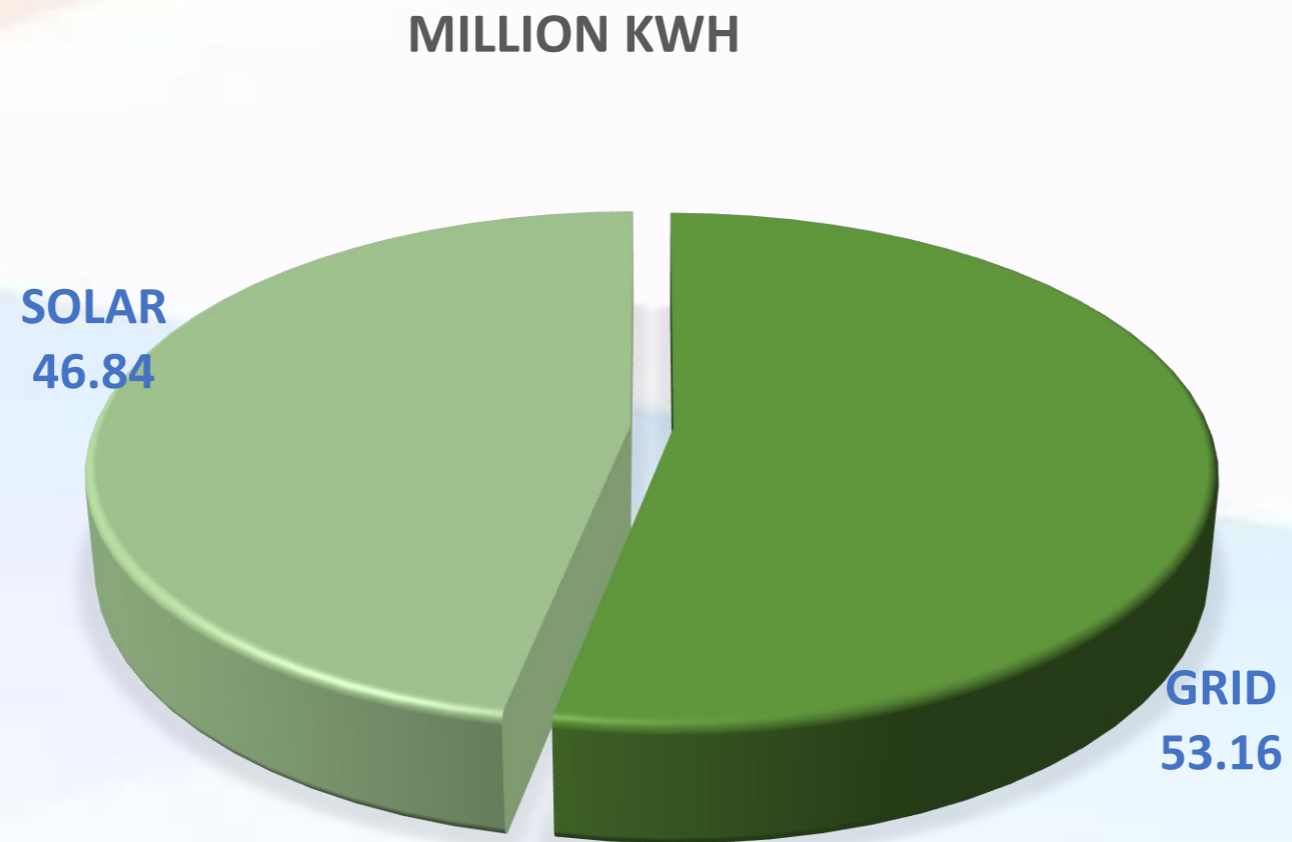
Rooftop Solar Plant- CMT Lab



Solar-Wind Hybrid Plant on ESTC

Utilization Of Renewable Energy Sources

Technology (electrical)	Type of Energy	Onsite/Offsite	Installed Capacity (MW)	Generation (million kWh)	% of overall electrical energy
Renewable	Solar	Onsite	0.534	0.576	46.84



Major Renewable Energy projects planned for 2024-25

- Installation of **530 kWp** On Site solar plant at various service buildings within the Workshop.
- Investment **24.433 million**
- Estimated annual Electrical savings **0.7632 million kWh**
- Expected to Complete it by March 2025
- With this total solar capacity will be 1.010 MWp.



“Shunya+” Labelling for Administrative Building

- A proposal for 150 kWp solar plant is planned during 2024-25.
- Solar generation anticipated 216000 units(approx.)
- Energy consumption 186943 units
- Net energy consumption - 29057(surplus)
- Builtup area 4500 sq.mts
- EPI (kWh/sq.mtr/yr) = -6.45
- Proposed for labelling: **Shunya+**



Waste Management

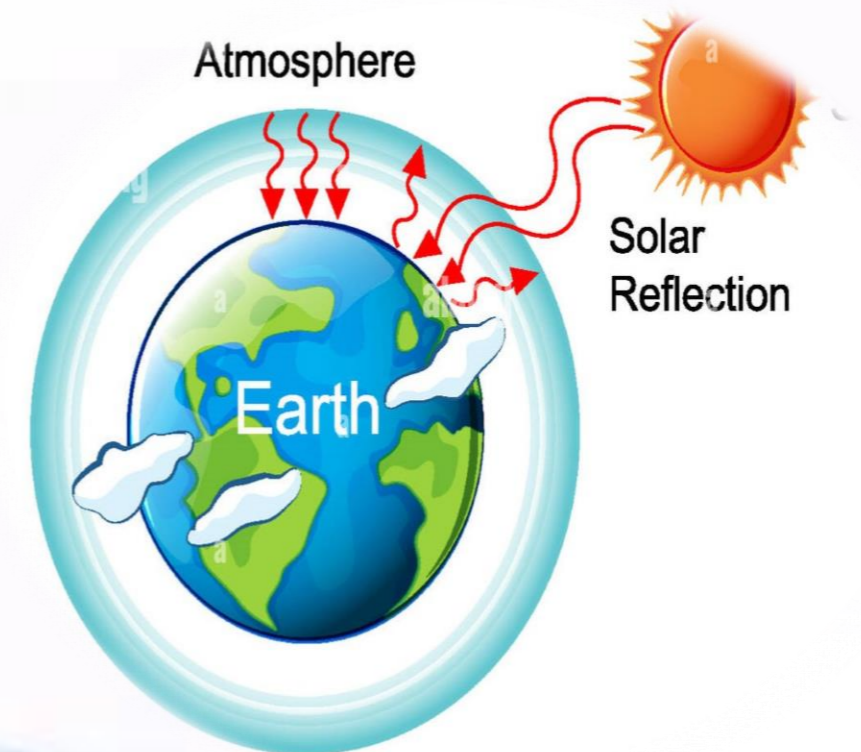
Sl No	Type of waste generated	Quantity of waste generated (MT/year)			Disposal method
		2021-22	2022-23	2023-24	
1	Ferrous & Non Ferrous	4519.033	5287.813	6740.874	Sent to Scrap depot
2	Non Metallic	87.175	110	218.84	Sent to Scrap depot
3	Hazardous	94.565	73.245	87.205	It is collected by RAMKY group for safe disposal who have developed eco friendly waste management facilities

- Above are the waste generated in production process and day to day working.
- In this condemnation process each item is dismantled to its basic elements(such as iron, copper, aluminum, steel) are sent to scrap depot where it is then auctioned.

Action plan for Reducing GHG Emission

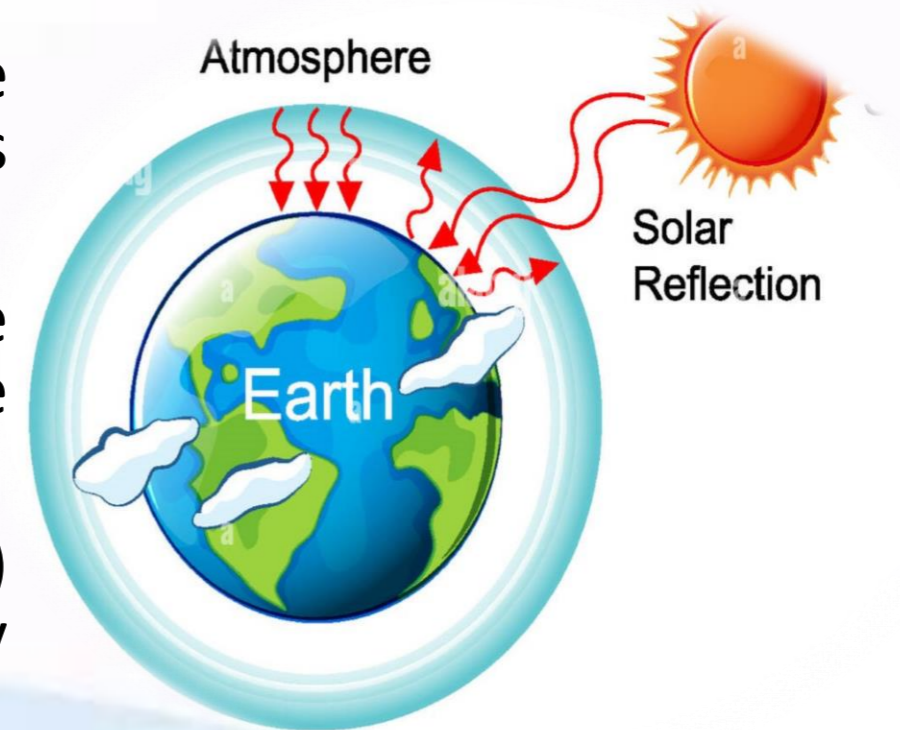
The amount of CO₂ generation is directly related to electricity consumption and production process and material handling. Target areas to reduce CO₂ emission:

- 1) Focusing more on capacity addition of SOLAR Plants to reduce GRID consumption.
- 2) Regular review of the production process and material handling.
- 3) Procurement of new Energy efficient products in place of old high power consuming electrical items like lights, fans, AC's etc.
- 4) HSD operated vehicles are like Fork Lifts, Lister trucks are now being switched to battery operated ones.



Action Plan for Reducing GHG Emission

- 5) Periodical Overhauling of DG sets are carried out to reduce emission.
- 6) Different energy saving technologies like analog timers, occupancy sensors, energy savers for welding plants and AC's are adopted.
- 7) E-office implemented for all supervisors, Office superintendents and ministerial staff to save physical paper involvement in daily activities.
- 8) IREPS (Indian Railways E-Procurement System) implemented for procurement of items with very less paper work.
- 9) Encouraging the staff for the use of E vehicles by providing charging points in parking space which gets supply purely from solar energy.



Green Supply Chain

The Stores Department in Carriage Workshop, Lallaguda is committed to protect the Environment by striving for Green Supply Chain mutually with the vendors in following areas:

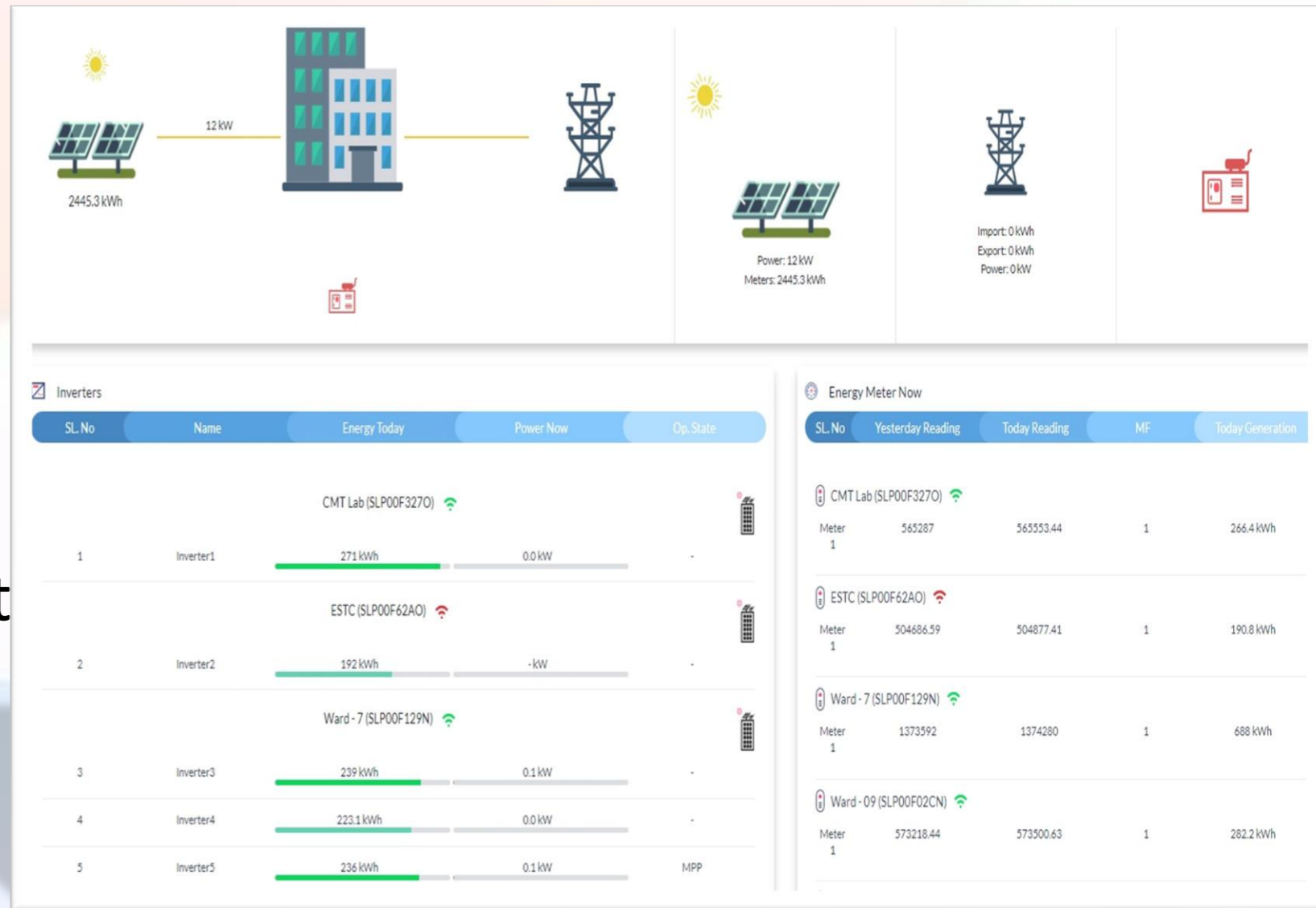
- Reduce waste generation, Specific Energy and Water consumption.
- Designing of product to have less hazardous substance at end of lifetime.
- Recycle and reduce the material consumption.
- Adopting proper conservation methods in storage of materials.
- Conducting periodical vendor meetings and creating Awareness among our vendors on importance of GreenCo Certifications.



Solar Monitoring System

Solar Monitoring System is a web based portal where Solar Power generation is tracked in both real time as well as recording type.

This system is installed at all the nine locations where solar plants are situated.



IR-NIYANTRAC

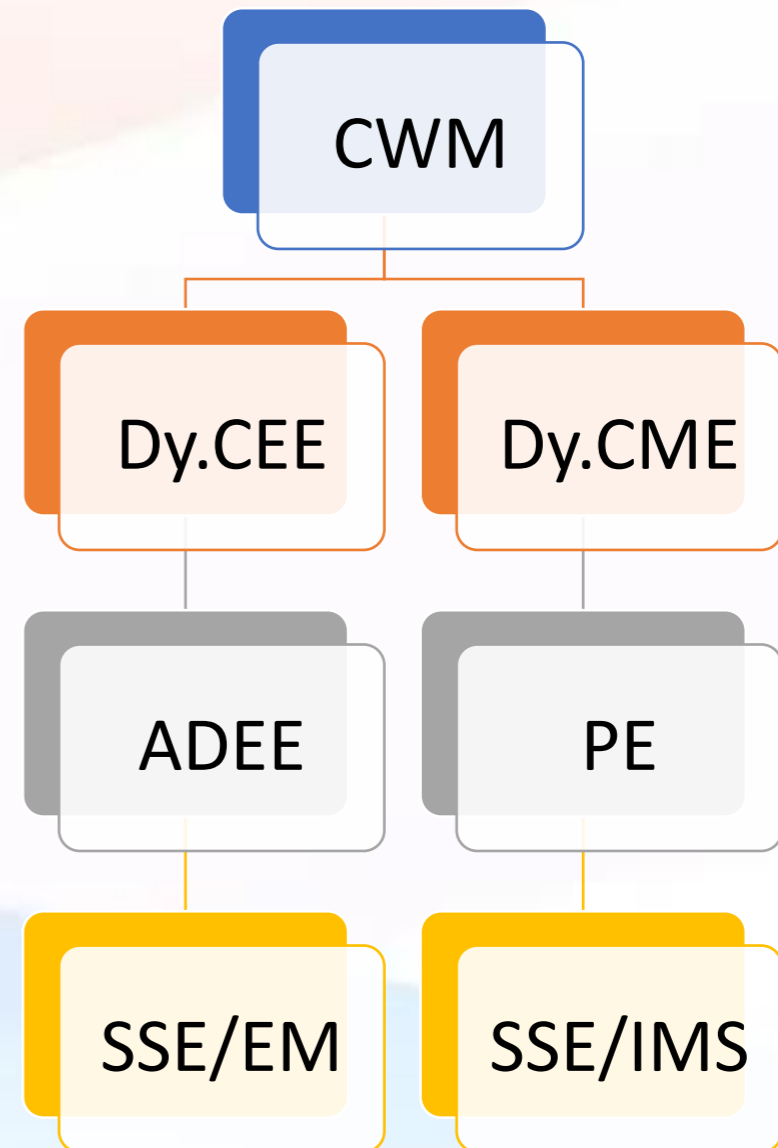
(Indian Railways Native IoT based Yield Analysis Telemetry Recording And Control)

- IR-NIYANTRAC is a complete application platform deployed by CRIS for monitoring and control of electrical assets and energy.
- It is a Vendor Neutral application.
- All energy inflows and outflows are monitored so that the energy consumption is established holistically.
- Real-time monitoring and control of pumps with sensor monitoring like continuous water level monitoring in OHTs/UGTs, pressure, flow, etc.
- This also enables Indian Railways to have a central asset repository system, rather than automation and digitalization in disconnected silos as this System will be hosted in CRIS Cloud.




Energy Management Team

- The Electrical Maintenance section records and monitors daily energy consumption for individual feeders in all 3 substations and major load centers such as CNC machines and Air Compressors.
- **Monthly Review Meeting** is chaired by Dy CEE with various stake holders to discuss about the consumption pattern and constraints.
- Innovate energy efficiency techniques in processes & strive for use of alternate energy in place of conventional sources.



Energy Efficiency Policy

- Carriage Workshop Lallaguda is IMS certified and has a combined IMS policy which includes QMS, EMS, EnMS and OHSMS.
- Indian Railways has set a target of Net Zero Carbon Emission by 2030 and inline with this vision circulated comprehensive policy in Dec'22 for Energy Efficiency on the following
 - Sustainable Buildings
 - Cloud based data monitoring and management portal
 - Energy Efficiency in equipment and appliances
 - Capacity building and awareness



सवारी डिब्बा कारखाना, लालागुडा
Carriage Workshop, Lallaguda
द.म.रेलवे, सिकंदराबाद
S. C. Rly, Secunderabad

आईएमएस नीति
(क्यूएमएस, ईएमएस, ओएसएसएस और ईएनएमएस)

हम, कोचिंग स्टॉक की आवधिक ओवरहालिंग और डीजल लोकोमोटिव फिल्टरों के निर्माण की गुणवत्ता में सतत सुधार लाने के साथ-साथ ग्राहकों की संतुष्टि को प्राप्त करने के लिए निम्नलिखित उपायों के माध्यम से वचनबद्ध हैं.

- पर्यावरण प्रदूषण की रोकथाम.
- कर्मचारियों को बीमार होने और चोट लगने से बचाना.
- ऊर्जा का प्रभावी उपयोग और वैकल्पिक एवं अक्षय ऊर्जा स्रोतों के उपयोग पर ध्यान देना.
- पानी की खपत को कम करने और पीने के अयोग्य पानी को पुनः उपयोगी/रीसाइकिल करने के अवसरों का पता लगाना.
- भूजल टेबल को रिचार्ज करने के लिए वर्षा के पानी का संग्रहण.
- उपयुक्त विधिक और अन्य आवश्यकताओं का अनुपालन.
- आईएमएस के उद्देश्यों और लक्ष्यों की नियमित पुनरीक्षा.

सिकंदराबाद
21 जुलाई 2017

राम. वि. कुमार
मुख्य कारखाना प्रबंधक
लालागुडा, दमरे.

IMS POLICY
(QMS, EMS, OHSAS & EnMS)

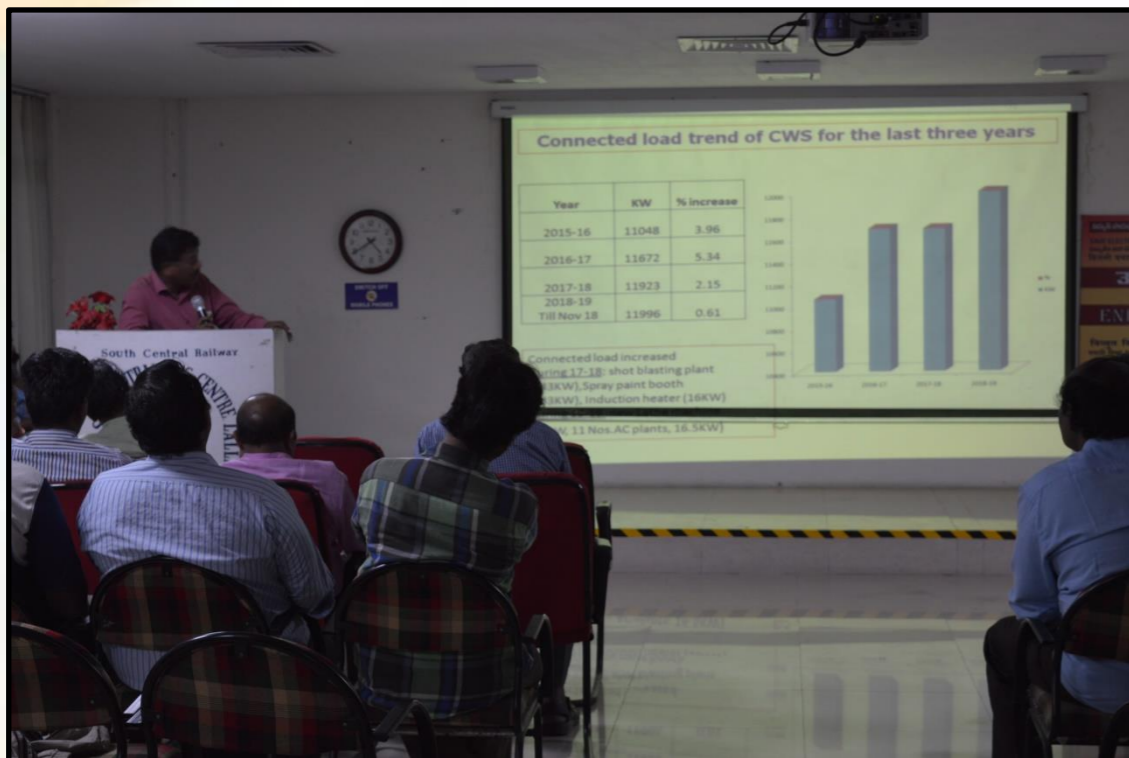
We are committed to achieve Customer satisfaction with continual improvement in quality of Periodical Overhauling of coaching stock and manufacturing of Diesel Locomotive Filters through:

- Prevention of Environmental Pollution
- Prevention of ill health and injury of employees
- Effective utilization of Energy and focusing on use of alternate and renewable energy sources
- Pursuing opportunities to reduce water consumption and also to reuse/recycle non-potable water.
- Harvest Rainwater for recharging ground water table.
- Compliance of applicable Legal and other requirements
- Regular review of IMS Objectives and Targets

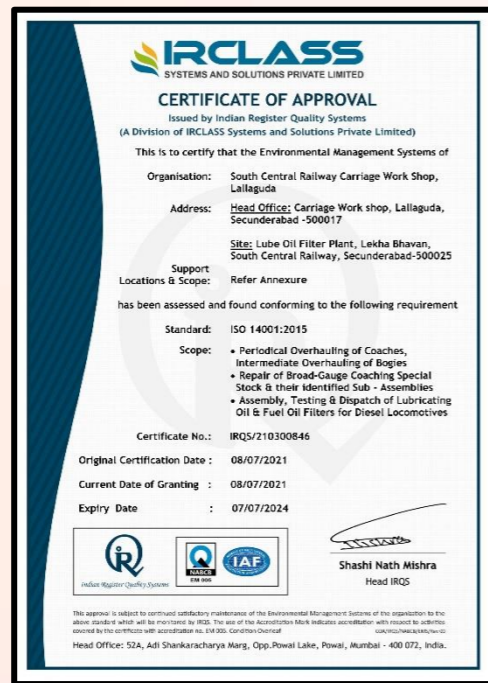
Secunderabad
21st July 2017

Kunal
Chief Workshop Manager
Lallaguda, SCRly

Energy Conservation Week



Certifications of CWS/LGD



ISO 14001 : 2015



ISO 50001:2018



ISO 9001:2015



Lean 6 sigma certificate

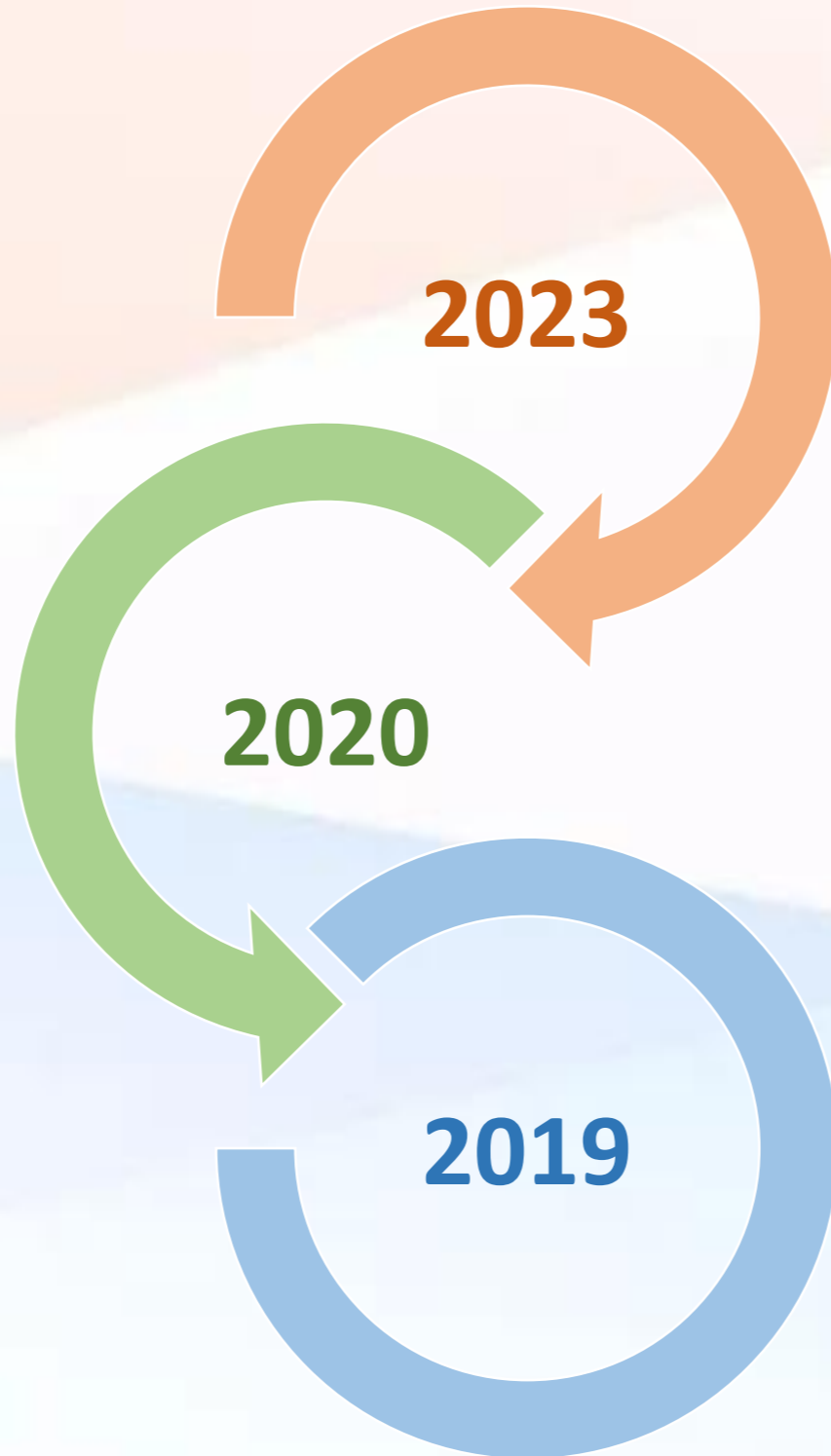


ISO 45001:2018

Awards and Achievements



Energy Efficient Unit by CII



SILVER prize by TSREDCO



GOLD prize by TSREDCO

Learning from CII Energy Award

- Learn about various techniques & ideas to reduce wastage of Energy.
- Role Of Training Program and evaluation of its impact on Energy Savings.
- Better awareness among employees regarding the effective utilisation of energy resources.
- Better exposure on the technical advancements and various energy conservation measures adopted by other organisations.

Thank You



Contact Number
9701370494



Email Address
dyceelgds@gmail.com