भारत सरकार/GOVERNMENT OF INDIA
रेल मंत्रालय /MINISTRY OF RAILWAYS
रेलवे बोर्ड/(RAILWAY BOARD)

No. 2025/EnHM/10/01/WED **Dated:12.06.2025**

The General Managers,
All Indian Railways/Production Units,
CMDs & MDs of all PSUs under M/o Railway,
Director General of RDSO & NAIR,
CAO/DMW, CAO/RWF/Bela,
Directors/All Central Training Institutes

Sub: IR's Environment Sustainability Annual Report 2023-24.

Please find enclosed herewith Indian Railway's Environment Sustainability Annual Report 2023-24, one (01) copy each for Zonal Headquarters, PUs, PSUs, Divisions and Workshops.

This report is also available on Environment Management Directorate's webpage under Mechanical Engineering.

Encl: Annual Report 2023-24

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AMITA BHALLA
Date: 12-06-2025
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(Amita Bhalla)
Joint Director/EnHM
Railway Board

सत्यमेव जयते

स्वच्छ भारत
एक कदम स्वच्छता की ओर

INDIAN RAILWAYS

ENVIRONMENTAL SUSTAINABILITY

Annual Report 2023-24


INDIAN RAILWAY
GREEN FOOT PRINT
ON SAND OF TIME

INDIAN RAILWAYS

"Swiftly progressing towards Net Zero carbon Emitter"

Environmental Sustainability

Annual Report 2023-24

INDIAN RAILWAYS ENVIRONMENT MANAGEMENT

VISION

To promote Green environment and clean energy while making the Indian Railways a global leader in sustainable mass transport solutions.

MISSION

- To promote energy conservation measures.
- To maximize the use of alternate forms of clean energy, thereby minimizing the carbon footprint of Railways.
- To provide clean and hygienic environment to customers.
- To promote conservation of water and other natural resources.
- To march towards Zero waste discharge from the major Railway units.
- To promote Green built-up spaces and expand tree-cover.
- To obtain Consent to operate from concerned Pollution Control Board under Environment Protection Act for major railway stations & goods siding
- Building in house capacity to set up an effective Environment Management System.
- To take care of environment through environment management plan in station redevelopment
- Noise reduction in Railway operations.

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भारतीय रेल पर्यावरण प्रबंधन

विजन

भारतीय रेलवे को व्यावहारिक द्रुत परिवहन समाधान के क्षेत्र में ग्लोबल लीडर बनाते समय हरित पर्यावरण तथा स्वच्छ ऊर्जा को बढ़ावा देना।

मिशन

- ऊर्जा संरक्षण उपायों को बढ़ावा देना।
- स्वच्छ ऊर्जा के वैकल्पिक स्वरुपों का अधिकतम उपयोग करना,जिसके परिणामस्वरुप रेलवे में कार्बन फुटप्रिंट को न्यूनतमकरना।
- ग्राहकों को स्वच्छ एवं स्वास्थ्यपरक पर्यावरण उपलब्ध कराना।
- जल और अन्य प्राकृतिक संसाधनों के संरक्षण को बढ़ावा देना।
- प्रमुख रेलवे इकाइयों से कचरे का उत्सर्जन न होने देने का प्रयास।
- हरित निर्माणतथा छायादार वृक्ष-क्षेत्र को बढ़ावा देना।
- प्रमुख रेलवे स्टेशनों और माल साइडिंग के लिए पर्यावरण संरक्षण अधिनियम के तहत संबंधित प्रदूषण नियंत्रण बोर्ड से संचालन के लिए सहमति प्राप्त करना
- प्रभावी पर्यावरण प्रबंधन प्रणाली स्थापित करने के लिए संगठनकेभीतर क्षमता विकसित करना।
- स्टेशन पुनर्विकास में पर्यावरण प्रबंधन योजना के माध्यम से पर्यावरण देखभाल
- रेलवे परिचालन में ध्वनि प्रदूषण को कम करना।

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CHAPTERS

1.0

Global Participation of Indian Railways on Climate Change

India is a Party to the UNFCCC, its Kyoto Protocol, and the Paris Agreement. Under the Paris Agreement, long-term temperature goal of holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels has been agreed upon by the countries ratifying Paris Agreement.

Climate change has widespread impact on human and natural systems. Accordingly, Climate Change Conferences are held annually in the framework of the United Nations Framework Convention on Climate Change (UNFCCC). India, through Ministry of Environment Forests and Climate Change (MoEFCC), has been participating in these conferences. In Conference of Parties (COP-21) held in December 2015, participating countries submitted near-term targets to address GHG emissions, called 'Nationally Determined Contributions' or NDCs to be reviewed and extending the targets every five years. An event on 'Transport Sector GHG Emissions' was organized at 'Indian Pavilion' as part of COP-21 at Paris, France in the year 2015.

Ministry of Railways participated in COP-22, held at Marrakecha, Morocco in November 2016, COP-23 at Bonn, Germany in November 2017 and COP-24 at Katowice, Poland in December 2018. Sessions on sustainable transport network were organised at 'India Pavilion'. COP-25 was held at Madrid, Spain in December, 2019.

1.1 In COP-26 held at Glasgov, United Kingdom in year 2021, India presented the following five nectar elements (Panchamrit) of India's climate action:-

- Reach 500GW Non-fossil energy capacity by 2030.
- 50 % of its energy requirements from renewable energy by 2030.
- Reduction of total projected carbon emissions by 01 billion tonnes by the year 2030.
- Reduction of the carbon intensity of the economy by 45% by 2030, over 2005 levels.
- Achieving the target of net zero emissions by 2070.

1.2 Hon'ble Prime Minister of India, during his speech at COP 26 held in Glasgow in November 2021, has, inter-alia, stated that passengers numbering more than the entire population of the world, travel by Indian Railways every year and Indian Railways have set itself a target of making itself 'Net Zero Carbon Emitter' by 2030.

This initiative alone will lead to a reduction of 60 million tonnes of emissions annually. Ministry of Railways also participated in the session hosted by CII at India Pavilion on "Practices in Indian Railway Transport and Automobile Sector towards climate mitigation".

1.3 An inter-Ministerial delegation from India attended the 27th session of Conference of Parties (COP-27) to the United Nations Framework Convention on Climate Change (UNFCCC) held in Egypt in November, 2022. India emphasized the necessity to adhere to the principles of UNFCCC and Paris Agreement, which include inter-alia equity, principle of common but differentiated responsibilities (CBDR-RC) and respective capabilities and that developed countries must take lead in climate action as well as the provision of climate finance and technology transfer.

1.4 The 28th Conference of Parties (COP-28) was held in Dubai, United Arab Emirates (UAE), from 30th November to 12th December 2023, where the representatives from 197 countries showcased their efforts to limit global warming and held discussions to prepare for future climate change. India's engagements at COP-28, led by Hon'ble Prime Minister of India, showcased a comprehensive and proactive approach for tackling climate change emphasizing the urgency of accessible climate finance for developing nations. Hon'ble Prime Minister of India highlighted the need to implement Nationally Determined Contributions (NDCs) and voiced concerns on behalf of the Global South. Prime Minister Narendra Modi along with Prime Minister of Sweden co-launched Phase II of the Leadership Group for Industry Transition (LeadIT 2.0) for the period 2024-26 which will connect the governments, industries, technology providers, researchers and think tanks of the two countries and launched the Green Credits Programme incentivizing pro-environment actions, and the focus on the Himalayan region's vulnerability, demonstrate India's commitment to diverse strategies for sustainable development.

1.5 A publication on India's climate action journey from COP-21 in Paris to COP-28 in the UAE was also released. The publication highlights the rapid strides of the country, including the IR's achievements, made in the decade since the Paris Agreement. It reinstates India's steadfast commitment to UNFCCC.

2.0

Indian Railways Reducing Global Carbon Footprints

India has a population of around 1.40 billion people spread over a vast geography. Mobility plays a key role with urbanisation and the growth of cities. The transport sector is and will continue to remain a critical enabler of development and would also have to grow in a sustained manner for the country to meet its developmental objectives.

Transport sector accounts for around half of India's total petroleum consumption and around 25% of the overall energy needs. It accounts for about 10% of the total Green House Gases (GHG) emissions. Road transportation accounts for around 87% of the total GHG emission of transportation sector. Given the relative advantage of the efficiency of rail-based transport, increasing the share of rail for both passenger movement (regional, sub-urban and urban) and freight movement is vital for increasing the energy efficiency of the transport sector thereby, reducing the GHG emissions of the country.

2.1 Nationally Determined Contributions (NDCs):

The India's Nationally Determined Contributions (INDC) document submitted by India in October 2015, was widely discussed at the 21st Conference of Parties (COP-21) organized by the UNFCCC in Paris, in November 2015. Ministry of Railways was the nodal ministry for India's transport sector dialogue and to set up the Government of India's official transport sector event at COP21.

Conference of Parties to the UNFCCC in its sixteenth session (COP-16) had also decided that developing countries should submit Biennial Update Report (BUR) as an update to the most recently submitted national communication. India furnished its first Biennial Update Report (BUR-1) in January 2016, second BUR-2 in December 2018 and third BUR-3 on 20th February, 2021.

The Government of India, as part of its updated Nationally Determined Contributions (NDCs) submitted to UNFCCC in August 2022, includes India's commitment to reduce Emissions Intensity of its GDP by 45 percent by 2030, from 2005 level, with the transport sector being one of the key sectors with substantial mitigation potential.

2.2 Indian Railways' role in India's NDC towards combating Climate Change:

- To enhance the share of the Railways in the overall land based freight transport.
- Setting up Dedicated Freight Corridors (DFCs) across the country.
- Increase the share of renewable energy in its energy mix.
- Railways to further improve its energy efficiency for both diesel and electric traction thereby facilitating the reduction of GHG emissions for the country.

- Perform Achieve and Trade (PAT) Scheme to be implemented in railway sector.
- Adopting the good practices on Green Buildings, Industrial Units and other establishments for the management of resources and infrastructure to achieve Environmental Sustainability in growth of Indian Railways.
- Contribution in 'Swachh Bharat Mission'
- Indian Railways (IR) have set a target of becoming a "Net Zero Carbon Emitter" entity by 2030.
- Improve water use efficiency by 20% upto 2030.
- Tree Plantation to increase Carbon Sink.
- Waste Management and Pollution Control.
- Use of biofuels.

3.0

Indian Railways: Unite With Mission Life Lifestyle For Environment

Hon'ble Prime Minister of India in COP-26 shared the mantra of LiFE-Lifestyle for Environment to combat climate change and emphasized to take forward this campaign to make it a mass movement of environment conscious lifestyles. The message conveyed by India was that the world needs mindful and deliberate utilization instead of mindless and destructive consumption.

Indian Railways (IR) is one of the world's largest rail networks spread over more than 69000 route Km. IR is the lifeline of the country carrying nearly 19 million passengers every day making it the largest passenger carrying system in the world. It is also the 4th largest freight transporter in the world moving around 1588 MT of freight in 2023-24 (an increase of ≈ 9% over 2022-23), as it traverses the length and breadth of the country. IR is on a mission to escalate this to 3000 MT reflecting its sustainable commitment to meeting the growing demand and boosting economic activity.

Rail-based transport is the most environment friendly mass transport system due to the inherent gains it provides in terms of energy efficiency and resource optimisation. To illustrate, one goods train carries about 4000 tons of iron ore whereas about 267 trucks are required to carry the same load, at a rate of 15 tons per truck. Railways are about 12 times more efficient in freight traffic and 3 times more efficient in passenger traffic as compared to road transport.

India stands committed through its updated Nationally Determined Contributions (NDCs) submitted to UNFCCC in August 2022. This includes emissions intensity reduction of Gross Domestic Product (GDP) by 45% by 2030 from 2005 level; achieve about 50 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030. This may be achieved with the help of transfer of technology and low-cost international finance including from Green Climate Fund and by propagating a healthy & sustainable way of living based on traditions and values of conservation and moderation, through a mass movement for 'LIFE'– 'Lifestyle for Environment' as a key to combating climate change. As the Indian economy transitions, with economic growth and sustainable development as twin goals, mobility will play a key role.

IR has taken several steps to streamline its initiatives with regards to environmental management, some notable initiatives are energy efficiency management, paced electrification of railway tracks, sourcing of energy requirements through renewable energy sources, water conservation initiatives, better waste management, green certifications of railway establishments, Consent To Operate (CTO) from concerned State Pollution Control Boards for major railway stations & sidings, use of 3 phase technology for regenerative braking in locomotives, use of Head on Generation technology (HOG) (eliminating the need for separate diesel fuelled power cars), provisioning of LED lights in trains & in all railway establishments, use of energy efficient rated appliances, creation of additional carbon sink by afforestation, Environment Management Plan sanction in station redevelopment projects etc.

Indian Railways is consistently participating through major outreach and advocacy activities on Mission LiFE with the aim to sensitize railway officials and people about the impact of behavioral change through mass mobilization and awareness generation campaign for the LiFE event.

4.0

Indian Railways: Adopted Strategies for Achieving 'Net Zero Carbon Emission' Target

IR has adopted four key strategies for achieving the 'Net Zero Carbon Emission' target for scope/ emissions:

4.1 Strategy-1: Adopt Carbon neutral/ Low carbon sources:

The projected energy demand of Indian Railways in 2029-30 would be about 72 Billion Units (BUs). To achieve Net Zero Carbon Emission, procurement of power through renewable energy sources is required. Expected requirement of renewable capacity by 2029-30 would be about 30,000 MW.

4.1.1 Renewable projects in pipeline:

- IR has tied up 400 MW power under optimum scheduling mode with Rewa Ultra Mega Solar (RUMS). Partial power of 80 MW already started flowing into Railways network.
- 800 MW of solar power under optimum scheduling mode from Bundelkhand Saur Urja Limited (BSUL) has also been tied up.
- 500 MW of solar power has been tied up from IRCON.
- IR has also tied up 100 MW round the clock (RTC) renewable power from Solar energy Corporation of India (SECI), partial power of 22 MW has already started flowing into Railways network.
- Work awarded for installation of 50 MW wind plant in developer mode.
- Two tenders for procurement of 900 MW and 700 MW renewable power under RTC mode have been awarded which are likely to be operational in the FY 2025-26 and 2026-27 respectively.

Solar plant by IRCON in Pavagada, Karnataka

4.2 Strategy-2: Reduce Energy Consumption:

IR extensively uses regenerative propulsion technology and adopting energy efficiency measures like use of star rated appliances, energy audits, super energy efficient buildings, etc. IR has issued a comprehensive Energy Efficiency Policy for Non-Traction installations in December 2022. The policy broadly centered around 05 action points i.e. Sustainable Buildings, Cloud based data monitoring and management portal, Energy Efficiency in equipment and appliances, Power quality restoration, Capacity building and awareness.

4.2.1 Energy efficiency upgrades existing stations and all other railway buildings. All existing building to be made BEE shunya/ shunya+ rating complaint

- Tenders for Investment Grade Energy Audit (IGEA) of 1100 railway buildings have been floated and IGEA completed in about 750 railway buildings.
- 73 buildings in different ZRs/ PUs have been certified with Shunya/Shunya+ by BEE.

4.2.2 Adoption of Super ECBC for the new buildings and station developments, and ECBC (R) for all upcoming Residential projects.

- 04 Railway Stations are being developed as super-ECBC compliant.

4.2.3 Online monitoring and controlling provision through cloud-based centralized web-portal-IR-NIYNANTRAC.

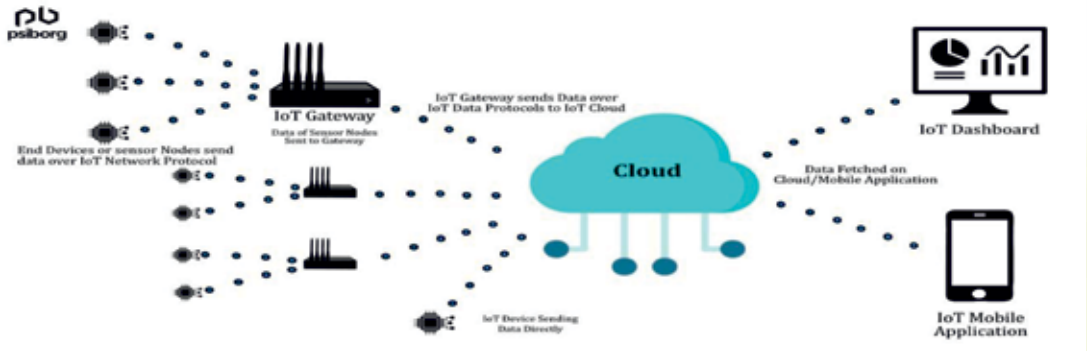
- CRIS has developed a portal for centralized monitoring of electrical assets. ZRs/ PUs are floating tenders for installation of IoT devices.

4.2.4 Procurement of BEE 5-star rated appliances, adoption of low carbon cooling systems and other feasible energy conservation measures.

4.2.5 Provisions for ensuring power quality across non-traction loads.

4.2.6 Capacity building and awareness campaigns for energy efficiency.

- 800+ Railway officials trained



IR-NIYANTRAC basic architecture

4.3 Strategy-3: Shift from Diesel to Electric Traction:

Ensuring 100% electrification and proliferation of Head on Generation (HOG) technology. Achievements/ details in this regard are discussed in upcoming chapters.

4.4 Strategy-4: Carbon sequester/offset emissions by tree plantation:

To offset additional carbon generated, afforestation is being planned along with purchase of carbon credits. Achievements/ details in this regard are discussed in upcoming chapters.

5.0

Energy Efficiency in Mass Transportation System

Decreasing carbon emissions is a crucial component of the solution to the serious problem of climate change that the world is currently confronting. Enhancing energy efficiency is one of the best methods to accomplish this because by reducing energy consumption, we can reduce the amount of carbon emissions that are released into the atmosphere.

5.1 Advances in Energy Efficiency in Electric Traction:

Indian Railways' Production Units have completely switched over to production of energy efficient three-phase electric locos. These locomotives are equipped with regenerative braking feature capable to regenerate electricity during braking action which is fed back to grid.

5.1.1 12000 HP Electric Freight Locomotive:

This is locally manufactured world's most powerful electric locomotive (12000 HP WAG12 electric locomotive), IR has around 800 such Locomotives. These high horse power locomotives will help to decongest the saturated tracks by improving average speed and loading capacity of freight trains. This locomotive is equipped with:-

- State of the art IGBT based 3 phase drive: These electric locomotives are equipped with regenerative braking system which provide substantial energy savings during operations.
- Power: These locomotives have power output of 12,000 horsepower, making it twice as powerful to its immediate predecessor.
- Speed: These can haul freight trains at speeds of 100–120 km/h, doubling the average speed of freight trains in the sector.
- Capacity: These can haul freight trains weighing more than 6,000 tonnes.

5.1.2 Adoption of Head on Generation (HOG):

It is more important to make Railway energy efficient, environment friendly and economically viable by reducing the losses and wastage of diesel fuel which is used to run the hotel load (AC plant and light of coaches). End on Generation (EoG) configuration requires power cars equipped with Diesel Alternator (DA) sets for feeding air conditioning, train lighting and other electrical loads in the coaches. Each such train has two power cars, each power car having 2 DA sets. This system has inherent disadvantage of air and noise pollution. In HOG system power is drawn through converters provided in locomotives. Pursuant to adoption of HOG system, trains run with single power car resulting into augmentation of one more passenger coach, reduced consumption of fuel, and significantly reducing carbon emission. The electrical power drawn by the pantograph of the locomotive is suitably converted and supplied for air conditioning, train lighting and other electrical loads in the train. 1376 LHB rakes have been converted into HOG as of July, 2024. Due to HOG conversion, diesel savings to the tune of around 887 million tones has been achieved till March'2024 (since 2018-19) resulting in reduced diesel consumption as well as reduction in air and noise pollution. As a matter of future plan efforts are being made to develop the specifications for procurement of OHE powered track machines.

5.2 Use of Alternative fuels:

5.2.1 Conversion of DEMU DPCs into dual fuel with CNG/LNG

Realising the importance of CNG as an alternate fuel, the concept of retro fitment of CNG kit in the present engine of DEMU without any major changes in the existing system is incorporated in Indian Railways after carrying out thorough feasibility studies. Dual fuel is becoming popular nowadays to reduce the exhaust emission and to save diesel fuel in diesel power cars. Till date, 29 DEMU DPCs have been converted into CNG based dual fuel engines and 2 DEMU DPCs have been converted into LNG based dual fuel engines. Conversion of DEMU DPC into dual fuel CNG/ LNG has effected substantial financial saving besides reduction of harmful emissions and thereby improve the environment.

5.2.2 Biodiesel blending:

Biodiesel is an alternative fuel that is produced from renewable resources. IR has started using biodiesel since year 2002 after first successful trial run of a passenger train using biodiesel. The consumption of bio-diesel in year 2023-24 was approximately26,392 Kiloliters over IR having B5 (up to 5% biodiesel) and B7 (7% biodiesel) blending.

5.3 Vande Bharat Trains:

More than 65 Vande Bharat Trains, India's semi high speed trains manufactured under 'Make in India' programme, are operational in service routes by August 2024. Version-2 of these trains sets are equipped with following improved features which help in better energy saving. These train sets are equipped with following features:-

(i) It has been provided with 3-phase IGBT based under slung propulsion equipments. Has advanced regenerative braking system and need for power car is eliminated. It helps in saving energy up to the tune of 35%.

(ii) Aerodynamic profile of the train also helps to reduce air drag and thus reduce energy consumption.

(iii) Energy efficient VVVF drive compressor in HVAC helps in 15% of energy saving.

(iv) Reduction in gross weight of rake (16 cars) by 41.41 tonnes than version-1 also helps in lesser energy consumption.

Make in India - Vande Bharat Train

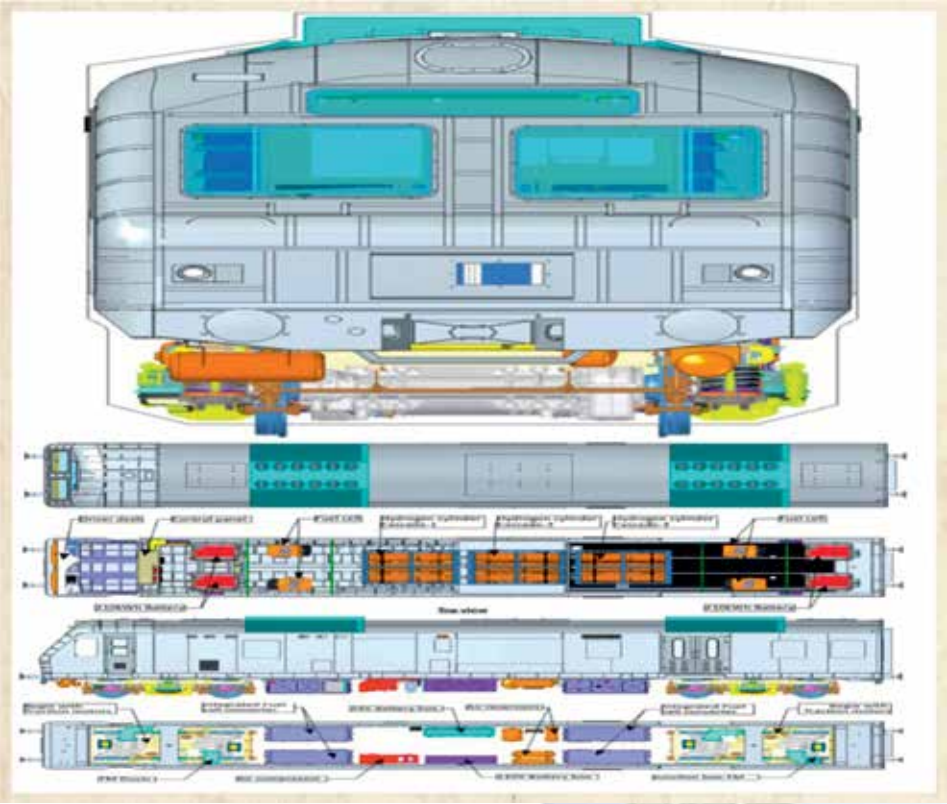
5.3.1 Vande-Metro Trains:

Vande Metros have been planned to revolutionize the travelling experience of suburban and regional commuters. These trains are being developed to cater the need of daily travelling of common masses for inter-city short distance movement as well as for suburban commuters. 1st prototype 12 car rake has been turned out from ICF, Chennai.

5.4 Development of Hydrogen Fuel Cell based distributed Power Rolling Stock (DPRS) 1200KW DEMU

Hydrogen is envisaged to be the future fuel to replace fossil fuels. Using power from renewable energy, such as green hydrogen, is one of the major requirements towards environmentally sustainable energy security of the nation. IR has taken up an ambitions state of the art project of running its first hydrogen train. This train would be fully indigenously developed by IR on specification made by RDSO. The new technology envisages zero emissions with water as net exhaust.

Indian Railways (IR) have envisaged to run 35 (thirty five) Hydrogen trains under "Hydrogen for Heritage" at an estimated cost of ₹ 80 crores per train and ground infrastructure of ₹ 70 crores per route on various heritage/hill routes. It is IR's first experience with hydgrougen fuel, which is still in developmental stage oll over the world. IR has awarded a pilot project for retro fitment of Hydrogen Fuel cell on existing Diesel Electric Multiple Unit (DEMU) rake. In the proposed hybrid power system, the primary energy source is Proton Exchange Membrane Fuel Cell (PEMFC) and secondary energy source will be battery bank to meet the peak and average power requirement. The project is in advance stage of execution, integration of fuel cell with other sub systems is under progress.



6.0

Capacity Augmentation: Network Expansion with Environment Sustainability

Indian Railways have prepared a National Rail Plan (NRP) for India – 2030. The Plan is to create a 'future ready' sustainable Railway system by 2030. The objective of the Plan is to create capacity ahead of demand, which in turn would also cater to future growth in demand right up to 2050 and also increase the modal share of Railways to 45% in freight traffic and to continue to sustain it. NRP is aimed to reform Railways to make it more efficient, greener and modern which will translate into cheaper, safer and assured mode of transport. To achieve this objective, National Rail Plan have formulate strategies based on both operational capacities and commercial policy initiatives to increase modal share of the Railways in freight to 45%, reduce transit time of freight substantially by increasing average speed of freight trains, 100% electrification, multi-tracking of congested routes, upgradation of train speed, elimination of Level Crossings, identification of new Dedicated Freight Corridors & High Speed Rail Corridors, sustained involvement of the Private Sector in areas like operations & ownership of rolling stock and development of freight & passenger terminals/ track infrastructure etc.

6.1 Mumbai-Ahmedabad High Speed Rail (MAHSR):

National High Speed Rail Corporation Limited (NHRCL) was incorporated in February, 2016 for construction of 508 Km long Mumbai-Ahmedabad High Speed Rail (MAHSR) project with estimated cost of Rs. 1,08,000 crore and maximum design speed of 350 Kmph and operating speed of 320 Kmph. All civil contracts for the MAHSR project have been awarded and the project has been divided into 28 contract packages. Entire land (1389.5 Ha) has been acquired for the project. As on July 2024, 350 km of Pier Foundation, 316 km of Pier Construction, 221 km of Girder Casting and 190 km of Girder Launching have been completed. The work of the undersea tunnel (approx. 21 Km) has also been started. This energy efficient and environment friendly rail transport system as per global standards will result in reduced CO2 emission.

6.2 Dedicated Freight Corridor:

Dedicated Freight Corridor Corporation of India Limited (DFCCIL) supports ecological sustainability by encouraging users to adopt railways as the most environment-friendly mode for their transport requirements. DFC ensures faster transits, reduced logistics costs, higher energy efficiency, and environment-friendly operations. The average speed of freight trains has nearly doubled resulting in half the time taken to ferry products.

Ministry of Railways has taken up construction of two Dedicated Freight Corridors (DFCs) viz. Eastern Dedicated Freight Corridor (EDFC) from Ludhiana to Sonnagar (1337 Km) and Western Dedicated Freight Corridor (WDFC) from Jawaharlal Nehru Port Terminal (JNPT) to Dadri (1506 Km). Construction of EDFC has been fully completed and 1220 KM out of 1506 KM of WDFC has been completed (as on July 2024) and train operations are going on in the complete sections. The construction of Dedicated Freight Corridors will reduce the logistic cost with higher axle load trains, Double Stack Container trains (DSC) and faster access to Northern hinterland by Western Ports and will also lead to development of new industrial hubs and Gati Shakti Cargo Terminals.

DFCCIL follows Corporate Environment Policy which envisages initiatives to foster growth and sustenance of healthy environment in each aspect of its working. It further lays emphasis upon compliance of all regulations and guidelines relating to environment protection and endeavors to adopt:-

- Integrated Environment Management and Practices.
- To exhibit sensitivity towards environmental responsibilities.
- Efficient utilization of energy resources.
- Associate in direct activities towards environmental improvement through development of green belt and conservation of water resources.
- Make efforts for preservation of ecological balance & heritage.
- Mitigation measures for noise, vibration and waste pollution.
- Sensitize human resource of the corporation towards environmental needs.
- Sustain improvement of environmental performance of the organization.

7.0

Energy Conservation Initiatives

Given the massive scale of its operation, it is not surprising that the Indian Railways have a growing appetite for the consumption of electricity. Indian Railways consume around 29 billion kWh of electricity annually, comprising around 2% of the country's total power consumption. With rail traffic projected to register an increasing growth in the coming years, it is estimated that the demand for electricity by the Indian Railways will go up over the next decade. IR is progressively shifting its power requirement from diesel to electric traction, 96% (63456 RKM out of total 65,141 RKM) railway track has been electrified as on March, 2024. Due to shift from diesel to electric traction, diesel consumption of IR has been reduced from 1.98 billion liters in FY 2022-23 to 1.60 billion litres in FY 2023-24, this has resulted in carbon emission reduction of of ~1 million tons.

IR has taken a series of measures to cut down its energy consumption and rationalise its energy procurement process by implementing several energy conservation measures, procurement of power under Open Access and harnessing Renewable Energy. Railways also carry out regular energy audits at consumption points.

7.1 LED lighting:

- All railway stations, service buildings & residential quarters have been provided with 100% LED lights. This reduces about 10% of total energy being utilized on its Non-traction thus leading to savings of about 240 million units of electricity.

- All coaches have been provided with energy efficient LED lights, which not only help in reducing energy bill but also enable Indian Railways to reduce emissions.

- Energy efficient LED Signal Aspect in place of conventional filament type signal lamps have been provided for Colour Light Signals at 6610 stations, 756 Intermediate Block Signals (IBS), 5743 Interlocked LC Gate signals and 4431 Route Km Automatic Signals as on 31.03.24 on Indian Railways. In total, 4,87,385 LED aspects have been provided on IR Signalling System as on 31.03.2024, which saves 15654800 KWh annually. This helps in conservation of energy as well as environment sustainability.

7.2 Perform Achieve Trade (PAT):

Perform Achieve Trade (PAT) is a flagship scheme under the National Mission for Enhanced Energy Efficiency (NMEEE) and Ministry of Power (MOP) for improvements in energy efficiency of energy intensive industries (called as Designated Consumers (DCs) who are required to appoint energy manager, file energy consumption returns every year and conduct mandatory energy audits regularly. If the DC achieves Specific Energy/Fuel Consumption (SEC/SFC) below the Target given by BEE, then Energy Saving Certificates (ESCerts) are issued to DCs which are tradable in the market and amount can be claimed for the same.

Indian Railways is a part of PAT Cycle-VII of Bureau of Energy Efficiency (BEE) and as per the provisions of section-14 of the Energy Conservation Act, 2001, 16 Zonal Railways, 08 Production Units and 02 workshops of Indian Railways are given the status of Designated Consumers (DCs) into the PAT Scheme (Cycle VII). The period for PAT Cycle-VII commenced from 1st April 2022 and will continue till 31st March 2025.For PAT cycle-VII, it is targeted to reduce energy by 1.90% in passenger and 5.37% in Goods for Electric traction as well as 3.38% in passenger and 1.36% in Goods for Diesel traction over IR. It is estimated that total energy saving of 95549 Million Tonne of Oil Equivalent(mTOE) and carbon emission reduction of approx 0.53 million tonnes would be achieved in PAT Cycle-VII for IR. Indian Railways have exceeded the targets set under Perform Achieve and Trade-II(PAT-II) and have achieved additional energy savings of 0.11 mTOE, totalling to 0.196 mTOE. The mission reduction through the implementation of PAT Cycle-II is about 1.0 million tonnes of CO2.

7.3 Energy Efficiency Study Initiatives of Indian Railways:

Confederation of Indian Industry (CII) has completed its Green Rating and Energy Efficiency studies of Indian Railway's Production Units and major Workshops. IR units covered in the study:-

Phase-I	Phase -II
BLW, Varanasi	MCF, Raibareli
CLW, Chittaranjan	Rail Wheel Plant, Bela
ICF, Chennai	Carriage Repair Workshop, Matunga
RCF, Kapurthala	Coach Rehabilitation workshop, Bhopal
PLW, Patiala	Coach & Wagon workshop, Liluah
RWF, Bengaluru	Coach Repair workshop, Hubali
Locomotive Workshop, Jamalpur	Carriage Repair Workshop, Alambagh
Wagon Repair Workshop, Jhansi	Carriage and Diesel Loco Repair Workshop, Ajmer
Golden Rock Railway Workshop, Trichy	Rail Spring Kharkhana, Sitholi
Carriage & Wagon Workshop, Jagadhari	Carriage, Wagon and Diesel Loco workshop, Kharagpur

7.4 Star rated buildings Certified by Bureau of Energy Efficiency (BEE): Around 50 buildings (including 4 Divisional Hospitals) have been given Star Rating by BEE.

7.5 Brushless Direct Current (BLDC) Fans: Old ceiling fans are getting replaced with energy efficient BLDC fans.

8.0

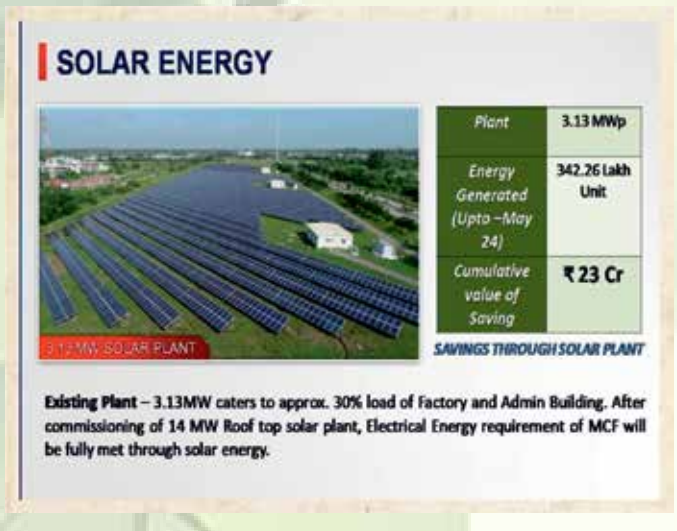
Harnessing Renewable Energy

Indian Railways, being a significant consumer of energy, identifying cost-effective options to install clean and efficient energy and realizing an energy system with least environmental impacts.

8.1 Solar & Wind Energy installed over Indian Railways:

- Around 241 MW solar capacity has been commissioned by IR as on July 2024.
- 103.4 MW wind-based power plants have already been installed. Wind based power plants of 10.5 MW (for non-Traction) and 10.5 MW (for Traction) capacity in Tamil Nadu, 26 MW (for traction) capacity in Rajasthan, 6 MW (for non-traction) and 50.4 MW (for traction) capacity in Maharashtra have been installed.

Zone-wise Solar & Wind power capacity installation (upto 31.07.2024)		
Rly/PU	**Solar energy (MW)**	**Wind energy (MW)**
CR	12.90	56.40
ER	21.22	
ECR	7.40	
ECoR	6.65	
NR	25.29	
NCR	12.48	
NER	6.41	
NFR	7.34	
NWR	10.09	26.00
SR	5.61	10.50
SCR	11.42	
SER	2.52	
SECR	55.45	
SWR	6.21	
WR	13.07	
WCR	8.95	
Metro	4.09	
ICF	4.46	10.50
RCF	2.69	
RWF	2.02	
BLW	3.86	
PLW	2.15	
CLW	6.53	
MCF	3.13	
TOTAL	**241.94**	**103.40**



3.13 MW solar plant installed in MCF

8.2 Solar Plants along the Railway Track for Traction purpose:

IR has planned to utilize its unused vacant land for setting up of Land Based Solar Plants for its traction power requirement as 'Green mode of transportation' and become a 'Net Zero Carbon Emission Railway' by 2030. There is about 51,000 hectare of Railway land which has a potential of installing 20 GW land based solar plants. The Solar power so generated will be fed to CTU/STU Grid or directly to 25 kV AC traction system. In order to proliferate solar power on its unused vacant land, as on July, 2024, IR has executed 03 projects:-

- 1.7 Mega Watt (MW) at Bina (WCR) - solar project commissioned in July' 2020, feeding solar power directly to 25 kilo Volt (kV) Traction System.
- 2 MW at Diwana (NR)- Commissioned in Sept.' 2020, feeding power directly to State Transmission Utility (STU) network at 132 kV.
- 50 MW at Bhilai (SECR) - for feeding solar power directly to Central Transmission Utility (CTU) at 220 kV commissioned in April'2023.

Solar Plant Feeding into Traction Sub-Station Installed at Diwana

1.7 MW at Bina feeding into25kV traction system

8.3 E-Mobility Policy of Indian Railways:

Government of India (GoI) has identified promotion of Electric Vehicles (EVs) as a major step towards decarbonization of the transportation sector and reduces demand for petroleum products, and has taken a slew of initiatives to encourage large scale EV adoption.

Indian Railways (IR), with its vast network of operations, is ideally suited to play an important role in taking forward GoI's mission of EV promotion, specifically creating an infrastructure of EV charging across the country. IR's vast number of stations, office buildings, and other assets act as important interfaces with other modes of travel including road transport. Ministry of Railways has issued a policy for promotion of E-Mobility in Indian Railways. The policy envisages adoption of Electric Vehicles (EVs) affordable and accessible EV charging infrastructure. This not only be a good source of Non-Fare Revenue (NFR) for the Railways but also can help in reducing the green house gases emissions from the petrol/ diesel driven vehicles.

EV Charging station installed in Railway Board, New Delhi

9.0

Accolades earned by Indian Railways during the year

The continuous efforts of IR to embrace various energy efficient technologies and energy conservation measures had resulted in bagging several awards at various levels over the years.

9.1 On the occasion of National Energy Conservation Day, i.e., December 14, 2023, Hon'ble President of India presented the National Energy Conservation Awards, National Energy Efficiency Innovation Awards. These Awards are being announced every year to recognize the efforts of various industrial units/ establishments/ organizations that have shown exemplary performance in conservation of energy and effective utilization of available energy.

9.1.1 IR bagged following 08 National Energy Conservation Awards for the year 2023

- Hyderabad Passenger Reservation System (PRS) Building - First prize in Government Offices Category
- Wagon Depot, Vijayawada - First prize in Railway Workshops Category
- South Central Railway Zone - Second prize in Zonal Railways Category
- South Western Railway Zone – Certificate of Merit in Zonal Railways Category
- Lekha Bhavan (SCR Accounts Office Building) - Second Prize in Government Offices category
- Renigunta Running Room - Certificate of Merit in Government Offices Category
- Guntakal Running Room - Certificate of Merit in Government Offices Category
- Divisional Railway Manager Office, Guntakal - Certificate of Merit in Government Offices Category.

9.2 Telangana State Energy Conservation Awards-2023 (TSECA): SCR has bagged 05 TSECA Awards.

a) Gold Award for

- Lekha Bhawan in Government Buildings category.
- Nalgonda Station in Railway Station Buildings category.

b) Silver Award for

- Carriage Workshop/Lallaguda in Medium Scale Industry Category.
- Passenger Reservation System/Hyderabad in Government Buildings category.
- Kacheguda Station in Railway station Buildings category.

Nalgonda Station

Carriage Workshop/Lallaguda

9.3 Andhra Pradesh State Energy Conservation Awards-2023: SCR has bagged 02 Awards.

a) Gold Award for DRM Office Building, Guntakal.

b) Silver Award for DRM Office Building (Rail Vikas Bhavan), Guntur.

DRM Office Building, Guntakal

DRM Office Building, Guntur

9.4 SCR has bagged 3 CII Awards in National Level Excellence in Energy Management – 2023.

i. Lekha Bhavan/HYB Divn. – Excellent Energy Efficient Unit.

ii. Rail Nilayam/HYB Divn. – Energy Efficient Unit.

iii. ZRTI/MLY/HYB Divn. – Energy Efficient Unit.

9.5 Shunya / Shunya plus Labeling obtained during the year 2023-2024:

Bureau of Energy Efficiency (BEE), Ministry of Power award the Net Zero Energy Building (NZEB) awards. IR has 73 buildings in different ZRs/PUs certified with Shunya/ Shunya+ by BEE. Followings are the buildings that have achieved Shunya/ Shunya+ status during the year 2023-2024:-

S.No.	Name of the Building	State	Shunya Labelling	Date of Issuance
1	Lekha Bhavan, Secunderabad	Telangana	Shunya Plus	10-04-23
2	KV School, RWF, Bangalore	Karnataka	Shunya Plus	10-04-23
3	ICF Administrative Complex, Chennai	Tamil Nadu	Shunya Plus	20-04-23
4	Zonal Railway Training Institute, Bhusawal	Maharashtra	Shunya Plus	23-10-23
5	BLW Inter College Building, Varanasi	Uttar Pradesh	Shunya Plus	15-12-23
6	Administrative building of Diesel Loco and Wagon Workshop, Ajmer	Rajasthan	Shunya Plus	27.03.24
7	Health Centre, Bano Railway Station	Jharkhand	shunya	12-12-23
8	Senior Secondary Railway School, Bhusawal	Maharashtra	Shunya	23-10-23
9	Technical Training Centre (TTC) at Modern Coach Factory (MCF), Raebareli	Uttar Pradesh	Shunya	25-08-23
10	RWF Administrative Block	Karnataka	shunya	March 2024

10

Co:operation with other agencies to promote and facilitate green initiatives over IR

10.1 Memorandum of Understanding (MoU) between IR and USAID/India:

Indian Railways is taking several initiatives as part of its commitment to reduce carbon footprints. In line with this, MoU was signed between Indian Railways and United States Agency for International Development/India (USAID/India) on 14thJune, 2023 for technical assistance and support on renewable energy and energy efficiency. USAID is an agency of the U.S. Government that supports international development and advances its mission objectives by supporting economic growth, agriculture and trade, clean energy, climate change mitigation and adaptation, global health, democracy and conflict mitigation and management, and humanitarian assistance. The MoU broadly includes but not limited to the following areas:-

- Long-term energy planning including clean energy for Indian Railways.
- Develop an Energy Efficiency Policy and Action Plan for IR Buildings.
- Planning for clean energy procurement to achieve Indian Railways' net-zero vision.
- Technical support for addressing regulatory and implementation barriers.
- Bid design and bid management support for system-friendly, large-scale renewable procurement.
- Supporting Indian Railways in the promotion of e-mobility.
- Collaboratively host events, conferences, and capacity-building programs in the mentioned identified areas including field visits and study tours (domestic/international).

10.2 Memorandum of Understanding (MoU) between IR and Confederation of Indian Industry (CII):

Indian Railways have significant number of Railway stations, Production units, major workshops and other establishments, for which IR has been taking various green initiatives in collaboration with CII for environment protection and reducing the carbon footprints. Under this MoU, CII will collaborate in bringing new/ relevant technologies and its implementation, assistance for achieving ISO 50001 certification of workshops/production units, development of Net-Zero Energy Railway station framework and creation of information dashboard to highlight the advancement in green initiatives throughout the year taken jointly by IR and CII.

11

Environment Management Plan: Redevelopment of Railway Stations

IR inherits number of stations developed before freedom of India. IR is committed to protect our environment, and therefore, all major stations have now obtained Consent to Operate (CTO) under Environment Protection (EP Acts) from concerned state pollution control boards by complying all necessary requirements.

Today the eyes of the whole world are on India and modernization of stations will create a new atmosphere for development of the country. Government of India has taken up 1309 stations under Amrit Bharat Station Scheme for their redevelopment for providing world class amenities along with elegant features and modern look. In redevelopment process, due care of all environmental norms are being taken for achieving sustainable modernization of stations. A specific committee of officers has been constituted to grant the clearance for the Environment Management Plan (EMP) of station redevelopment projects.

The project executing company is also required to have a well laid down environmental policy for station redevelopment duly approved by Environment and Housekeeping (EnHM) Directorate of the Railway Board. This policy prescribes standard operating procedures and proper checks and balances to bring into focus to avoid any infringements/ deviation/ violation of the environmental, forest or wildlife norms. A separate Environmental Cell both at the project and company head quarter level, with qualified personnel is set up under the control of senior executive, who will directly report to the head of the organization for implementation of the respective EMPs.

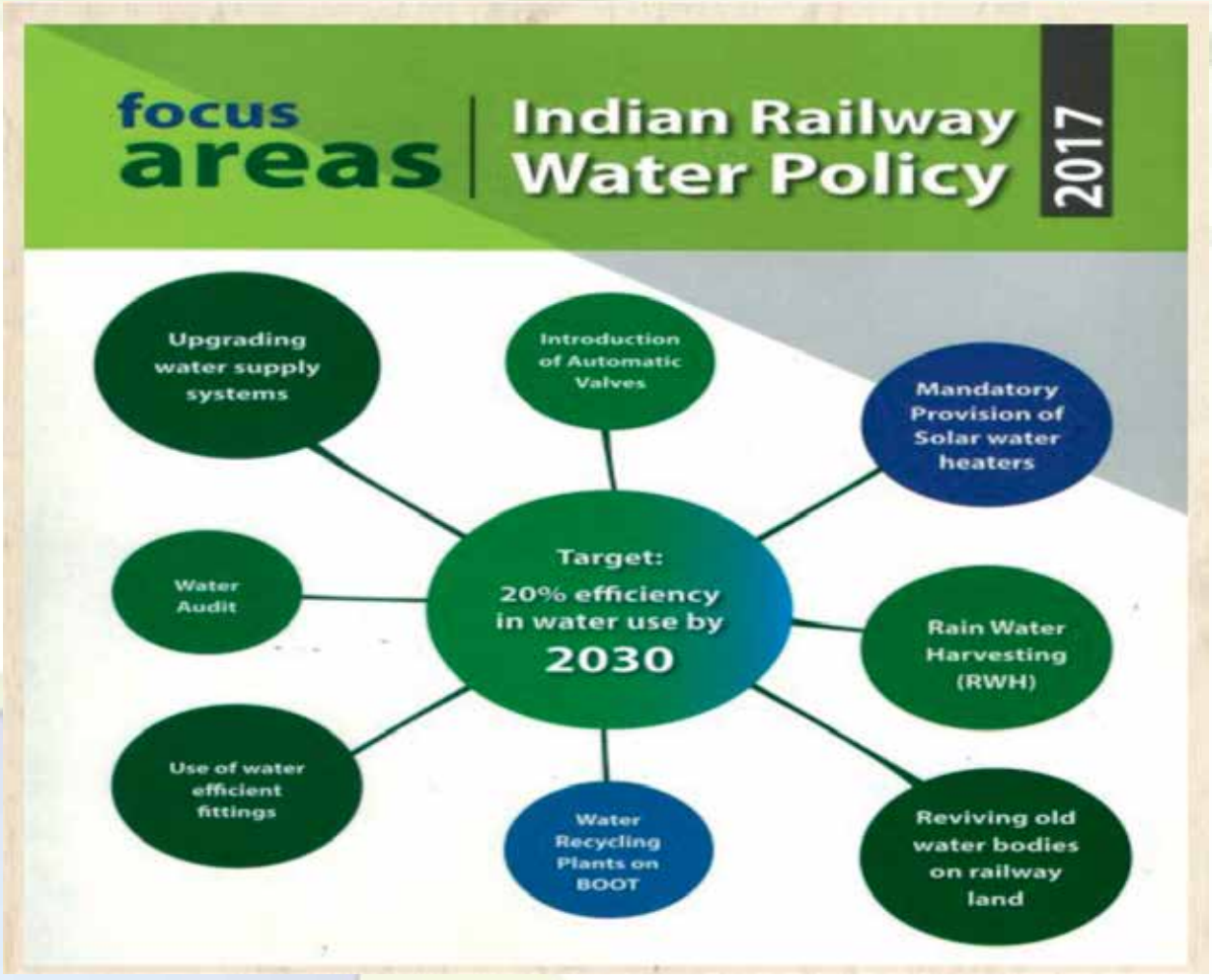
Under station redevelopment plan, 31 stations have got their EMP sanctioned during the year 2023-2024. All aspects of Environment Protection (EP Acts) are being taken care during the process of sanction of EMP, which are broadly enumerated as below:-

- Adherence to the stipulations made/observed by the State Pollution Control Board and the State Government.
- Statutory compliance;
- Air quality monitoring and preservation;
- Water quality monitoring and preservation;
- Noise monitoring and prevention;
- Energy Conservation measures;
- Waste Management;
- Green Cover;

12

Water Conservation

Shortage of water in India is becoming a very serious issue. The tube wells drilled are lowering water tables in most parts of the country. This problem gets further compounded in areas where rain fall is poor. To overcome this problem, Railways have taken initiatives in Rain Water Harvesting (RWH), Water Recycling Plant (WRP), Water Audits and Water bodies rejuvenation existing in its jurisdiction. IR issued 'Water Policy' in March, 2017 covering all aspects of water use efficiency, water recycling, conservation, recharge of ground water and restoration of water bodies.



12.1 Water Recycling/Effluent Treatment/Sewage Treatment Plants:

Water Recycling Plants (WRP) are being provided at major consumption locations (PUs/ Workshops/ Stations/ Sheds etc.) where there is heavy demand for water and provision of same is economically justified. 17 WRPs were installed in 2023-24, culminating into 142 WRPs by March'2024 over IR. More than 225 Effluent Treatment Plants (ETPs) and 200 Sewage Treatment Plants (STPs) have been installed over IR by March, 2024.

ETP of capacity 05 KLD installed at Bikaner Workshop during the year 2023-24

STP at Perambur Workshop

GM/SER inaugurated the ETP plant at Garden Reach (H.Q) on 02-10-2023.

WRP installed at Harnauth Work shop

WRP installed at Patna

WRP commissioned at Coaching Complex Dhanbad

Sewage Treatment plant of capacity 1.6 MLD is operating in Research Design & Standards Organisation (RDSO)

12.2 Automatic Coach Washing Plants (ACWPs):

Automatic Coach Washing Plants have been installed at 74 locations (including 06 commissioned in year 2023-24) over zonal Railways to clean exterior of coaches more effectively and efficiently. In addition to excellent cleaning the direct water consumption also gets reduced avoiding wastage and recycling the water through water recycling plant integrated with this plant. The rake is made to move into the coach washing plant at a slow speed and the body is sprayed with water as pre-wetting process. The rake then moves ahead where detergent is sprayed through a nozzle. At the water brush station, the coach is cleaned by rotating nylon combination brushes on both sides. This is followed by final rinsing of the coach body. Towards the exit, blowers on both sides dry off the coach.

ACWP at Mysuru shed

ACWP with ETP at GAYA MEMU Shed

12.3 Water Bodies

IR has decided to assess and review the Water Bodies existing in the Railway land including the ones which are presently non-functional and take action to ensure that all the existing Water Bodies are protected and nurtured and water bodies which are non-functional are restored. As on March 2024, around 845 natural water bodies are functional on Indian Railways. 14 nos. of natural water bodies have been restored in the year 2023-24 itself and 87 artificial water bodies have been restored over IR.

Water body at Kajipet/ SC Division (Before/After)

12.4 Water Audit

To minimize water wastage, Zonal Railways have been asked to conduct water audit at major water consumption centres through third party for quality as well as quantity and to take up works of water recycling plants based on the report of water audit. During the year from 2015-16 to 2023-24 (i.e. up to March' 2024), a total of 1371 Water Audits were conducted by various zonal Railways out of which 207 were completed in the year 2023-24.

12.5 Rain Water Harvesting (RWH)

To promote water conservation, Indian Railways have been providing Rain Water Harvesting (RWH) systems at various locations as per extant policy. In 2001, Railways were asked to adopt roof top rain water harvesting to recharge ground water especially in areas experiencing seasonal shortage of water and to take necessary assistance from regional offices of Ministry of Water Resources. In 2013, it was decided that RWH scheme shall be an essential sub-set of all the project estimates related to constructions of built assets like service buildings, hospitals, stations buildings (including remodelling etc), Railway quarters, workshops/ sheds, yard modelling as also in doubling, new line and gauge conversion and sidings. Installation of Roof Top Rain Water Harvesting is being monitored across all Railway Zones. With consistent effort of zonal Railways, 7692 nos. of RWH systems in total have been installed in Railways up to March' 2024 out of which 433nos of RWH have been installed in the year 2023-24 itself having roof top area more than 200 Sqm. 559 nos of RWH system were installed in Railways in year 2021-22 and 561 nos in year 2022-23 respectively.

12.6 Adaptation of Mechanised cleaning, Optimised water usage techniques:

Adaptation of cleaning/sanitation activities at major Railway stations/ trains & other establishments through comprehensive mechanized cleaning method with use of advance machines reduced wastage of water. Recycled water is used for washing, gardening, cleaning. RO waste water repurposed for garden watering/ utensil cleaning etc.

12.7 Quick Watering System:

Quick watering facilities are being provided for quick watering in trains with ensuring optimized/ prevention of water wastage. Quick watering system is installed and functional at 128 locations over IR.

12.8 Dual flush cistern in commode and sensors in urinals and taps:

To save fresh water, IR is proliferating using sensor-based water taps/urinals and dual flush type cistern in commode

13

Afforestation

Afforestation on vacant Railway land in between sections is carried out by Railway departmentally and also with a view to safeguard Railway land against unauthorized occupation.

In pursuance of Railways' commitment towards environmental improvement and sustainable development, Forest Departments of the States are being involved in plantation as well as maintenance and disposal of trees, thus bringing in their expertise in afforestation. For this purpose, Ministry of Railways have finalised a model agreement in consultation with Ministry of Environment, Forest and Climate Change (MoEFCC) in January 2016 to be entered between Zonal Railways and respective State Forest Department for plantation of trees on Railway land along the Railway track and station yards without transferring the ownership of the land in favour of State Forest Department.

The agreement has already been finalised with State Forest Departments of Maharashtra, Haryana, Punjab, Assam, Andhra Pradesh, Chhattisgarh, Odisha and Karnataka.

Details of Railway plantation achievement are as under:-

(In Thousands)

Year	Achievement	Year	Achievement
2014-15	6081	2019-20	13141
2015-16	5512	2020-21	9270
2016-17	12508	2021-22	7210
2017-18	8896	2022-23	8143
2018-19	11009	2023-2024	7592
Total (2014 to 2024): 89362			

Tree plantation drive conducted during world environment day 2023

Vertical gardens developed in SE Railway as part of green initiatives

Scrap yards transformed into beautiful garden in ADRA division

13.1 Miyawaki Plantation:

Miyawaki is a technique pioneered by Japanese botanist Akira Miyawaki that helps build dense, native forests in a short time. Usage of Miyawaki technique helps in creating denser forests at 10 times more pace, and Miyawaki trees absorb 30 times more carbon than monoculture plantations. The Miyawaki method mimics the way a forest would recolonise itself if humans stepped away. Only native species, that would occur naturally in that area without humans, given the specific climate condition, are planted. Indigenous plant species have spent thousands of years adapting to their local environment to create a supporting ecosystem, so planting them doesn't just reinstate this biodiversity also it builds a site that's more responsive to climate change. IR is developing forest on railway land using Miyawaki method.

Miyawaki Forest under development at RCF Kapurthala

14

Green Co certified Railway Units

GreenCo rating developed by Confederation of Indian Industry (CII) offers significant value addition and direction to organizations in terms of resource conservation, waste reduction, climate change mitigation, greener supply chain and superior environmental performance. It has been acknowledged in India's Intended Nationally Determined Contribution (INDC) document, which was submitted to UNFCCC, as a proactive voluntary action undertaken by Indian private sector aimed towards combating climate change.

14.1 Green Co certification in Railway units (Production Units/ Workshops/ Sheds):

IR has taken the initiative of undertaking Green Rating Certification for different types of Railway establishments, including the industrial units. Such certification mainly covers assessment of parameters having direct bearing on environment, such as, energy conservation measures, use of renewable energy, impact on GHG emission, water conservation, solid and liquid waste management, green cover etc.

S. No.	Location Name	Place	Rating
1	Modern Coach factory	Rae Bareilly	Platinum
2	Wagon Workshop	Guntupalli	Platinum
3	Carriage Repair shop, SCR, Tirupati	Tirupati	Gold
4	Patiala Locomotive Works	Patiala	Gold
5	Mysuru Workshop	Mysuru	Gold
6	Jagadhri Workshop	Jagadhri	Gold
7	Diesel Loco shed, Moula ali	Hyderabad	Gold
8	Liluah, Workshop	Liluah	Gold
9	Pratap Nagar workshop	Pratapnagar	Gold
10	Integral Coach Factory	Chennai	Gold
11	Golden Rock Workshop	Tiruchirappalli	Gold
12	Ratlam Diesel Shed	Ratlam	Gold
13	Diesel loco Shed Kazipet	Kazipet	Gold
14	Diesel Loco Shed	Vatva	Gold
15	Wagon Repair Shop, Kota, WCR	Kota	Gold
16	Northern Railway Alambag Workshop	Alambagh	Gold
17	Charbagh Workshop	Lucknow	Gold
18	Carriage Repair Workshop, Ajmer	Ajmer	Gold
19	Diesel Locomotive Works / Varanasi	Varanasi	Silver
20	Carriage Workshop, Lallaguda	Secunderabad	Silver
21	Wagon repair Workshop, Nagra, Jhansi	Jhansi	Silver
22	Rail Spring Karkhana	Gwalior	Silver
23	Kharagpur Workshop	Kharagpur	Silver
24	Mettuguda Stores	Hyderabad	Silver
25	Diesel Loco Shed	Vizag	Silver
26	Kalka Workshop	Kalka	Silver
27	Bhavnagar Workshop	Bhavnagar	Silver
28	Rail Wheel factory, Yelahanka	Bangalore	Silver
29	New Bongaigaon Workshop	New Bongaigaon	Silver
30	Amritsar Workshop	Amritsar	Silver
31	Diesel Loco Shed, Gooty	Gooty	Silver

32	Diesel Loco Shed	Guntakal	Silver
33	Coach Rehabilitation Workshop	Bhopal	Silver
34	Eastern railway Workshop	Kanchrapara	Silver
35	Electric Loco Shed , Kazipet	Kazipet	Silver
36	Carriage and Wagon works , Perambur	Chennai	Silver
37	Bela Wheel Factory	Bela	Silver
38	Bikaner Workshop	Bikaner	Silver
39	Mechanical Workshop, Izzatnagar	Barielly	Bronze
40	Carriage Repair Workshop,Hubli	Hubli	Bronze
41	Mancheswar Workshop	Bhubaneswar	Bronze
42	Wagon Repair Shop	Raipur	Bronze
43	Carriage Workshop, Matunga	Mumbai	Bronze
44	Lower Parel workshop	Mumbai	Bronze
45	Dibrugarh Workshop	Dribrugarh	Bronze
46	Carriage Repair Workshop, Harnaut	Harnaut	Bronze
47	Ajmer Loco Workshop	Ajmer	Bronze
48	Jodhpur Carriage Workshop	Jodhpur	Bronze
49	Rail Coach Factory	Kapurthala	Bronze
50	Perambur Loco Workshop	Chennai	Bronze
51	Motibagh Workshop	Nagpur	Bronze
52	Gorakhpur Workshop	Gorakhpur	Certified
53	Loco, C & W Workshop, Dahod	Dahod	Certified
54	Parel Loco Workshop	mumbai	Certified
55	EMU Mahalaxmi	Mumbai	Certified
56	Locomotive workshop, Jamalpur	Jamalpur	Certified
57	Budge Budge Bogie manufacturing facility	Kolkata	Certified

14.2 Green Co certification of Railway Buildings, schools, health care units etc:

Green Buildings is an effort to reduce the negative impact of buildings on the environment during its construction and use. The aim of green building is to minimize demand on non renewable resources, maximize the utilization efficiency of resources, and maximize the reuse, recycling and utilization of renewable resources. The rating systems in India like LEED, GRIHA, IGBC offer green rating for existing buildings as well as new buildings.

SN	Railway Buildings	Rating typology	Rating Level
1	IRICEN, Pune	New Building	Platinum
2	ICF Administration Building, Chennai	Existing Building	Platinum
3	Rail Nilayam, Hyderabad	Existing Building	Gold
4	Hyderabad Bhavan, Hyderabad	Existing Building	Gold
5	Supervisor Training Center, Hyderabad	Campus	Platinum
6	SEC railway Higher Secondary School, Bilaspur	School	Gold
7	Rail Vikas Bhavan, Guntur	Campus	Platinum
8	Divisional Railway Hospital, Ajmer	Healthcare	Silver
9	Rail Wheel Factory - Admin Building, Bengaluru	Existing Building	Platinum
10	Rail Saudha, Hubli	Existing Building	Gold
11	Supervisors Training Centre, Lucknow	Existing Building	Silver (2018), Platinum(2020)
12	ICF Silver Jubilee Matriculation Higher Secondary School, Chennai	School	Platinum
13	ICF Nursery & Primary School, Chennai	School	Platinum
14	Administrative Building at DMW Railway Colony	Existing Building	Platinum
15	Office Building of DRM Guntakal	Existing Building	Platinum
16	DRM Building Danapur	Existing Building	Silver
17	National Academy of Indian Railway, Vadodara	Campus	Certified
18	Railway Officers Enclave, New Delhi	Green Residential Society	Platinum

19	NWR Headquarters, Jaipur	Existing Building	Platinum
20	Northern Railway Central Hospital, Delhi	Healthcare	Platinum
21	Railway School Kalyan, Mumbai	School	Platinum
22	Rail Bhawan, New Delhi	Existing Building	Gold
23	DRM Office Building, Ratlam	Existing Building	Gold
24	Supervisor's Training Centre, Kharagpur	Existing Building	Gold
25	Central Railway Hospital, Jaipur	Healthcare	Platinum
26	Administrative Building of Jagadhri Workshop, Haryana	Existing Building	Gold
27	Divisional Railway Hospital Agra	Healthcare	Gold
28	DRM Office Building, Ahmedabad	Existing Building	Gold
29	DRM Office Building, Jaipur	Existing Building	Platinum
30	DRM Office Building, Jodhpur	Existing Building	Silver
31	Zonal Railway Training Institute, Udaipur	Existing Building	Silver
32	Jagjivanram Hospital, Mumbai	Healthcare	Platinum
33	Ujjain Railway Station Building, Ujjain	New Building	Certified
34	Admin Building of Marathwada Rail Coach Factory, Latur, Maharashtra	New Building	Gold
35	High Speed Rail Training Institute, Gujarat	New Building	Silver
36	Admin Building Northern Railway Mechanical Workshop, Amritsar	Existing Building	Platinum
37	Divisional Railway Manager Building, Ajmer	Existing Building	Silver
38	Administrative Block, Patiala Locomotive Works	Existing Building	Platinum
39	Chittaranjan Locomotive Works (CLW), Admin Block, Chittaranjan, Asansol	Existing Building	Gold

14.3 Green Railway Stations:

IR has embarked on a mission of "Net Zero" Carbon emission by 2030 and as per estimation by CII green certification of each major Railway Station is expected to result in 500 Tonnes of CO_2 reduction per year. Green Certifications covers assessment of parameters having direct bearing on the environment, such as, energy conservation measures, use of renewable energy, Green House Gas emission reduction, water conservation, waste management, material conservation, recycling etc. 200 such green stations have been planned for taken up to be Green Certification in upcoming years.

SN.	Station	Zone	Final Rating Level
1	Secunderabad (Re-Cer 2023)	SCR	Platinum
2	New Delhi (Re-Cer 2021)	NR	Platinum
3	Jaipur (Re-Cer 2023)	NWR	Platinum
4	Chennai (Re-Cer 2023)	SR	Platinum
5	Varanasi	NR	Certified
6	Katra	NR	Certified
7	Howrah Station (Re-Cer 2023)	ER	Silver
8	Kacheguda (Re-Cer 2023)	SCR	Gold
9	Vijayawada (Re-Cer 2023)	SCR	Gold
10	Tirupati	SCR	Gold
11	Anand Vihar	NR	Silver
12	Hazrat Nizamuddin	NR	Certified
13	Guntakal	SCR	Gold
14	Tiruchirappalli	SR	Gold
15	Rajendra Nagar Patna	ECR	Silver
16	Visakhapatnam	ECoR	Platinum
17	Chhatrapati Shivaji Maharaj Terminus	CR	Gold
18	Ratlam Junction	WR	Silver
19	Delhi Cantonment	NR	Silver
20	Delhi Sarai Rohilla	NR	Silver

21	Yeshwanthpur	SWR	Silver
22	Asansol	ER	Platinum
23	Coimbatore	SR	Platinum
24	Jodhpur	NWR	Platinum
25	Chittaurgarh	WR	Gold
26	Hyderabad Deccan	SCR	Platinum
27	Solapur	CR	Gold
28	Agra Cantonment	NCR	Silver
29	Malda Town	ER	Silver
30	BapudhamMotihari	ECR	Gold
31	Dhanbad	ECR	Gold
32	Sir M. Visvesvaraya Bangalore	SWR	Silver
33	Ahmedabad	WR	Platinum
34	Bhagalpur	ER	Silver
35	Ajmer	NWR	Gold
36	Virangana Lakshmibai Jhansi	NCR	Silver
37	Prayagraj	NCR	Silver
38	Mumbai Central	WR	Gold
39	Banaras Railway Station	NER	Silver
40	Hajipur	ECR	Gold
41	Sealdah	ER	Gold

15

Solid Waste Management

Solid Waste Management Rules, 2016 identify railways as a bulk waste generator. Different types of wastes are generated at various railway premises like Municipal Solid waste, Plastic waste, hazardous waste, bio-medical waste, E-waste etc. During the course of transportation, waste is generated by pantry cars and by the passengers especially in long distance trains. IR strictly follows waste hierarchy, the priority order, in which the solid waste is to be managed by giving emphasis to prevention, reduction, reuse, recycling, recovery and disposal, with prevention being the most preferred option and the disposal at the landfill being the least. IR emphasizes on segregation/ collection of waste in three separate streams namely bio-degradable, non biodegradable and domestic hazardous wastes. Single use plastic is completely banned over IR.

15.1 Zonal Railways and Production Units have taken initiatives to set up solid waste management facilities including segregation and waste processing methods such as composting, vermi-composting, bio-methanation for bio-degradable waste and recycling of recyclable waste. IR has installed Solid Waste Management Facilities over 220 locations (including Waste to Energy:16, Waste to Compost:164 & Solid waste management plant:35).Material Recovery Facilities have been installed around 200 major stations over IR. Waste disposal is also being done with coordination of Urban Local Bodies (ULBs).

Material Recovery Facilities at Sambalpur City railway station

Automatic Organic Waste Composter with Material Recovery Facility at Salem/SR

Use of organic manure from the dry leaves collected in RDSO campus

Installation of composter boxes at Rail Nagar Colony

Vermi compost Plant at Matunga, workshop

Compost Plant at Pune station

15.2 On Board Housekeeping Service (OBHS) is provided in identified long distance trains. The OBHS staff not only conducts cleanliness activities of the trains en-route but also collects the waste generated during the journey which is disposed at designated stations.

15.3 IR is also taking various awareness drives for railway officials as well as for passengers for proper waste management, including eradication of single-use plastic in Railway premises through awareness rallies social and press media, audio announcements, passenger interaction, posters and placards. Display banners to say no to plastic, Nukkad natak for Anti Littering, Audio-visual awareness campaign and display of fine/penalty board at station. IR removed approximately 8000 tonnes of plastic waste in Swachhata Hi Seva campaign launched in the month of September-October, 2023.

15.3 Bio-Medical Waste (BMW) generated at Railway Hospitals/ Health Units is disposed as per Bio-Medical Waste Management and Handling Rule, 2016. Bio Medical Waste generated in hospitals are collected by State Pollution Control Board approved agencies for the purpose and disposed off the waste as per State Control Board approved guidelines. Proper segregation (in colour coded bags) have been provided to collect BMW. Hospital kitchen waste is also being segregated into wet waste and dry waste in two separate dustbins at the point of generation.

15.4 Indian Railways is one of the major producers of E-Waste on account of computerization of the related IT infrastructure at passenger reservation centers, EDP centers, unreserved ticketing systems, offices as also extensive IT infrastructure used for signaling and telecom services.

Central Government had notified E-Waste (Management) Rules, 2016 that superseded the E-Waste (Management and Handling) Rules, 2011. These rules aim to enable the recovery and/or reuse of useful materials from E-Waste, thereby reducing the hazardous wastes that destined for disposal and to ensure environmentally sound management of all types of waste of electrical and electronic equipment.

These discarded items like computers/laptops, e-monitors, T.V. sets, electronic equipment, servers etc. are properly identified, segregated, stored and disposed of in a manner, which is not hazardous to human health and is in harmony with the environment. The scrap batteries etc. are sold to State Pollution Control Board (SPCB) approved recyclers only. The reports regarding consolidated data comprising of quantity of Hazardous/ e-waste etc. generated, recycled and sold during the year are sent in stipulated forms regularly by Zonal Railways/ Production Units/ Other establishments to SPCB accordingly.

15.5 Material Conservation under RRR policy:

- Released PSC (Pre-Stressed Concrete) sleepers are being innovatively repurposed for various construction projects, such as roads, platforms, and boundary walls.
- Repurposed rails have been utilized for constructing barricades at level crossing gates and

trespassing locations. This approach reduces civil construction work and promotes material conservation.

- Creative artwork by using scrap materials



15.6 Zero-waste Railway station & colony initiative with GIZ at Varanasi: A project has been undertaken by Northern Railway to make Varanasi Cantt a model zero-waste railway station and AEN Colony at Varanasi a model zero-waste railway colony. This initiative has been undertaken in partnership with the Government of Uttar Pradesh (GoUP) and German Development Cooperation (GIZ-India), as part of the Indo-German bilateral cooperation agreement in the State of Uttar Pradesh. In this project, all the waste generated at Varanasi railway station will be segregated into wet and dry waste. The dry waste will be recycled and wet waste will be composted.

15.7 Delhi division/NR has awarded an innovative contract to the firm M/s Rekart Innovations Private Limited, Gurugram for waste management and resource recovery at New Delhi, Hazrat Nizamuddin, Delhi, Delhi Sarai Rohilla and 26 other railway stations of Delhi area in April 2021. This contract marks a paradigm shift as on expenditure contract has been converted into revenue contract fetching non fare revenue of Rs 50 lakhs for 05 years. The firm segregates station waste into wet and dry waste, ensures treatment of wet waste and recover the recycled dry waste. The firm is also creating awareness about segregation of waste for behavioral change among passengers, vendors etc.

15.8 Zero Waste Railway Colony at S.P. Marg/New Delhi:Northern Railway has undertaken a pilot project to transform its two colonies, S.P. Marg and San Martin Marg Railway Colonies, into Zero-Waste colonies, through a collaborative partnership with the Why Waste Wednesdays Foundation, on a pro-bono basis. A zero-waste colony is a colony from which waste sent to the landfill is minimal or as close to nil as possible. Thus, most of the wet waste generated in such colonies is processed within the premises and dry waste is segregated and reused or recycled by involving the informal sector/authorized recyclers in accordance with Solid Waste Management Rules 2016 and amendments thereto.

15.9 The Policy of Zero Scrap on Indian Railways is in vogue. Railway Board has issued instructions to Zonal Railways and Production Units to maintain Zero Scrap Balance (defined as no scrap arising older than 2 months). Zonal Railways and Production Units strive to maintain the Zero Scrap Balance. This has resulted in cleanliness of environment & availability of space and generation of revenue by sale of scrap.

16

Capacity Building and Awareness

Managing an organisation as expansive and diverse as the Railways spanning across the varied landscapes of our nation, presents a significant challenge in promoting and developing capacity for nature conservation. Instilling environmental consciousness demands not only educating passengers but also enlightening staff about diverse environmental concerns. IR is actively disseminating awareness among all stakeholders through a combination of traditional and inventive methods.

16.1 Capacity Building programmes

Capacity building programmes on Environment Management and Sustainability are regularly organised at different Training Institutes/ Zonal Railway Headquarters/ Railway Board's level. A number of courses were conducted at NAIR, IRITM and IRIMEE during the year.

16.2 Celebration of World Environment Day 2023:

5th June is globally observed as a World Environment Day every year with the aim to raise awareness on environmental issues. Indian Railways have been continuously taking major initiatives that have positive impact on the environment and contributing to sustainability. Like every year, Indian Railways observed World Environment Day on 5th June 2023 over its zonal Headquarters, Divisions, Production units, workshops & other establishments in an appropriate and befitting manner keeping in line with the theme 'Beat Plastic Pollution' launched by United Nations Environment Programme (UNEP).

Today, plastic clogs our landfills, leaches into the ocean and is combusted into toxic smoke, making it one of the gravest threats to the planet. Not only that, what is less known is that micro plastics find their way into the food we eat, the water we drink and even the air we breathe. Many plastic products contain hazardous additives, which may pose a threat to our health. In order to control plastic pollution, Indian Railways has banned single use plastic and has been issuing guidelines time to time on plastic waste management & promotion of alternatives to banned single-use plastic items etc.

All Units of Indian Railways observed World Environment Day Programme on 5th June, 2023 in an appropriate and befitting manner by highlighting the achievements of Indian Railways and future initiatives and programmes in the field of Environment. Besides other initiatives, campaigns involving Scouts/ NCC and other social groups to create awareness towards plastic pollution and its solutions were also organized at major railway stations, work places and colonies.

16.3 Celebration of Swachhata Pakhwada & Swachhata Hi Sewa Campaign 2023:

IR observed Swachhata Pakhwada 'Swachhata hi Sewa' (SHS) campaign from 15th September 2023 to 30th September 2023, extending it suo-moto up to 02nd October with culmination on Mahatama Gandhi's Jayanti.

Dedicated days were assigned for activities during pakhwada like Swachh Railgadi, Swachh Station, Swachh Aahar, Swachh Tracks etc. Extensive awareness campaign were conducted through digital media/public announcement via PA systems to educate people about the use of bio-toilets, avoiding single use plastic and observing cleanliness habits.

Chairman & Chief Executive Officer/Raiway Board inaugurated Swachhata Pakhwada

Hon'ble MR during cleanliness drive at Delhi Cantt Railway Station

16.4 Special Campaign

Inspired by the vision of Hon'ble Prime Minister, the Government of India launched Special Campaign 3.0 from 02.10.2023 to 31.10.2023 focusing on cleanliness all around, reducing pendency of public matters and improving work-culture at work places.

During the campaign, IR undertook 23,672 cleanliness campaigns over entire Indian Railways including Zonal offices, Divisional offices, PSUs, PUs, Training Institutes, Railway Workshops and Stations.

17

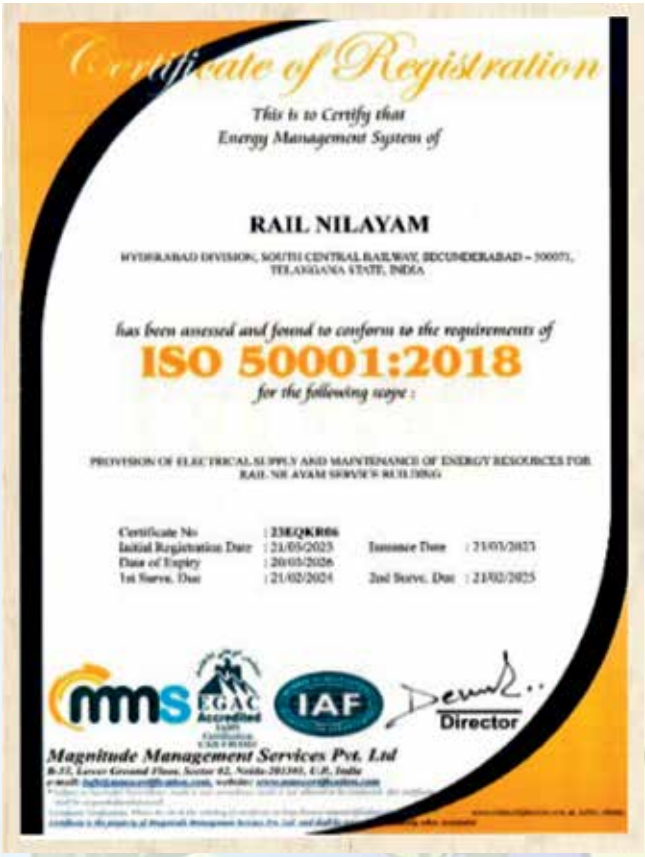
Other Green Initiatives

17.1 Shield on Environment Management: An MR's shield has been instituted, and given every year to the best performing ZR/PU for the excellent work done in Environment management.

17.2 Environment friendly Bio-Toilets & Bio-vacuum toilets for Passenger Coaches:

Indian Railways have developed environment-friendly Bio-toilets for passenger coaches jointly with Defence Research & Development Organization (DRDO). In these bio-toilets, the waste retention tanks are fitted below the coach floor underneath the lavatories and the human waste, discharged/collected into them, is acted upon by a colony of anaerobic bacteria that convert human waste mainly into water and bio-gases (mainly Methane CH4& Carbon Dioxide CO2). The gases escape into the atmosphere and waste water is discharged after disinfection onto the track. Raw human waste thus does not fall on the railway tracks and this keeps station premises/ tracks clean. Indian Railway has completed the work of fitment/ installation of bio-toilets in all its coaches on line. With this effort, dumping of nearly 274000 liters per day of waste water and 3980 tons per day of excreta on tracks is avoided. All newly manufactured coaches, turning out of Production Units, are being provided with bio-toilets.

17.3 Environment Management System (EMS)/ Integrated Management System (IMS):


Certificate of Registration

This is to Certify that
Energy Management System of

RAIL NILAYAM

has been assessed and found to conform to the requirements of
ISO 50001:2018
for the following scope :

Director

Magnitude Management Services Pvt. Ltd

- All 8 Production Units and 44 major Workshops are certified to ISO: 14001 that helps organizations to reduce their environmental impacts. All 8 Production Units and 44 major Workshops are also certified to ISO: 50001 showing commitment to energy conservation and energy efficiency.

- 38 Diesel Sheds, 61 Coaching Depots, 21 Freight Depots and 8 Electric Loco Sheds, 3 MEMU/ DEMU Car Sheds, 2 Engineering Workshops and 1 Stores Depot are also certified. Railway Hospital, Railway buildings, stations & other establishments are also progressing to achieve EMS/IMS certification for implementing best Energy Conservation Measures.

- All major 720 Railway Stations have been

certified for implementation of Environment Management System to ISO: 14001 and taken up for re-certification upon expiry, this is in compliance to Hon'ble NGT directives.

17.4 Rail Green Point (Carbon saving while transportation by Rail):

A new initiative namely Rail Green Points have been launched in April 2022 in coordination with CRIS/FOIS. It assigns carbon saving points termed as rail green points, to freight customers. It will be applicable only to the freight customers who are registered on e-RD portal of FOIS. Every customer who places demand online (on e-demand module) for freight service may be prompted by a 'Pop up' thanking him for choosing to transport by Indian Railway giving details of the expected saving of carbon emission called rail green points. Once Railway Receipt (RR) is generated, the saving of carbon emission will be credited to customers' account in the form of real green point and the cumulative points will also be shown in account on freight business development portal. Downloadable certificate displaying real green point may be provided in the system. The rail green points can't be claimed for any benefit from Railways. It will be reckoned on financial year basis. The 'feel good factor' that customer would get from this information will motivate them to transport more by train tomorrow, moreover, the corporate customers may likely to mention it on their website in their annual reports.

17.5 Registration of demand for wagons electronically (e-RD) through FOIS web portal:

Registration of demand for wagons electronically (e-RD) provides a facility to rail users to register demand for wagons electronically through FOIS web portal. This has made the process of registering demand for wagons simpler, convenient, speedier and transparent. Customer has been allowed to show e-Forwarding Note un mobile/ tablet/ laptop in place of physical submission of Forwarding Note has been made mandatory which makes it paperless system and this has ecological and environmental benefits including reduction in carbon emissions.

17.6 Electronic transmission of Railway Receipt (eT-RR):

Electronic transmission of Railway Receipt (eT-RR) envisages a user friendly and paperless transaction system wherein RR is transmitted electronically to rail customers. Delivery of consignment is given on e-surrender of eT-RR. Now, customer has been allowed to show Transaction slip/eT-RR on mobile/tablet/laptop. In place of submitting physical transaction slip/ eT-RR at the time of taking delivery, which is beneficial to environment.

17.7 Implementation of e-Office:

E-office is Cloud Enabled Software Application developed by NIC. This software helps to improve efficiency, productivity and accountability & Transparency in the workplace by creating a reliable, efficient and effective way to handle office files & documents. A digital workplace also ensures less consumption of paper thereby reducing cutting of trees and thus impacting the environment in a positive way. E-Office has been rolled out at 236 Railway locations covering Railway Board, all Zones, Divisions, Production Units, RDSO, CTIs, Workshops and other Railway units. Railway

zones/divisions/PUs/CTIs have also been interconnected through E-Office for digital movement of files from one railway unit to another railway unit thereby ensuring complete paperless working.

17.8 Provision of Telepresence/ VC facility:

The use of telepresence/ VC facility for various meetings/ conducting online classes is helping in reducing the carbon footprint. Railway Board vide Telecom Circular No. 01/2024 dated 12.01.2024, has formed the policy to allow for procurement of cloud based video conferencing services to Zonal Railways/ Divisional HQs/ PUs/ CTIs. 112 Webex User Host Admins (Internet based VC facility) and 134 VDCOT Admins with audio and video facility have been issued to Zonal Railways/ Centralized Training Institutes (CTIs) for conducting VCs/ Online, thus going by digital way of meeting/training, and saving papers.

17.9 "Switch Rail Grinding Machines (SRGM) and Rail Milling Machine (RMM) have been inducted first time for maintenance of rail of IR track, having Electronically Controlled Emmissionized (ECM) engines compliant to Tier-2 emission norms. Further, procurement of track machines has been planned with the engines compliant to Tier-2 emission norms to contribute the environmental sustainability.

17.10 Sky light/ Natural lighting utilization: Polycarbonate Sky light panels are used for natural light utilization.

Diesel Locomotive factory, Marhowra *Green Field Electric Locomotive Factory, Madhepura*

17.11 Electrical/Electronic Interlocking and Centralized Traffic Control: 84 mechanical lever frame signalling have been replaced this year with Electrical/Electronic Interlocking signalling system including major yards at Danapur, Patratu and Bhilai Exchange yard. This will result in savings in coal and diesel used in maintenance of mechanical level frames.

24 hours shifts of Centralized Traffic Control (CTC) Tundla started from March 2019 covering 26 stations and 250 Route Km on Aligarh-Kanpur section. Power consumption at wayside stations reduces with CTC operations.

17.12 MCDO portal has been developed with CRIS: for online submission of monthly MCDO to Railway Board. Portal has the facility to generate instant reports for performance

comparison. The practice of sending hard copies has been discontinued. This initiative has resulted in saving of about 6000 sheets of paper in a year.

Only limited copies of Budget books/ booklets like Pink Book are printed now and all required books are available online. With merger of Rail Budget with General Budget, the requirement has further come down.

17.13 Saving paper saving Trees:

17.13.1 Railway Recruitment Boards have introduced online examination through Computer Based Test (CBT) for all Group 'C' posts since 2015 and also for Group 'D' posts in 2018. RRBs have dispensed with paper pen examination (OMR sheets). The elimination of paper from the examination is a step towards a better environment. During year 2022-2023, around 1.2 Crore candidates took part in CBT for group C post examinations. IR has also introduced centralized computer based examinations (CBT) for conducting 70% selections and 30% LDCEs for promotion to Group 'B' posts in organized services, earlier being carried out by respective zones/ units through the conventional pen/paper mode. Introduction of Computer based exam (CBT) has resulted in saving of tons of paper required for the answer-sheets. National Academy of Indian Railways (NAIR) as an initiative has issued Course Certificates in NFT and Digital form. Relieving letters and other course materials are also distributed in digital form which results in saving of papers and hence saving of trees.

17.13.2 To achieve greater transparency in vigilance, maximum number of complaints received in Vigilance Directorate are processed via online mode i.e. through E-mail, E-office, Satark Portal, CVC Portal, IRVIN software etc. This Exercise leads to reduction in the cost of paper, printing and transportaion. This elimination of paper is a step towards better environment. This helps Vigilance Directorate to contribute to the environment by saving a substantial number of trees.

17.14 Wildlife protection:

IR is consistently taking all precautionary and preventive measures for a sustainable and balanced approach towards the movements of the trains in the forest section catering in the larger public interest by a host of measures to prevent the death of wildlife.

Joint meetings and inspections are conducted along with the forest officials in order to mitigate the loss of wildlife due to the train accidents.The authorities of the Forest Department and the Railway Officials work in co-operation to ensure that no wild life death in the section goes without reporting. The locomotives are equipped with the event recorder to record the speed, braking and honking of the Locomotive. Locomotives of the section are provided with powerful horns and Loco Pilots are given instructions to freely honk in the forest area to drive away the animals in or nearby tracks.

IR has taken various measures to prevent death of wildlife on railway tracks etc, as enumerated below:-

- Permanent Speed Restrictions (PSRS) have been imposed.
- Signage boards have been fixed to caution the Loco Pilots of possible wild animal crossings.
- Vegetation by the side of Track at identified locations is being cleared by Railway.
- Whistle-free caution orders have been imposed in a few identified sections.
- Construction of underpasses and ramps
- Enforcement of speed limits

17.15 Noise reduction in power car:

Indian Railways' Production Units are manufacturing all power cars with low noise feature. Introduction of Head on Generation technology (HOG) resulted significant reduction in noise and air pollution as it has eliminated the need for separate diesel fuelled power cars which produce an unbearable noise of around 100dB and on an average 3000 litres of diesel per trip per train.

17.16 Monitoring/Sampling and testing of Ambient Air Quality (AAQ):

The Air (Prevention & Control of pollution) Act was amended in 1987 to provide for the Prevention, Control and Abatement of air Pollution in India, Various initiatives have been taken by IR to mitigate air pollution and improve air quality like Tree Plantation, Development of Garden, Nursery, Green Belt, forest etc. A total of 720 stations have been brought under respective state Pollution control Boards and consent to operate has been obtained. To abide the guidelines of Hon'ble NGT, Monitoring/Sampling and testing of Ambient Air Quality (AAQ) and Ambient Noise Level (ANL) test conducted for identified stations and found under limit as per Air pollution & Noise Pollution (Regulation & Control) Rules. 17.17 Turbo ventilators:

17.17 Turbo ventilators:

Turbo ventilators have been fitted in workshop and rolling stock maintenance depots of IR. These are air driven, non-stop ventilators that do not require any electrical energy but effectively take out fumes, hot gases and air pollutants from workplace.

17.18 e-RCT Project:

Railways has decided to revamp its existing Railway Claims Tribunal (RCT) system to make it more efficient, transparency and quality in services of RCT and has sanctioned Rs.11.59 Crores for the work of "Computerization and Digitization of Railway Claims Tribunal (RCT)", in short, e-RCT project, across all 23 benches of RCT. National Informatics Centre (NIC) has been roped in to develop the software for the project. The project will facilitate digital eco-system for online processing of cases to enhance their service delivery capability from the existing legacy process. The project will lead to an approach towards paperless office that encourages eco friendliness and significantly reducing paper usage annually. The project is under implementation phase and its trial has been started in 5 benches of RCT.

17.19 Flat Multi-purpose wagon (FMP):A new design of low floor height flat multi-purpose wagon for transportation of Road vehicles, containers, steel products and similar commodities has been developed by RDSO. The Floor height has been reduced to 975 mm to accommodate trucks & containers within the IR-MMD. One rake will consist of 5 units of 2 A-car & 7 B-car. It can carry all types of rigid frame trucks (12m). The design has been further improved for transportation of Container and steel coil, making the design as a multimodal design and to give flexibility to Train operators for loading different commodities. The FMP wagon is expected to reduce pollution and expected to bring down consumption of petroleum products. Railway Board sanction has been received.

17.20 No Car Day:

RCF Kapurthala has taken an initiative to check organisation's carbon footprint and has declared every first Saturday of the month as "No Car Day". Officials are encouraged not to use I/C engines for commuting to offices on No Car Day. Activities like walking and cycling to office are encouraged.

18

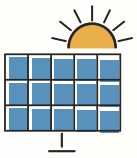
Policy Initiatives of Indian Railways towards Environmental Sustainability

With a pan-India network and linkages to various sectors of the economy, the Indian Railways have always considered environmental management as part of the core operating strategy. A renewed focus and thrust has been given in its activities to achieve a better environment with the launching of the new Environment and Housekeeping Management Directorate in the Railway Board. Some important policy initiatives taken in recent years are noted below:

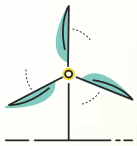
18.1 Policy on Water Management

- Water Recycling plant to be provided at major water consumption centres subject to techno-economic viability
- Rain water harvesting system to be provided
- Water audit to be done at major water consumption colonies / installations / stations
- Revival of water bodies
- Inclusion of Automatic Coach Washing Plant with Water Recycling in all major coaching depots

18.2 Policy on Energy Management



- 5% energy consumption to come from alternative sources
- Retrofitting with efficient lighting and other star-rated appliances
- Production of only energy efficient 3 phase electric locos from 2016-17 onwards
- Provision of LED lights in coaches during POH
- Use of 5% bio-diesel in traction fuel
- 20% CNG substitution in DEMUs



- 100% Green Powered Stations started
- Certification to EMS 50001 Energy Management System

- IR has joined the Perform, Achieve and Trade (PAT) Progamme of Bureau of Energy Efficiency (BEE) showing its commitment for improving energy efficiency

18.3 Waste Management

- All passenger coaches have environment-friendly bio-toilets.
- Provision of dustbins in sleeper coaches also in addition to AC coaches
- Provision of dustbins in bio-toilets in all coaches
- Provision of separate dustbins for bio-degradable and non-bio-degradable waste and more dustbins at stations
- Pilot Plants for Solid Waste Management at major railway stations

18.4 Funding of Environmental Sustainability Works

- Policy frame work to earmark 0.5% lump sum provision in certain project estimates towards environment related works
- Policy frame work to undertake environmental sustainability works by Zonal Railways through CSR has been put in place

18.5 Other Green policy initiatives

- MoUs with States for planting of trees on vacant railway land
- Use of plastics of less than 20 micron thickness in packaging is banned
- EMS/IMS certification for all PUs, Workshops, Loco Sheds and major Coaching depots
- Green Certification of Railway establishments
- 'Consent to Establish' and 'Consent to Operate' / 'Consent for Operation' for production units, stations, siding goods sheds etc are to be taken from State Pollution Control Board in accordance with the provisions of SPCB, keeping in view the notified areas / air pollution control areas and categorisation of Industrial Sectors.

Applicable Laws and Rules

Environment Protection Act

- The Environment (Protection) Act, 1986, amended 1991 The Environment (Protection) Rules 1986
- Water Pollution
- The Water (Prevention and Control of Pollution) Act, 1974, amended 1988
- The Water (Prevention and Control of Pollution) Cess Act, 1977
- The Water (Prevention and Control of Pollution) Amendment Rules 2011
- The Water (Prevention and Control of Pollution) Cess Rules 1978
- The Water (Prevention and Control of Pollution) Rules, 1975

Air Pollution

- The Air (Prevention and Control of Pollution) Act 1981, amended 1987
- The Air (Prevention and Control of Pollution) Rules 1982

Noise Pollution

- The Noise Pollution (Regulation and Control) Rules 2000

Waste Management

- Solid Waste Management Rules 2016
- Hazardous Waste (Management, Handling & Transboundary Movement) Rules 2016
- Bio-medical Waste Management Rules 2016
- Plastic Waste Management (Second Amendment) Rules 2022
- E-Waste (Management) Rules 2022

Construction and Demolition Waste Management Rules, 2016

Prepared by: Environment and Housekeeping Management Directorate, Railway Board, Ministry of Railways.

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