ENERGY CONSERVATION & MANAGEMENT
CENTRAL WORKSHOP
SOUTHERN RAILWAY, PONMALAI,TRICHY ,TAMILNADU

SANTOSH KUMAR PATRO

Chief Workshop Manager

TUSHAR ADITYA

Dy.CME/DSL/GOC & Environmental Officer

ENERGY TEAM – GOC

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Company Profile

2023-24

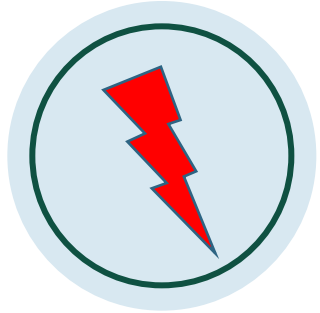
750 WAGONS

1 STEAM LOCO

1370 COACHES

75 DIESEL LOCOS

4058 EMPLOYEES



MAXIMUM ENERGY DEMAND 2100 KVA

Manufacturing Process

- BAKING OVEN

- DIESEL FIRED FURNACE

- AIR COMPRESSORS

- WELDING PLANTS

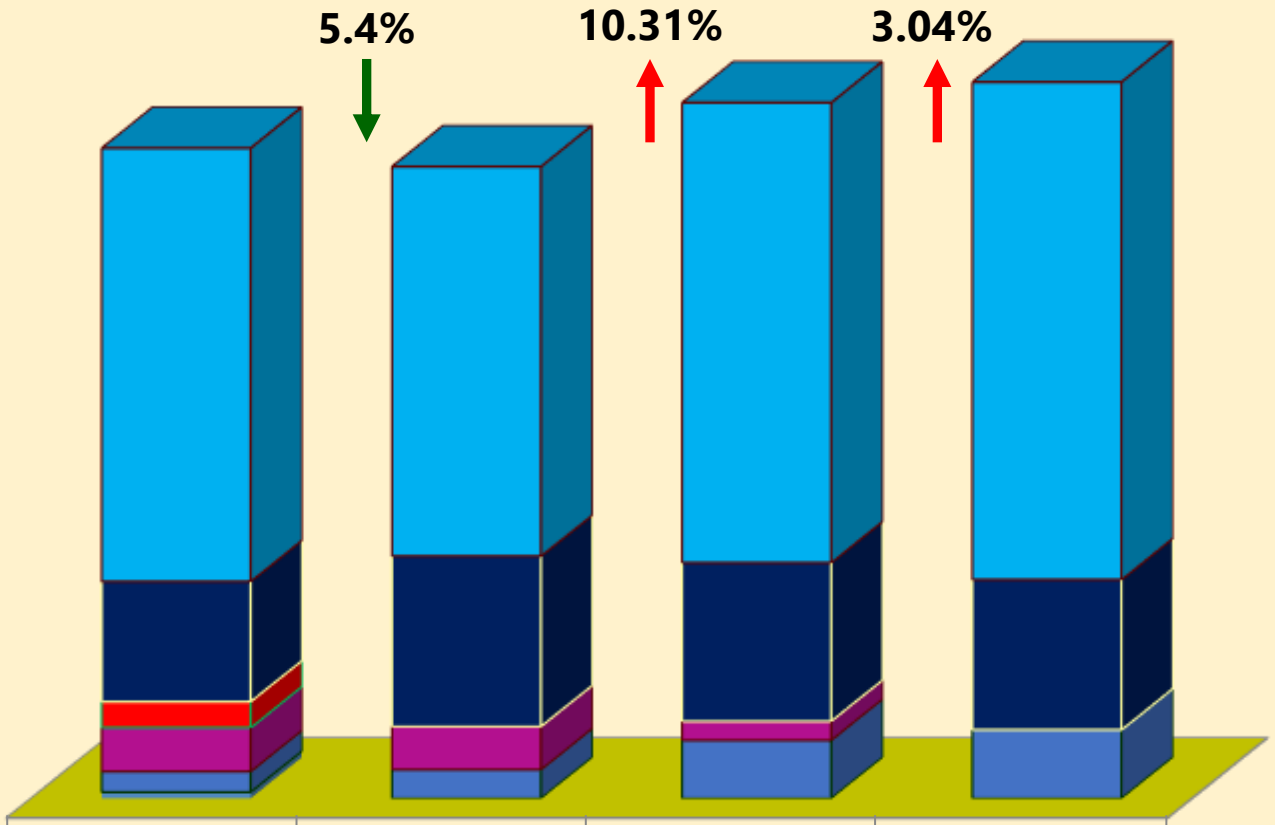
- MULTISTATION HORIZONTAL DRILLING & BORING MACHINES

- CNC PLASMA CUTTING MACHINES

- EOT CRANES

- LPG/CBG CUTTING

TOE Of Various Energy Sources



	2020-21	2021-22	2022-23	2023-24
ELECTRCITY	287	258	304.68	329.63
HSD OIL	79.64	112.8	105	99.5
FURNANCE OIL	17.29	0	0	0
ACETYLENE	29	28.57	12.64	0
CUTTING GAS	13.61	19.08	38.5	45.4
COKE	4.2	0	0	0

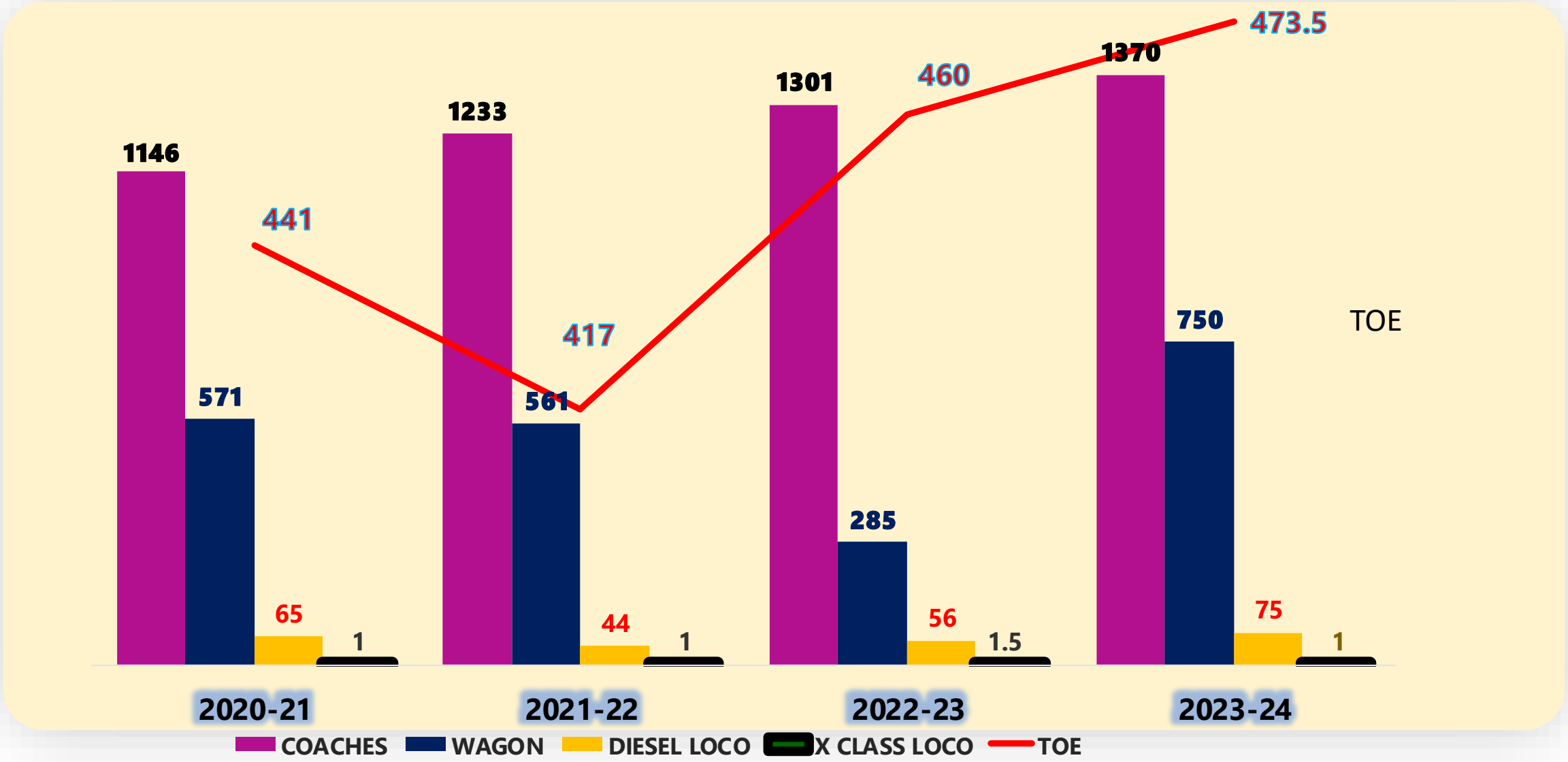
2020-21
441 TOE

2021-22
417 TOE

2022-23
460 TOE

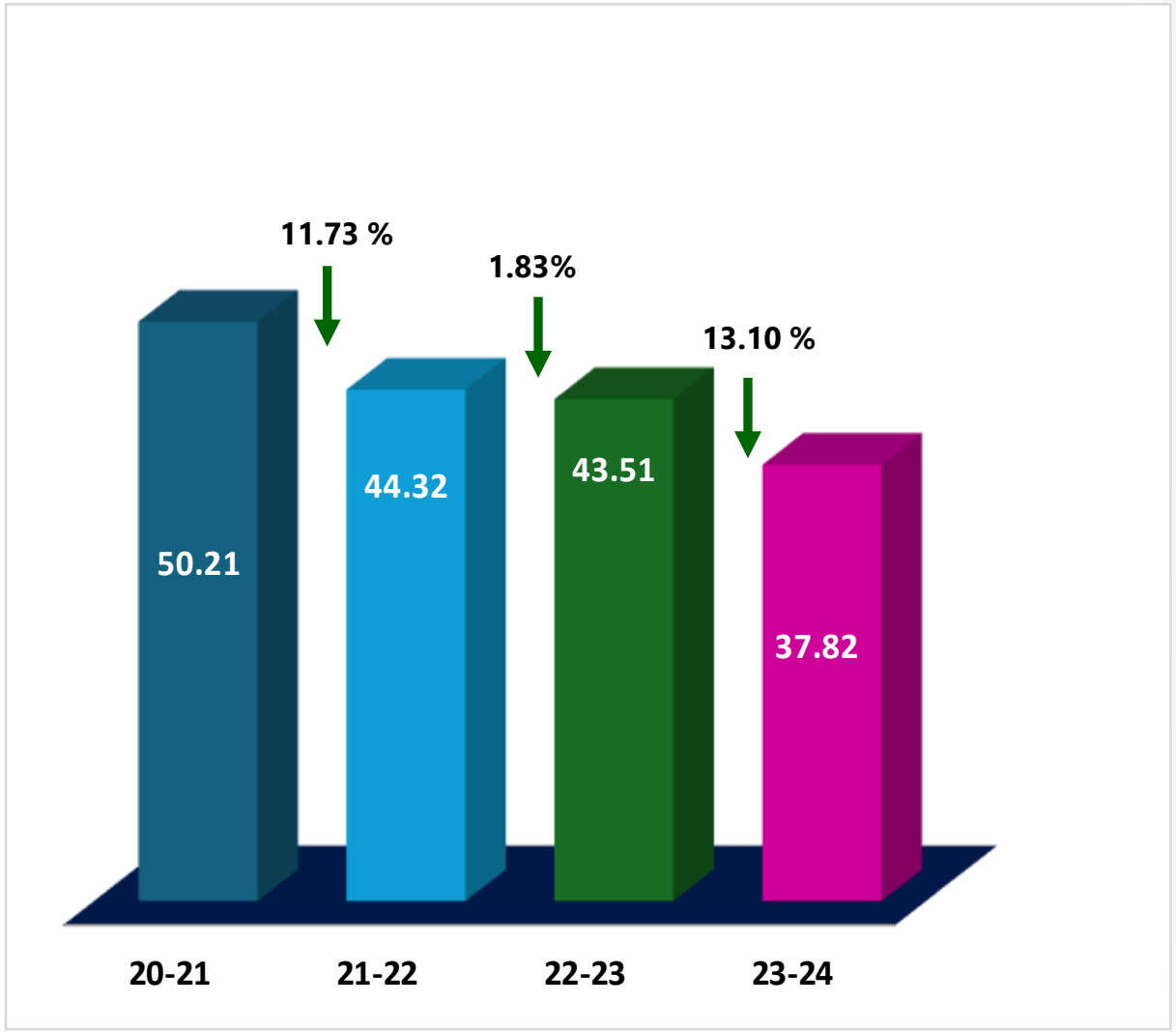
2023 - 24
474 TOE

Out Turn Vs Energy Consumption Trend - Last 3 Yrs



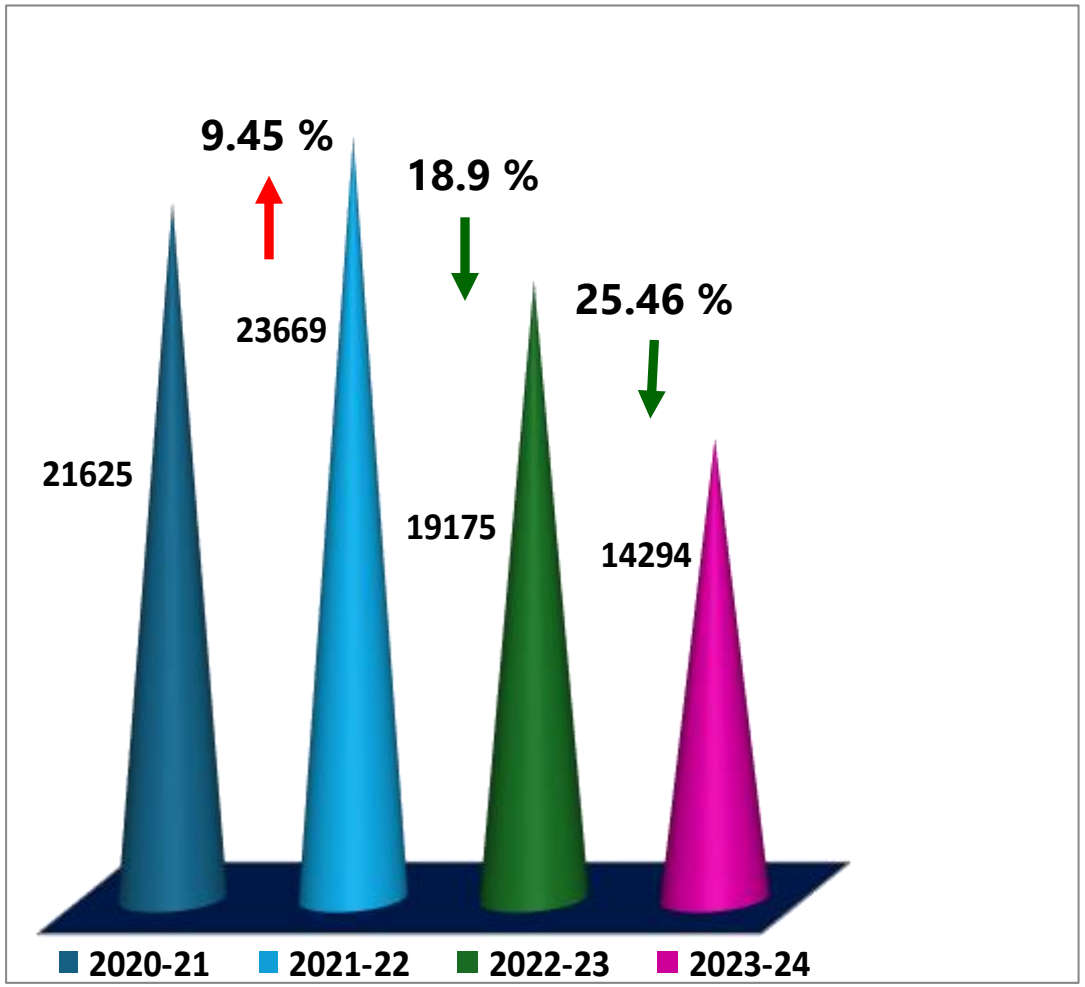
Specific Electrical Energy Consumption - Kwh/Tonne

Electrical Energy (SEC) Trend



- Reduction of CMD from 2700 to 2100 KVA.
- Replacement of 300 CFM Expressor compressor with 120 CFM screw compressor
- Replacement of 38 Nos of conventional welding plants with IGBT based welding plants
- Replacement of 502 Nos of Conventional ceiling fans with BLDC ceiling fans.
- Replacement of 15 Nos of conventional Air circulators with BLDC Air circulators
- Installation of 1021 Nos of Wind driven roof mounted Ventilators.
- Withdrawal of 2 Nos of inefficient ovens from service.
- Installation of EOT cranes with VFD control of Various capacities (11 Nos)
- Installation of IoT based water management system
- Installation of IGBT based Rectifier unit for Traction motor test kit
- Introduction of Sonic industrial imager for detection of compressed air leakage

Specific Thermal Energy Consumption - Kcal/Tonne



*Conversion of 1 NMGHS coach is equivalent to POH of 3.9 ICF coaches

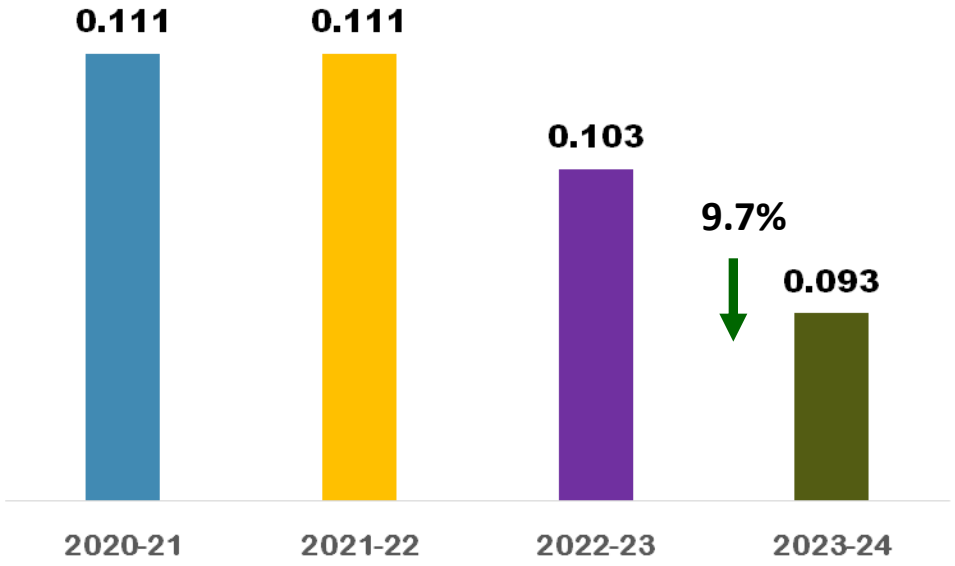
Projects implemented for Thermal Energy conservation

- Installation of 3 Nos. of Oxy - hydrogen fuel gas Generators for Metal cutting in place of Acetylene
- Introduction of CBG fuel to replace the Oxy-Acetylene fuel for metal cutting
- Installation of Dynamic wheel balancing machine
- 100% withdrawal of acetylene from metal cutting

Specific Energy Consumption Of All Major Products

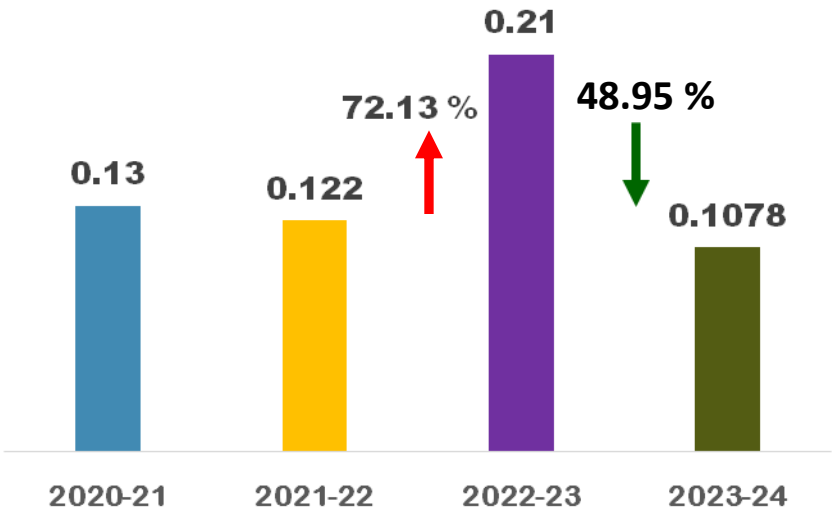
SEC- CARRIAGE (TOE/COACH)

Reduction in SEC - Carriage is due to the increase in outturn of carriage POH from 1301 to 1370.



SEC-WAGON (TOE/WAGON)

Increase in SEC- Wagon is due to the non availability of wheels for turning out of wagons.

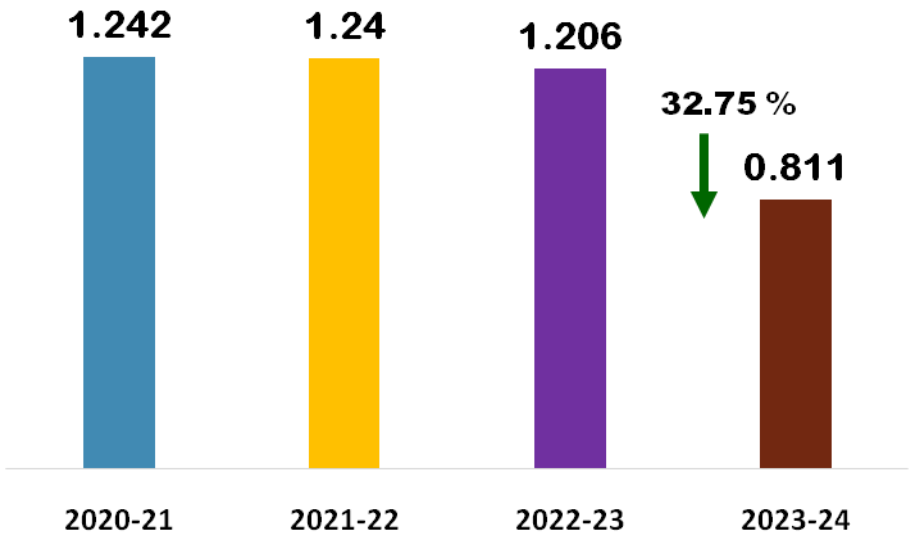


Reduction in SEC- Wagon is due to the increase in outturn of wagon from 285 to 750 .

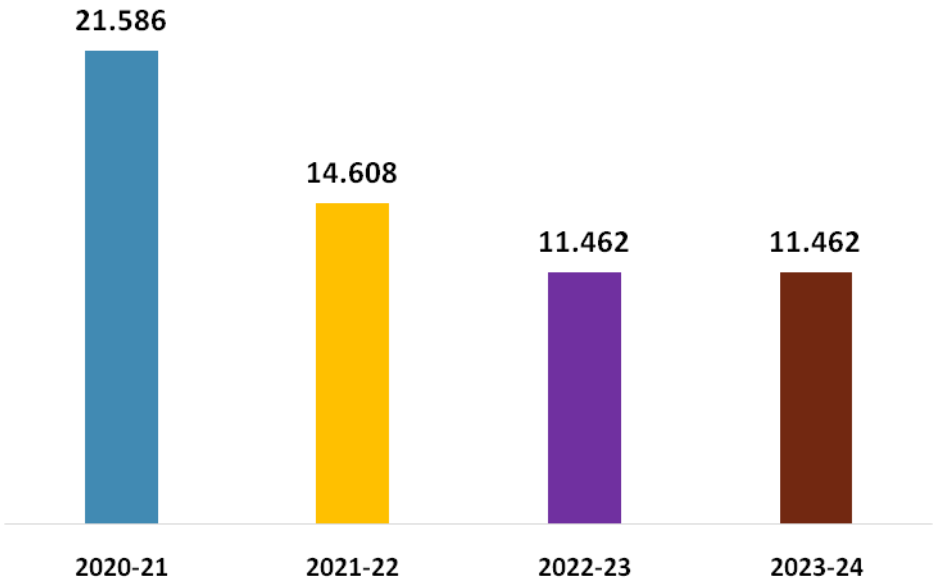
Specific Energy Consumption Of All Major Products

SEC- LOCO
(TOE/DIESEL LOCO)

Reduction is achieved in the SEC-Loco due to the increase in Diesel loco outturn from 56 to 75 Nos.



SEC- X CLASS LOCO
(TOE/X CLASS LOCO)



Major Encon Projects Planned - 2024-25

Sl. No H	PROJECT	ENERGY SAVINGS	INVESTMENT Rs. IN LAKHS	PILLARS OF GREENCO
1	CONVERSION OF HSD OIL FIRED FURNACE IN TO CBG BASED FURNACE	224.5 M.kCal	25.63	Carbon neutral &safe fuel
2	INSTALLATION OF VFD BASED CRANES (2 Nos.) OF VARIOUS CAPACITIES	13,300 kWh	75	Improving Process Efficiency
3	REPLACEMENT OF CONVENTIONAL FANS BY BLDC FANS (160 Nos.)	14,400 kWh	4.78	Improving Energy Efficiency
4	REPLACEMENT OF CONVENTIONAL AIR CIRCULATORS BY BLDC AIR CIRCULATORS (66 Nos.)	35,500 kWh	8.16	Improving Energy Efficiency
5	INSTALLATION OF IGBT CONTROLLED BAKING OVEN OF CAPACITY 25 kW (2 Nos)	5,940 kWh	30.81	Process improvement
6	INSTALLATION OF 350 kWp SOLAR PANEL	5,11,000 kWh	215.6	Harnessing of solar power
7	INSTALLATIOIN OF WIND DRIVEN ROOF MOUNTED VENTILATOR (395 NOS)	86,700 kWh	24.71	Harnessing of wind power

Total Electrical Saving : 6,66,840 kWh **Total Investment : 384.69 LAKHS**

Total Thermal saving : 224.5 M kCal

Consolidated Details of Projects Implemented For last 3 Yrs

YEAR	NO. OF ENERGY SAVING PROJECTS	INVESTMENTS (INR MILLIONS)	ELECTRICAL SAVINGS (MILLION KWH)	THERMAL SAVINGS (MILLION KCal)	SAVIMGS (INR MILLION)	IMPACT ON SEC (ELECTRICAL, THERMAL)
2021-22	11	17.31	1.148	6.98	11.257	ELECTRICAL & THERMAL
2022-23	10	25.91	0.131	7.89	7.808	ELECTRICAL & THERMAL
2023-24	7	7.36	0.237	-	4.412	ELECTRICAL
TOTAL	28	50.58	1.516	14.87	23.479	ELECTRICAL & THERMAL

Energy saving Projects implemented last 3 years

YEAR	NAME OF ENERGY SAVING PROJECTS	INVESTMENTS (INR MILLIONS)	ELECTRICAL SAVINGS (MILLION KWH)	THERMAL SAVINGS (MILLION KCal)	TOTAL SAVIMGS (INR MILLION)	PAY BACK PERIOD (MONTHS)
2021-22	REPLACEMENT OF CONVENTIONAL FANS BY BLDC FANS (180 Nos)	0.5382	0.0162	0	0.1391	46.43
2021-22	REPLACEMENT OF CONVENTIONAL WELDING PLANTS WITH IGBT BASED WELDING PLANTS (37 Nos)	9.2394	0.4265	0	3.6635	30.26
2021-22	WITHDRAWAL OF INEFFICIENT, OVER AGED BAKING OVENS FROM SERVICE (3 NOS)	0	0.297	0	2.551	0
2021-22	WITHDRAWAL OF INEFFICIENT OIL & TRANSFORMER/DIODE BASED WELDING PLANTS (26 NOS)	0	0.0936	0	0.804	0
2021-22	SOLAR CONCENTRATOR BASED WATER HEATING SYSTEM	2.485	0.1909	0	1.639	18.19
2021-22	REPLACEMENT OF CONVENTIONAL RESISTANCE TYPE CHARGER CUM DISCHARGER WITH REGENERATIVE CHARGER	0.6278	0.008	0	0.0687	109.65
2021-22	INTRODUCTION OF CBG BASED FUEL IN PLACE OF OXY-ACETYLENE FOR METAL CUTTING	0.01152	0	0	0.01568	8.82
2021-22	REDUCTION OF CMD FROM 2700 KVA TO 2400 KVA	0	0	0	1.134	0

Energy saving Projects implemented last 3 years

YEAR	NAME OF ENERGY SAVING PROJECTS	INVESTMENTS (INR MILLIONS)	ELECTRICAL SAVINGS (MILLION KWH)	THERMAL SAVINGS (MILLION KCal)	TOTAL SAVIMGS (INR MILLION)	PAY BACK PERIOD (MONTHS)
2021-22	REPLACEMENT OF CONVENTIONAL AIR CIRCULATORS BY BLDC AIR CIRCULATORS (32 NOS)	0.48	0.0173	0	0.1482	38.87
2021-22	INSTALLATION OF WIND DRIVEN ROOF MOUNTED VENTILATOR(448 NOS)	2.82	0.09843	0	0.8447	40.06
2021-22	INSTALLATION OF JALVAAYU (AQUA GAS) ON SITE OXY-HYDROGEN FUEL GAS GENERATOR, FOR METAL CUTTING	1.049	0	11.16	0.2331	54
2022-23	REPLACEMENT OF CONVENTIONAL FANS BY BLDC FANS (110 Nos)	0.3289	0.0099	0	0.085	46.43
2022-23	REPLACEMENT OF CONVENTIONAL AIR CIRCULATORS BY BLDC AIR CIRCULATORS (15 NOS)	0.225	0.008087	0	0.0694	38.9
2022-23	USAGE OF CBG BASED FUEL IN PLACE OF OXY-ACETYLENE FOR METAL CUTTING	0.02304	0	0	0.03136	8.82
2022-23	REPLACEMENT OF ACETYLENE WITH LPG FOR METAL CUTTING	0.904	0	0	3.135	3.46
2022-23	INSTALLATION OF JALVAAYU (AQUA GAS) ON SITE OXY-HYDROGEN FUEL GAS GENERATOR, FOR METAL CUTTING	2.098	0	22.32	0.4662	54

Energy saving Projects implemented last 3 years

YEAR	NAME OF ENERGY SAVING PROJECTS	INVESTMENTS (INR MILLIONS)	ELECTRICAL SAVINGS (MILLION KWH)	THERMAL SAVINGS (MILLION KCal)	TOTAL SAVIMGS (INR MILLION)	PAY BACK PERIOD (MONTHS)
2022-23	COMMISSIONING OF WHEEL DYNAMIC BALANCING MACHINE	2.875	0	71.103	0.927	37.22
2022-23	INSTALLATION OF WIND DRIVEN ROOF MOUNTED VENTILATOR (100 NOS)	0.631	0.021970	0	0.2124	35.65
2022-23	IGBT BASED RECTIFIER UNIT FOR TRACTION MOTOR TEST KIT	1.646	0.018430	0	0.1786	110.59
2022-23	INSTALLATION OF IOT BASED WATER MANAGMENT SYSTEM	3.992	0.066	0	0.639	74.97
2022-23	INSTALLATION OF 25 T EOT CRANES WITH VFD CONTROL(2 NOS)	13.311	0.0075	0	0.07265	2198.65
2023-24	REPLACEMENT OF CONVENTIONAL CEILING FANS BY BLDC DEILING FANS (212 Nos)	0.489	0.019080	0	0.1959	29.95
2023-24	INSTALLATION OF VFD BASED CRANES (9 NOS) OF VARIOUS CAPACITIES	1.35	0.020250	0	0.2079	77.92
2023-24	REDUCTION OF CMD FROM 2400 KVA TO 2100 KVA	0	0	0	1.782	0

Energy saving Projects implemented last 3 years

YEAR	NAME OF ENERGY SAVING PROJECTS	INVESTMENTS (INR MILLIONS)	ELECTRICAL SAVINGS (MILLION KWH)	THERMAL SAVINGS (MILLION KCal)	TOTAL SAVIMGS (INR MILLION)	PAY BACK PERIOD (MONTHS)
2023-24	INSTALLATION OF INVERTER BASED TWIN WIRE PULSED MIG/MAG WELDING PLANT	1.369	0.023053	0	0.236	69.61
2023-24	INSTALLATION OF WIND DRIVEN ROOF MOUNTED VENTILATOR (473 NOS)	2.984	0.103922	0	1.067	33.56
2023-24	INTRODUCTION OF SONIC INDUSTRIAL IMAGER FOR BETTER DEDUCTION OF COMPRESSED AIR LEAKAGE	1.168	0.062086	0	0.637	22
2023-24	REPLACEMENT OF 300 CFM COMPRESSOR AIR WITH 120 CFM COMPRESSOR	0	0.0279	0	0.286	0

Innovative Projects Implemented -2022-23

Demonstration for usage of Carbon Neutral Upgraded Compressed Bio Gas for Wheel disc cutting and canteen cooking applications in GOC Workshops.

Cutting of wheel discs using CBG with no modification in cutting torch

During the FY 2022-23, 216 cu.mts of CBG was procure d which has resulted in the financial savings of 1.08 Lakhs

Usage of CBG in canteen burners for cooking instead of LPG

Key Benefits of using CBG in replacing Acetylene and Bharat Metal cutting Gas are:

- **Carbon Neutral Fuel (3 times lesser Carbon foot print that Bharat Metal Cutting Gas and 4 times lesser than Acetylene)**
- **Cost of Acetylene is Rs. 588 per Cubic metre whereas Cost of CBG is Rs.88/– per Cubic Metre.**
- **Very safe fuel compared to Acetylene gas**
- **Very narrow range of flammability index 4.4 – 16.5 as against 2.5 – 80 for Acetylene**
- **100% usage with zero residual gas while sending for refilling**
- **100% Greener supply chain due to transportation of cascades in CBG fired vehicle.**

Stand alone special cable free solar panelling system-2024

Application:

Where cabling system not possible or too costly (Eg. Ring road RPF patrolling)

Merits:

1. First Make-in INDIA design.
2. Aesthetic look.
3. For Same wattage, area occupancy less.
4. Since designed by GOC shop, cost is 1/3rd of commercial cost
5. 20W customised manufactured for GOC.
6. 12V- 18AH- LFP Lithium Ferro Phosphate Battery (weight to AH ratio very less)
7. M.M.P.T. charge controller with Dawn to Dusk glowing
8. Luminary index- 120 L/W
9. Colour rendering Index- 5500- 6500 K
10. Size- 1.6m x 100 mm

Innovative Projects Implemented– 2023-24

Afforestation measures- BEEMA BAMBOO Plantation

Planting of 4246 saplings of BEEMA BAMBOO was done during 2023-24 by CWM /GOC, Officers, supervisors and staff in GOC Workshop.

Target for achieving net zero emission is 20000 Nos of Bheema bamboo Saplings

- Each plant releases **35 % more oxygen** than an equivalent stand of trees.
- Due to 4246 plants, **384 T of CO_2** is absorbed every year.

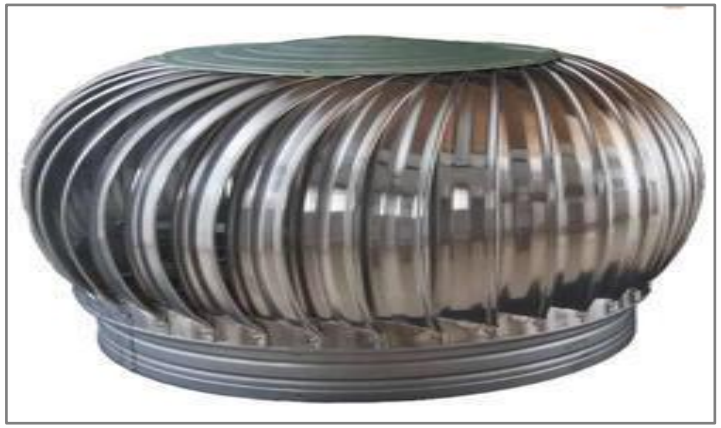
Status: 100 % survival and good growth ensured

Utilisation Of Renewable Energy Sources – On site

Renewable Energy Generation, Utilization and % of Overall Energy Consumption – ON SITE

Year	Source	Installed Capacity (MW)	Capacity addition (MW) after Financial year 2020-21	Total Generation (Million Kwh)	Share % with respect to Overall Electrical consumption
FY 2021 - 22	Solar PV	121 KW	-	0.151819	5.07
	Solar thermal concentrator	5000 Liters of Hot water per day	-	0.0456	1.52
FY 2022 - 23	Solar PV	121 KW	-	0.158833	4.48
FY 2023 - 24	Solar PV	371 KW	250 KW	0.216354	5.64

Utilisation Of Renewable Energy Sources



Translucent roofing sheets have been provided in sheds on need basis

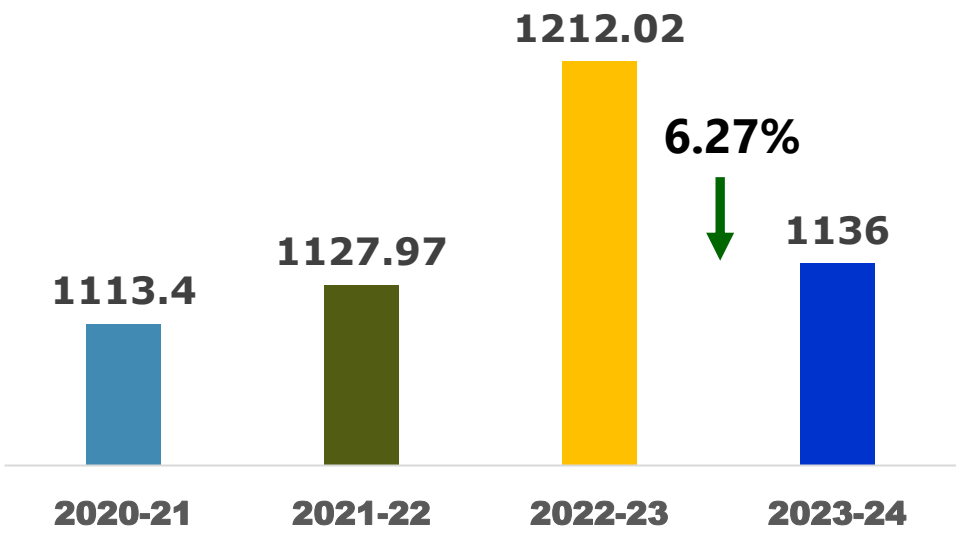
Roof Mounted Ventilators installed at GOC Workshop:
448 Nos during 2021-22
100 Nos during 2022-23
395 Nos during 2023-24

Estimated Annual Energy Saving :
2,07,083 KWh

GHG Inventorisation

GHG emission contribution in Kg CO2/ Equivalent Product				
YEAR	Scope 1 Emission	Scope 2 Emission	Scope 3 Emission	Total Emission
2023-24	59	1015	62	1136.00
2022-23	72.8	1067.77	71.45	1212.02
2021-22	71.05	973.41	83.51	1127.97
2020-21	51.14	983.58	78.42	1113.4

GHG EMISSION TREND
IN Kg CO2/ Equivalent Product



PUBLIC DISCLOSURE AT THE ENTRANCE

GHG Inventorisation

Action Plan For Achieving Short Term & Long Term CO_2 Emission Reduction Targets :

1. Adopting smart technologies(IoT based energy Management system, IGBT based welding plants & Ovens, VFD based Cranes etc.) resulting in reduction of purchased electricity.
2. Switching over to carbon Neutral fuel for process applications like gas cutting.
3. Harnessing Renewable Energy(350 KWp PV Solar panel) for reducing Purchased Electricity.
4. substituting waste for reducing carbon foot print.
5. Planting 20000 Nos of saplings of Bheema bamboo for achieving net zero emission.
6. Conversion of HSD oil fired furnace in to CBG fuel based furnace

Action Plan For achieving Scope 3 Emission Reduction :

1. Developing Local Contractors for supply and manufacturing of Wagon, Diesel Locomotive, X Class Locomotive and Carriage components.
2. Encouraging Local Vendors to supply materials that are being received from for away Locations.

Waste Utilization & Management

Briquetting of fallen leaves

	2020-21	2021-22	2022-23	2023-24
Qty of waste as fuel used (MT/year)	0	3	4	4	4
GCV of fuel (Kcal/Kg)	3346			
Heat value (Million Kcal/year)	10	13	13	13

Kitchen and paper waste used to generate 5 cubic meter of biogas daily.

	2020-21	2021-22	2022-23	2023-24
Qty of waste as fuel used (MT/year)	1.6	0	1.7	1.7
GCV of fuel (Kcal/Kg)	5750			
Heat value (Million Kcal/year)	6	0	6	6

Waste Utilization & Management

Co-processing of accumulated Zero Value Waste (ZVW) such as Rexine cloth, "V" belt, FRP items, assorted Vynatile sheets, plywood waste, cushion packing material etc., at Cement factories to reduce their coal consumption. All old wastes are now disposed off and the reclaimed area [Approx. 1,00,000 Sqft.] is utilized for afforestation.

Green House Gas emission reduction-Carbon neutral approach(GCV of Waste Fuel:4500 Kcal/Kg)

YEAR	ZERO VALUE WASTE DISPOSED IN MT	REDUCTION OF COAL IN METRIC TONS	REDUCTION OF CO_2 EMISSION IN METRIC TONS	HEAT VALUE (MILLIOIN K CAL /YEAR)
2020-21	5000	500	266	22500
2021-22	6500	650	346	29250
2022-23	7500	750	399	33750
2023-24	4025	402.5	214.13	18112

Green Supply Chain Management

Green supply chain policy

The Stores Department in Central Workshop, Southern Railway, Ponmalai is committed to protect the environment by striving for Green supply chain mutually with the vendors in the following areas:

i) adhering to environment, health and safety compliance.

ii) arranging training and capacity building to create awareness and follow environmental practices.

iii) cultivating plantation and greenery.

iv) encouraging saving of energy and water.

v) reusing recyclable resources.

Date: 03-12-2021

Dy.Chief Materials Manager

उप मुख्य सामग्री प्रबंधक
DY. CHIEF MATERIALS MANAGER
दक्षिण रेलवे / SOUTHERN RAILWAY

Green Procurement guidelines

Encourage the vendors to

a) follow environmentally sound practices in manufacturing.
b) supply and increase the availability of environment friendly materials duly following RoHS directives by MOEF.
c) avoid the usage of single use plastic for packing purpose.
d) reduce waste generation, specific energy and water consumption
e) Designing of product to have less hazardous substance at end of life time.
f) Allowing the customers to visit the worksites and evaluate the green initiatives taken at their sites.
g) Recycle and reduce the material consumption.
h) Adopting eco friendly packaging materials.
i) adopting proper conservation methods in storage of materials.
j) Commitment to review the objectives for continual improvement towards greener environment and to comply with all the applicable legal requirements.

Transport Policy

I). The trucks/vehicles less than 15 years old only to be used for transporting materials to the Workshop.
II) All the trucks/vehicles transporting the materials to the Workshop, must carry valid Pollution Under Control certificate and valid insurance policy.
III) All the trucks/vehicles transporting hazardous materials to the Workshop, must carry the product Material Safety Data Sheet (MSDS) and valid Chemical Abstracts .Service (CAS) number.
IV) All new heavy vehicles to be fitted with speed governors
V) RTA norms should be must be followed for driver's competence.
VI) The transporter must ensure that any pilferage/leakage to be avoided during the transit of the material.

All over the Indian Railways, the procurement procedures are followed as per the directives/guidelines issued by the Railway Board from time to time and also as per the instructions of the vendor approving agencies/Production Units. Hence, for the same material, the suppliers may not be the same for every procurement activity.

However, the procurement officials will encourage all the suppliers to support the green initiatives taken by Central Workshop to improve the environment.

Date: 03-12-2021

DY. CHIEF MATERIALS MANAGER
दक्षिण रेलवे / SOUTHERN RAILWAY

Green supply chain policy

Green Procurement guidelines

Vendor meet conducted on 15/16.02.2024 along with MSME Developers

Green Supply Chain Management

Initiatives taken in supply chain to reduce Energy consumption

Supplier / vendor audits for >50% of the critical suppliers / vendors

SI	Vendor Name	Products supplied	audits conducted
1	SIECHEM TECHNOLOGIES PRIVATE LIMITED-PONDICHERRY	Wires & Cables	1
2	AMARA RAJA BATTERIES LTD	Batteries	1
3	EXIDE INDUSTRIES LIMITED	Batteries	1
4	FAIVELEY TRANSPORT RAIL TECHNOLOGIES INDIA LIMITED-HOSUR	Brake control equipment, Pantograph	1
5	MEDHA SERVO DRIVES PRIVATE LIMITED-HYDERABAD	Electronic products	1
6	MYSORE THERMO ELECTRIC PVT LIMITED-BANGALORE	Batteries	1
7	NANDI ELECTRIC COMPANY-BANGALORE	HRC fuses,Terminals	1
8	POLYMER PRODUCTS OF INDIA-BANGALORE	Rubber products	1
9	VIBGYOR PAINTS AND CHEMICALS M.M.NAGAR -CHENNAI	Paints	1
	Total		9

Plan for Expansion of Green Supply Chain

- Formation of Green supply chain core team form material management Department.
- Fixing up of short term and long term Targets.
- Allocation of funds for Environmental issues.
- Conducting Periodical Vendor meet to create Green co Awareness.
- Encouraging Local Vendors to supply materials being received from far away locations to reduce Scope 3 emission.
- Evaluation of Vendors periodically to make them Energy Efficient.

Project implemented

Commissioning of Wheel dynamic balancing machine to avoid transportation of wheel between GOC and Perambur which results in HSD oil saving of 7700 Ltrs /year

EMS System & Other Requirements

Daily monitoring of energy consumption of energy intensive machines through IOT.

Southern Railway

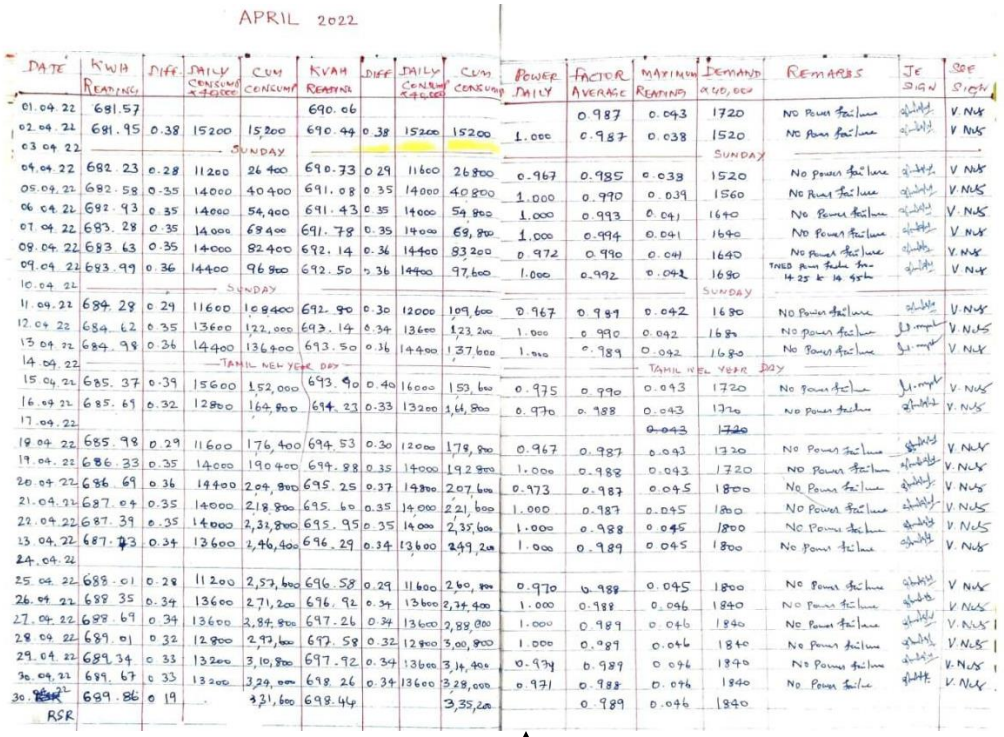
Office of the SSE/PH/GOC

Dt.10.08.2024

SHOPWISE MONTHLY ELECTRICAL ENERGY CONSUMPTION - May 24

SL	SHOP	CONSUMPTION	MONTHLY TARGET	DIFF. IN UNITS	DIFF. IN %	CONSUMP IN %
1	DSL	13928	17165	-3237	-19	81
2	HERS	4680	7711	-3030	-39	61
3	EBR	809	4176	-3367	-81	19
4	TMS	11164	12086	-922	-8	92
5	DG	1373	1721	-348	-20	80
6	UTS	1384	2629	-1246	-47	53
7	TOS M/C	535	1030	-495	-48	52
8	CMS	1554	1691	-137	-8	92
9	BRS	21895	35955	-14060	-39	61
10	WAS	26382	32673	-6291	-19	81
11	WAS/COMP	5215	2853	2363	83	183
12	WBS	17710	16295	1415	9	109
13	WCS	9174	12060	-2886	-24	76
14	FSS	7160	8790	-1630	-19	81
15	TR	864	815	50	6	106
16	MS	8835	5440	3196	59	159
17	FY/BFY	1671	3819	-2149	-56	44
18	WS	38663	42496	-3833	-9	91
19	ES	3440	2745	695	25	125
20	CRS	3461	4457	-997	-22	78
21	CRS/PIT	11820	10848	972	9	109
22	CBS	4878	6879	-2201	-32	68
23	NCRS	845	11059	-10214	-92	8
24	PS	5226	4417	809	18	118
25	BATTERY / TLS	5818	4654	1164	25	125
26	AC SHOP	10493	11152	-659	-6	94
27	TLS	4919	4874	45	1	101
28	MMW	1908	1826	83	5	105
29	EMW	1590	2421	-832	-34	66
30	CMT LAB	1121	1160	-39	-3	97
31	ADMN.BLDG	8274	8079	195	2	102
32	BTC	1641	922	719	78	178
33	BTC/WS	172	403	-231	-57	43
34	CANTEEN	1160	1779	-618	-35	65
35	YL	752	797	-36	-4	96
36	A-GATE	1807	1866	-59	-3	97
37	MISC	18469	17321	1148	7	107
	TOTAL	260403	307067	-46664	-15	85

SSE/PH/GOC



Daily Energy consumption of GOC Workshop is monitored at Power House and shops contributing for the increase in the Energy consumption will be advised on monthly basis.

EMS System & Other Requirements


INTERCERT

CERTIFICATE OF REGISTRATION

INTERCERT hereby certifies that the Energy Management System of

CENTRAL WORKSHOPS

SOUTHERN RAILWAYS,GOLDEN ROCK, **TIRUCHIRAPPALI** 620 004, TAMIL NADU, INDIA

Has been successfully assessed as per the requirements of

ISO 50001:2018

For the scope of

PERIODIC OVERHAULING OF DIESEL LOCOMOTIVES, STEAM LOCOMOTIVES AND COACHES, REPAIRS, RECLAMATION AND MANUFACTURE OF ROLLING STOCK COMPONENTS, MANUFACTURE OF WAGONS AND STEAM LOCOMOTIVES AND SUPPORT ACTIVITIES IN CENTRAL WORKSHOPS, GOLDEN ROCK.

Initial Certification Date	:	March 08, 2021
Certificate Issue Date	:	March 08, 2024
Surveillance Validity Date	:	March 07, 2025
Recertification Date	:	March 07, 2027

Registration Number: IC-En-2103050

Issued on behalf of InterCert
Head - Certifications

INTERCERT REGISTERED

IAF

The validity of this certificate can be verified at **www.intercert.com** or through an e-mail at **info@intercert.com**. This certificate is the property of **INTERCERT INC**, 207 Timberloch Place - Suite 500, The Woodlands, Texas 77380, United States and must be returned on request.

Learning and implementation from CII Energy award or any other Award Program

- **BEST PRACTICES FOLLOWED BY OTHER INDUSTRIES FOR ENRGY CONSERVATION**
- **ZERO VALUE SCRAP DISPOSAL TO CEMENT INDUSTRIES**
- **VRF BASED AC PLANTS**
- **IOT BASED COMPRESSOR MONITORING**
- **SOLAR THERMAL PARABOLIC CONCENTRATOR**
- **BLDC CEILING FAN /AIR CIRCULATOR**

Team work, Employee Involvement & Monitoring

WEEKLY PERFOMANCE REVIEW MEETING CHAIRED BY CWM/GOC

(CONDUCTED EVERY FRIDAY TO REVIEW THE OUTTURN AND ENERGY PERFORMANCE)

ENERGY MANAGEMENT TRAINING

EMPLOYEES

100 % employees were given training regarding energy efficiency measures in their respective areas of work

SUPERVISORS

All supervisors are trained on Energy Efficiency and Management

25 Supervisors were trained on Internal Audit of Energy Management System.

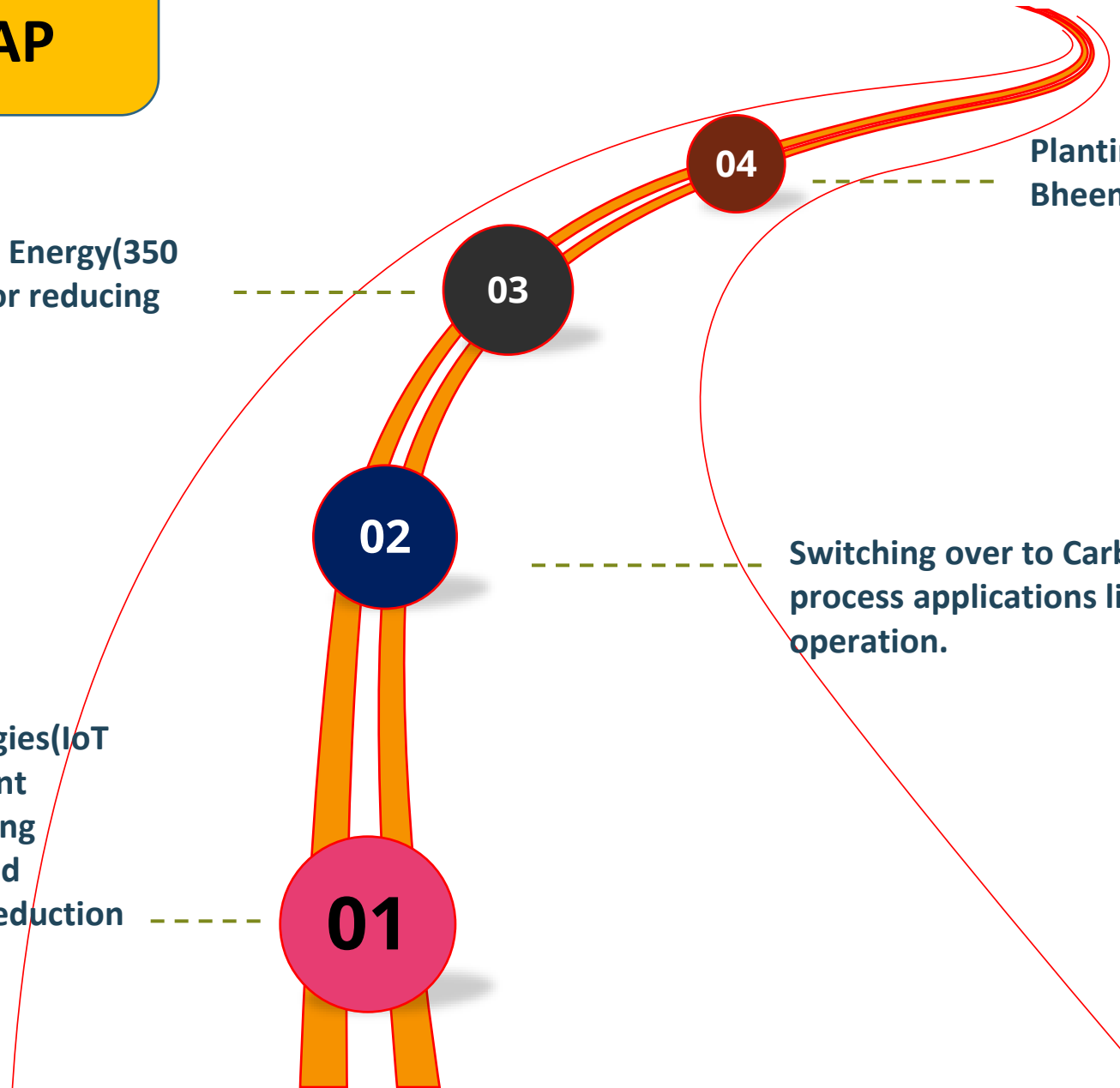
OFFICERS

Awareness and the requirements of Energy Management System-Trained by outside agency

ROAD MAP

NET ZERO Commitment

NET ZERO TARGET YEAR - 2027



04 — Planting 20000 Nos of saplings of Bheema bamboo

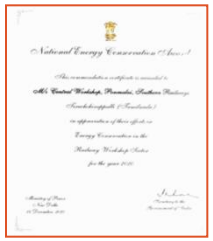
03 — Harnessing Renewable Energy(350 KWp PV Solar panel) for reducing Purchased Electricity.

02 — Switching over to Carbon Neutral fuel (CBG) for process applications like gas cutting & Furnace operation.

01 — Adopting smart technologies(IoT based energy Management system, IGBT based welding plants & Ovens, VFD based Cranes etc.) resulting in reduction of purchased electricity.

Any other relevant Information

ACCOLADES OF GOC WORKSHOP



BEE-NECA AWARDS

- CERTIFICATE OF MERIT FOR THE YEAR 2020
- BAGGED SECOND PRIZE IN THE YEAR 2023

CII AWARDS

- EXCELLENT ENERGY EFFICIENT UNIT 2017, 2020, 2021, 2022 & 2023
- ENERGY EFFICIENT UNIT 2018 & 2019

CII ENERGY LEADER AWARDS

RECEIVED ENERGY LEADER SHIELD AWARD FROM CII IN 2022 & 2023

Thank you