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ENVIRONMENT CONSERVATION

A way of Life for INDIAN RAILWAYS

- Indian Railways (IR) is working in mission mode to become the largest Green Railways in the world and is moving towards becoming a "net zero carbon emitter" before 2030

A train with a red and orange locomotive and blue passenger cars is crossing a stone bridge over a large waterfall. The waterfall cascades down a rocky cliff face, surrounded by lush green vegetation. The scene is set in a mountainous region.

JOURNEY THROUGH ECOSYSTEMS

Train Passing Dudhsagar Water Falls
Belgaum–Vasco da Gama Rail route

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ENVIRONMENT CONSERVATION

A way of Life for INDIAN RAILWAYS

Railways is guided by a holistic vision of being an environment friendly, efficient, cost effective, punctual and a modern carrier of passengers as well as the freight in order to serve the growing needs of New India. IR is looking at helping the environment from its biggest to the smallest steps ranging from massive electrification, day to day water & paper conservation to saving animals from being injured on Railway tracks. The following measures showcase how IR has adopted Environment Conservation in its daily work...

ENERGY CONSERVATION



ELECTRIFICATION

WATER CONSERVATION



GREENERY

Railway Electrification

Pace of Railway Electrification, which is environment friendly and reduces pollution, has increased nearly ten times since 2014. With a view to transform Indian Railways into "Green Railways" and to capture the economic benefits of electric traction in an accelerated manner, Railways has planned to electrify balanced Broad Gauge (BG) routes by December, 2023 to achieve 100% electrification of BG routes. This will facilitate elimination of diesel traction resulting in significant reduction in its carbon footprint and environmental pollution. The major highlights in this regards are as below...



TOTAL ROUTE KILOMETERS ELECTRIFIED (RKM)		
2013-14	2020-21	% Growth
610	6,015	886%

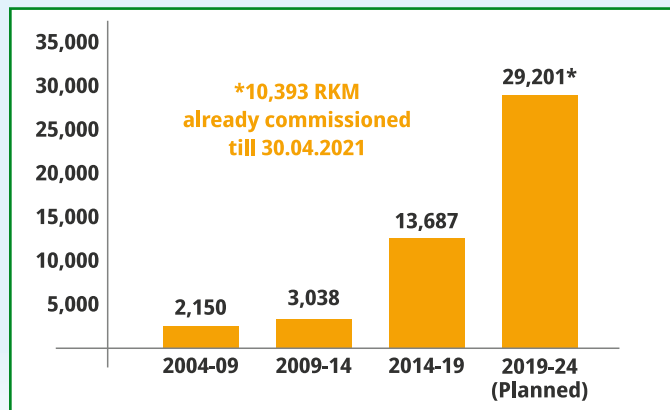
TOTAL ROUTE KILOMETERS ELECTRIFIED (RKM)		
2007-14	2014-21	% Growth
4,337	24,080	455%

AVERAGE ROUTE KILOMETERS ELECTRIFIED (RKM) PER ANNUM		
2007-14	2014-21	% Growth
620	3,440	455%



Growth of Railway Electrification

As on 01 May 2021, 71% of the total Broad Gauge network has been electrified. If the Railway electrification programme had been executed with the pace of electrification prior to 2014, 100% electrification would have taken more than 50 years to complete, whereas with the increased pace after 2014, we would be able to complete it by December, 2023.



Expenditure: Earlier RE projects were used to be financed through budgetary support from the Union Government but being highly remunerative, they are now being financed through Extra Budgetary Resources (Institutional Finance)

Further, expenditure of approximate Rs.21,000 crore is expected to be incurred for completion of the balance electrification

Expenditure under Plan Head-RE (Rs. Crore)

2013-14	2020-21	% Growth
1,265	6,141	385%

Expenditure under Plan Head-RE (Rs. Crore)

2007-14	2014-21	% Growth
5,686	29,715	422%



Expenditure

At the time of submitting a proposal of 100% electrification to the Cabinet Committee on Economic Affairs (CCEA) during 2018-19, the **annual saving in fuel bill was estimated as Rs.13,510 crore/year after completion of 100% electrification. However, with the recent increase in diesel prices, the estimated saving currently is Rs. 14,500 crore/year**



Electrification offers advantages like:

- ✔ Environmental friendly mode of transport
- ✔ Reduced dependence on imported diesel fuel, thereby saving precious foreign currency and reduced carbon footprints
- ✔ Reduced operating cost
- ✔ Haulage of heavier freight trains and longer passenger trains with high haulage capacity of Electric Locomotives leading to increased throughput
- ✔ Increased sectional capacity by eliminating detention on account of traction change
- ✔ Reduced Operating and maintenance Cost of Electric Loco

Steps Taken: To complete the projects in time, various other steps have been taken which includes among others, award of large size Engineering Procurement and Construction (EPC) contracts, better project monitoring mechanisms, assured / committed funds through 'Extra Budgetary Resource (Institutional Finance), and decentralization of powers to field units.

Future Planning: As on 01 May 2021, 18,808 kilometres (incl. KRCL) of BG routes are balanced for electrification. Planning to execute these works is as under

Year	Target (RKM)
2021-22	6,000
2022-23	6,500
2023-24 (upto December-2023)	6,308
Total	18,808



Head on Generation (HOG)

IR is also introducing Head on Generation (HOG) system, whereby electrical power is fed to the coaches directly from the Over Head Equipment (OHE) through the Locomotive. It eliminates the need for separate power cars in trains and thus reduces the need for pulling extra coaches and increases efficiency. Over 1,120 trains have already been converted to HOG. Further, 160 HOG compliant trains have been received from Production Units. Hence, total 1,280 trains have been equipped with the HOG system. There will be a reduction in Carbon footprint by 31,88,929 Ton per annum. There will also be a saving in fuel costs to the tune of Rs 2,300 crore due to elimination of power cars.



Head on Generation Green Initiative

- 🌿 Environmental friendly
- 🌿 No noise and air pollution
- 🌿 Eliminates use of fossil fuel
- 🌿 Direct Saving (fuel cost) with one round trip of Kolkata / Mumbai Rajdhani: Rs. 1.5 Lakhs
- 🌿 Less Maintenance vis-à-vis Power car
- 🌿 Higher reliability
- 🌿 Composite Converter for WAP-5, high speed loco
 - ✦ Compact Design
 - ✦ Single unit for Traction and Hotel Load Converter
- 🌿 More than 300 locomotives fitted with the system
- 🌿 Operation of Prestigious trains like Rajdhani, Shatabdi and Duronto trains.



Rapid Development Of Environmentally Efficient Dedicated Freight Corridors (DFCs) With More Load Carrying Capacity And Faster Speed

Dedicated Freight Corridors are being developed as a low carbon green transportation network with a long-term low carbon roadmap which will enable it to adopt more energy efficient and carbon-friendly technologies, processes and practices. IR is implementing two Dedicated Freight Corridor projects viz. Eastern Corridor (EDFC) from Ludhiana to Dankuni (1,875 km) and Western Corridor (WDFC) from Dadri to Jawaharlal Nehru Port Trust (1,506 km). Sonnagar-Dankuni (538 km) portion of EDFC has been planned for execution on Public Private Partnership (PPP) mode.



Future Plan

It has also been decided to undertake preparation of Detailed Project Reports of about 4,000 km of New DFCs, for the following shortlisted segments

- ❖ East Coast Corridor: Kharagpur-Vijayawada (1,115 km)
- ❖ East West Corridor: Bhusaval-Kharagpur-Dankuni (1,673 km) and Rajkharsawan-Andal (195 km)
- ❖ North South Corridor: Vijayawada-Nagpur-Itarsi (975 km)

DPR work of above corridors has been entrusted to DFCCIL, which has already awarded the work on 4th December 2020. Preliminary reports are expected to be completed by August'21 and Final Reports by June'22

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- DFC is fully electrified and designed for Heavier Axle Load, higher speeds (max 100 kmph), long haul trains (1.5 km), Double stack container trains, thereby resulting in higher carrying capacity and faster movement of goods. DFCCIL has adopted 3-phase technology for electric locomotives which facilitates regeneration of 14-15% of energy consumed by utilizing the braking energy for traction purpose.
- **Various installations in the DFCCIL network are planned to adopt Green Energy Concept so as to meet minimum 10% energy requirements through renewable sources.**
- In both WDFC and EDFC, all contract packages are 100% in compliance with respect to certification on ISO 14001, ISO 45000 and OHSAS 18001. These certifications have created a systematic management system of monitoring, measurement & review of environmental and social performance in the DFC Project.
- **DFCs will enable modal shift of Freight traffic from road to rail from 30% to 45%, thus shifting cargo to a non-polluting greener transportation system.**
- Total 1,110 km of DFC has been completed in 2020-21 as per target set. Total length of DFCs of 2,843 km i.e. Ludhiana-Sonnagar (1,337 km) section of EDFC and entire WDFC (JNPT-Dadri 1,506 Km) is now targeted to be completed by June 2022



Improving Cleanliness Through Bio Toilets

As a part of "Swachh Bharat Mission", Indian Railways has completed installation of Bio Toilets on its entire fleet. This has ensured that no human waste is discharged from coaches on track. With this effort nearly 2,74,000 litres per day of excreta on tracks is being avoided. Additionally, human waste led corrosion of rails and fittings costing Rs. 400 crore per annum is also avoided. 73,078 coaches have been fitted with 2,58,906 Bio Toilets



Further, Indian Railways has planned to supplement the existing Bio Toilet system with Vacuum flushing system toilet (Bio-Vacuum Toilets), which substantially reduces the requirement of water for flushing, while ensuring effective flushing of fecal matter from the pans. Indian Railways have provided Bio Vacuum Toilet in total 1,372 LHB coaches and it has been decided to provide Bio Vacuum Toilets in AC LHB Coaches. Sanctions for 8,500 coaches are also available



Installation of Solar Plants Over Rooftops of Railway Buildings to Harness Clean Energy

IR is committed to contribute towards the improvement of the environment. In this direction, **it is focusing on environment friendly measures like use of renewable energy which includes wind and solar energy. IR has installed about 114 MW of solar rooftop plants in over 1,000 stations and 400 service buildings. IR plans to be a Zero Net Carbon Emitter by 2030.**



- IR plans to **set up solar plants on unused vacant Railway land** for meeting its traction power requirement. Railway plans to install 20 GW land based solar plants.
- To further proliferate these pilot projects, IR has initially planned to set up 3 GWp of land based solar plants in 3 phases.
- Further, IR also plans to take up a storage based solar project. This pilot project is taken up to manage peak demand management and solar peak generation management.
- A pilot project to procure renewable power in the round the clock mode to the tune of 150 MW is also being planned.



LED Lighting to Save Electricity

100% LED replacement done in all Railway stations (more than 8,000) and all Railway installations & buildings (more than 20,000) during 2014-20. All residential quarters (about 5 lakhs quarters) have also been converted to LED by May 2020



Plastic Bottle Crushing Machine at Stations

IR has taken various initiatives to reduce, recycle and dispose of plastic waste generated in stations in an eco-friendly manner. In order to give a further push to these environmental friendly initiatives of eco-friendly disposal of plastic waste, a comprehensive policy on installation of plastic bottle crushing machines (PBCM) at stations was introduced on 27 September 2019. The policy envisages to install and maintain Plastic Bottle Crushing machines at prominent locations at stations on a self-sustaining business model. A total of 585 PBCM machines have already been installed at more than 400 railway stations and more are in process.



Reducing Pollution by Shifting from Diesel Locos to Electric Locos

With increasing electrification, production of electric locomotives has been stepped up significantly in the last few years.



ELECTRIC LOCOMOTIVES PRODUCED

2013-14	2018-19	2019-20	2020-21	2021-22 (Planned)
264	605	784	721	905

More electric locomotives are being utilised for train operation and an equivalent number of diesel locomotives are being withdrawn from service. Reduced use of diesel locomotives for train operation has resulted in increased share of electric Gross Ton Km (GTKM) (around 77%) as compared to 65.4% during 2013-14 in haulage of freight trains and huge savings in diesel consumption.



New and Better Locos with Higher Energy efficiency

Indian Railways has awarded a contract for supply of 800 electric locomotives with 12,000 HP Insulated Gate Bipolar transistor based three phase propulsion technology. These locomotives are energy efficient and have digital tracking features. 106 of these have been inducted on IR to haul heavier freight trains at higher speeds. At full load, its efficiency is 87%. It has been decided to produce only 3 phase propulsion fitted electric locomotives in all three production units of Indian Railways.



Double Stack Container Trains Which Are More Energy Efficient

With these a single train (with same number of Locos) can carry much higher loads. Double Stack (DS) Long Haul Container Train Operation will have an enhanced axle load of 25 tons. The design will maximize capacity utilization, uniform distribution and point loading. This will result in reduction of carbon footprint, by efficiently carrying more load with optimal power utilisation.



- Higher horsepower 12,000 HP, 6,000 HP electric locomotives are being deployed for hauling double stack container trains in Western DFC routes having high reach OHE. Further, manufacturing of 200 indigenously developed 9,000 HP electric locomotives have been started by Chittaranjan Locomotive Works (CLW), to be turned out in next 2 years, for faster and energy efficient hauling of double stack containers.
- **The advantage of DS container operation is that in a single train instead of the 90 TEUs (twenty-foot equivalent unit) which can be transported, in a double stack train theoretically double this number can be transported by loading an additional tier of containers over the first stack. In practice, 160 TEUs are transported on an average in a DS train. Hence, a DS train is nearly 80% more efficient than a single stack train.**
- This helps in clearing more cargo per train which means higher throughput. Busy terminals in ports or inland container depots (ICDs) can be decongested faster. The cost of transportation becomes lower. This translates to commercial advantage in form of lower tariff for containers on the upper deck of a DS train. **This results in diversion of traffic from road to rail which is environmentally a better outcome.** Presently, less than 10% of the total container trains are DS because the required infrastructure in form of high rise OHE is not available. As the Western DFC gets progressively completed, this number would increase.

Focus on Increase in Freight Share as Freight Through Rail is More Efficient than Movement of Goods Through Roadways

Development of the **National Rail Plan (NRP)** for a future ready Railways with capacity ahead of demand. The NRP aims to create capacity by 2030 that would cater to a demand horizon up to 2050. The capacity so created would enable Railways to increase its modal share in freight transportation from 27% to 45%. **India has committed as part of its Nationally Determined Contribution (NDC) a reduction by 30% of emission per unit of GDP by 2030 and increasing Railways modal share in freight transportation is one of the constituents of this commitment.**



Increasing Freight Train Throughput Resulting in Improved Efficiency

With a view to increase the cargo carried in one freight train, Indian Railways has been working on increasing the load carrying capacity of its wagons. In this direction, IR has introduced more than 35 different types of wagons with axle loads of 25 Ton/22.9 Ton/22.82 Ton. This gives additional loading capacity compared to earlier wagons with 20.32 Ton axle load by 10-20%. Thus in one train 10-20% extra cargo could be carried, resulting in cost savings as well as reduction in emissions per Ton of cargo carried.



Further, in the year 2020, IR increased the speed of these 22.28 Ton and 22.9 Ton axle load wagons from 60 kmph to 75 kmph. This was achieved by conducting extensive speed and safety trials during the COVID-19 pandemic. Thus the trains would not only carry more cargo but also at a higher speed. Taking this initiative further, the proportion of these heavier axle load wagons would increase in future. The Dedicated Freight Corridors are constructed such that the wagons with axle load of upto 25 Ton would be capable of running at 100 kmph, thus giving faster turnaround in addition to the increased throughput



Movement of Freight, like Food Grains & Oxygen in pandemic, being more environment friendly as compared to Road transport

During the period April 2021 to May 2021 (upto 22nd), Railways moved 73 Lakh tonnes of food grains and has run 241 loaded Oxygen express trains of which 228 have reached destination since its start from 19th April, 2021, moving 922 loaded tankers, thereby transporting 15,046 tonnes of oxygen to various part of the country. **Movement of freight through Railways is more environment friendly as compared to Road transport.**



Introduction Of New And Environment Friendly Train Sets, Like Vande Bharat

1st train started from 17th February 2019 between Delhi-Varanasi and the 2nd train started on 5th October 2019 between New Delhi-Shri Mata Vaishno Devi Katra. **These trains are efficient and generate less pollution.** Further, orders for propulsion systems, for 44 rakes train sets have also been issued in February 2021 and accordingly production plan 2021-22 has been issued for manufacturing of 32 Trains sets coaches.



Passenger Trains Being Converted to MEMUs (Mainline Electric Multiple Unit) to Reduce Carbon Footprint

IR is gradually converting passenger trains to MEMU which is a cleaner and more efficient alternative, and also has a positive impact on the environment. During the period 01 April 2014 to 31 March 2021 about 350 passenger trains have been converted to MEMU



Faster, Cleaner & More Efficient Bullet Trains Being Introduced

High Speed Rail is considered to be an ecofriendly means of transport with much lower carbon dioxide emissions as compared to air or car travel. High speed rail produces only one-third of the carbon emissions of car travel and one-quarter the emissions of an equivalent trip by air per passenger. The Government of India has sanctioned the Mumbai-Ahmedabad High Speed Rail Corridor Project (508 kms)



Further, following seven high density passenger routes covering about 5,000 km have been identified for High-Speed Rail in the first phase for preparation of Detailed Project Report (DPR)

- ✦ Delhi - Varanasi (865 kms).
- ✦ Delhi - Ahmedabad (886 kms).
- ✦ Mumbai - Nagpur (753 kms).
- ✦ Mumbai-Pune-Hyderabad (711 kms)
- ✦ Chennai-Bangalore-Mysore (435 kms).
- ✦ Delhi - Chandigarh - Amritsar (459 kms).
- ✦ Varanasi-Patna-Kolkata (760 kms)

National High-Speed Corporation Ltd (NHSRCL) has been entrusted for undertaking preparation DPRs for these above corridors, which are expected to be completed by March 2022



Reducing Pollution By Recycling and Improved Efficiency During Production at Rail Wheel Factory (RWF), Bengaluru

Water self-sufficiency: Two new open wells have been sunk and four old open wells have been revived by creating an Eco Zone with water bodies around them for recharge. Water bodies are used to store rainwater. This along with conservation and recycling of water has made RWF self-sufficient in daily process water requirement of 2-3 lakh litres. Various water conservation efforts across plant and colony has resulted in annual savings of about Rs 1.7 crore in water bill.

Resource conservation- About 28 tons of foundry grade sand is used daily in the Wheel Shop of RWF. As an effort to conserve this scarce natural resource, a thermal sand recycling plant has been commissioned in 2020 which has reduced the requirement of fresh sand considerably. So far, over 5,000 tons of sand has been recycled. RWF has also taken up co-processing of several of its process waste.

Mechanisation of scrap wheel cutting: Indian Railways is recycling its end of life wheels and axles for casting new wheels. These are collected from all over Indian Railways and cut manually into pieces for charging into electric arc furnaces. To mechanise this cutting work an in-house prototype has been successfully developed by RWF in January 2020. This system has been fine tuned and has cut over 9,700 tons of scrap wheels and axles. This mechanisation will make the process more efficient as well as safer for the staff involved in the work. Five more machines are planned to be introduced this year.

Commissioning of Fume Extractor: Secondary fume extractor system was commissioned in the Steel Melt Shop at Rail Wheel Factory in 2017-18 to mitigate particulate matter emission of about 3-4 tons every week from the three electric arc furnaces.

Conversion of furnaces fuel to PNG: Furnaces in the Axle and Wheel shops of RWF have been converted from High Speed Diesel to Process Natural Gas fuel over the last 3 years. The biggest normalising furnace of Wheel Shop is underway. This will reduce the stack emissions of RWF.

New Technology Compactor Dustbins to Promote Cleanliness

Dustbin facilities in AC coaches were already in process. From 2015, provision of dustbin started in non AC coaches under mission Swachh Bharat. A new concept of compactor dustbins is being introduced wherein the garbage will be compressed to ensure that dustbin can take garbage multiple times of its capacity. This is being installed in LHB Coaches to ensure cleanliness and provide this high capacity dustbin. It has been decided to place a centralised supply contract from the board. Tenders have been opened and bids are under scrutiny for 17,458 dustbins (8,729 coaches). Sanctions are available for 15,000 LHB coaches



Toilets for Loco Pilots

This is an important step in addressing waste management, as currently Loco staff has to go to other locations or tracks, and this step will provide them with a clean and environment friendly toilet facility. Around 45 electric and diesel locomotives have been provided with water closet facilities for Loco Pilots (Lps). Further, over 300 new diesel locomotives rolled out from Marhowra plants are fitted with urinals for LPs. Passenger electric locomotives do not have space for providing toilets. Efforts are on to address the concerns raised by Zonal Railways on cleanliness, hygiene and train operation requirements



Integrated Mechanised Cleaning At Stations

Until 2015, cleaning of different parts of the stations were being done by separate agencies. To make the process more effective, use of machines was gradually encouraged. Further, the integrated mechanised cleaning of selected stations was started to ensure integrated cleaning of all parts of the station with the use of the latest cleaning machines such as high pressure jet cleaners, floor scrubbers etc



- Mechanized cleaning contracts have been provided at around 950 stations, increasing from around 450 stations in 2014. Separate dust bins for wet and dry waste have been provided at all major stations for segregation of waste at source.
- Use of CCTVs has been intensified for monitoring of cleanliness activities at about 700 stations, increasing from 250 stations in March 2015. These measures have improved cleaning standards at the stations and passenger's perception.



Mechanised Cleaning of Coaches to improve cleanliness and reduce water wastage

Mechanised Cleaning of Coaches is being carried out through around 160 coaching depots. Machines like high pressure jet cleaners, floor scrubbers, wet and dry vacuum cleaners, hand held buffing machines, etc. are deployed for the purpose. Exterior cleaning of coaches is done mainly by high pressure jet cleaning machines and large brushes on washing lines (pit line) at coaching depots



Installation Of Automatic Coach Washing Plant (ACWP) to Save Water

To provide infrastructure for major coaching depots for exterior cleaning of trains with substantial reduction in water consumption and saving in man power. Automatic Coach Washing Plants (ACWP) are now being installed at major depots. Exterior cleaning of coaches is done while placing the rake on washing lines (pit lines) through ACWP. ACWPs not only clean the exterior of coaches more effectively and efficiently, they also reduce the direct water requirement by avoiding wastage. These also come with water recycling facilities thereby further reducing water requirements



Location Identified	126
Location installed	29
No. of Locations for which PO issued by COFMOW	59
Locations for which work awarded by Railways	10
Locations under the stage of work before award	8
Locations for which work has been sanctioned	12
Locations under process for sanction	8

Further, work is under process to get these plants installed at 69 additional locations in addition to already installed at 29 Locations

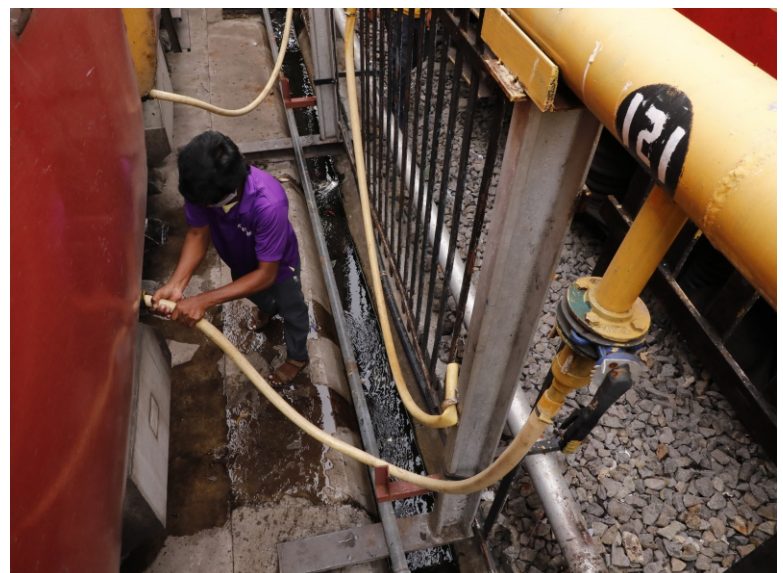
- Normal Water consumption without ACWP - 1500 litres per coach
- Water consumption for cleaning with ACWP - 300 litres per coach only.
 - ⇒ Recycled water use - 80% (240 litres)
 - ⇒ Fresh water additional required - 20% (60 litres)
- Net water requirement per coach - 60 litres. **Net saving in water consumption with ACWP - 96% reduction in water consumption.**
- **Estimated annual savings of water- 1.28 Crore Kilolitres**

Pressurised Water Filling to Save Time and Reduce Wastage of Water

To facilitate full watering of complete rakes within 8-10 Minutes, quick watering arrangement is now functional at identified stations to ensure potable water in coaches, which also eliminates wastage of water due to overflowing



Location Identified	158
Location installed	71
No. of Locations for which tender has been awarded	57
Locations under tendering	4
Locations for which estimate has been sanctioned	3
Locations for which detail estimate is under preparation	13
Locations under process for sanction	10



Rainwater Harvesting to Conserve Water

To promote water conservation, Indian Railways has been providing Rain Water Harvesting system (RWHs) at various locations as per extant policy.



- **Rain Water Harvesting system (RWHs) is being provided in all establishments having rooftop areas of more than 200 square meters.**
- RWHs has been made mandatory in all new constructions of built up assets like service buildings, hospitals, station buildings (including remodelling, etc.), railway quarters, workshops/sheds, yard modelling as also in doubling, new line and gauge conversion and sidings. With consistent effort of zonal Railways, 6,112 Rain Water Harvesting systems have been installed in Railways up to March 2021



Elimination of Level Crossing (LC) Leading to Less Stoppage and Faster Movement

After 2014, elimination of manned LCs was given focussed attention, and now about 1,000 manned LCs are being removed every year. Elimination of LCs has huge benefits of fuel saving for road vehicles



Level Crossings removed

2013-14	2020-21	% Growth
301	961	219%

- Average detention of about 15 minutes is caused to road traffic at level crossing during the passage of trains. These vehicles comprising both heavy duty and light vehicles then crawls till crossing the level crossing due to traffic congestion. During this movement, toxic fumes in the form of vehicle exhaust - mainly carbon monoxide, Nitrogen oxide & Hydrocarbons, etc are released into the atmosphere besides high consumption of fuel. Recognising the importance of reduction in vehicular pollution at Level crossings, Railways is striving to reduce the number of level crossings by replacing them with Road over/under bridges with the participation of concerned state.
- Since 2014, Railways have eliminated 4,544 manned LCs in the last 7 years of which 2,234 manned LCs eliminated during the last two years.

E-tendering to reduce the use of paper

Before 2014, E-tendering was being adopted only for supply tenders in zonal headquarters. Supply tenders in field units were being issued in printed forms. All tenders for works, services and earning/ leasing tenders were also being issued in printed forms



- Since 2014, Railways undertook multiple initiatives to digitize all procurement and supply chain activities making it paperless in a phased manner. Digitisation of procurement processes and online interaction with vendors has eliminated any requirement to visit Railway offices by vendors which has reduced fuel consumption at vendors' end. Energy requirement and upkeep of offices has also improved due to elimination of physical files.
- On an average around 4 lakh tenders are issued every year in Railways. Above digital initiatives have resulted into consumption of paper and ink not only in Railways but at the vendors' end also in various activities related to around 4 lakh tenders annually.
- Tender committee proceedings & minutes and acceptance of tenders was being done on physical files. Material inspection certificates, supply acknowledgements, supply acceptance certificates and contractors' bills were being issued in printed forms. Demands for procurement of materials, issue tickets for drawl of material and maintenance of stock ledgers at user end were in physical mode. Process of vendor approval including applications by vendors and approval process in Railways was completely manual on printed forms and files.
- E-tendering for all tenders including supply tenders in Headquarters and field units (Divisions & workshops), works tenders, services tenders and earning/ leasing tenders have been implemented in all units of Railways.
- Besides tendering all other activities related to procurement and supply chain have also been digitized and made paperless. Tender committee proceedings, tender acceptance, material inspection certificates, supply acknowledgement certificate, supply acceptance certificates, contractors' bills, material issue tickets by users, etc. have been digitized and are being done in paperless mode.

Demands for procurement of materials, issue tickets for drawl of material and maintenance of stock ledgers at user end have been digitized fully and made paperless. Entire process of vendor approval including application for approval by vendors in Railways has been digitized.

Travelling Ticket Examiners (TTEs) Now Use Handheld Devices To Save Paper

550 HHTs (Hand Held Terminals) have been provided in Rajdhani, Shatabdi & Gatimaan Express. Further procurement of 10,000 more HHTs is under process.



- In addition to HHTs, more than 13,000 Portable POS have been provided to TTEs for digital transactions. Provision for ticket checking through QR code on tickets has been implemented in HHT Application.
- Instructions have been issued to discontinue pasting of reservation charts outside the reserved coaches from 01 September 2018. Further, display of physical reservation charts has also been dispensed with for those stations where electronic chart display facility is available.



Removal of Physical Timetable

IRCTC has been advised to devise an application to provide information contained in Trains at a glance in electronic form for dissemination time table related information to travelling public.



E-Ticketing to reduce the Usage of Paper

The percentage of share of Passenger Reservation System (PRS) counter tickets has progressively decreased from 60% in 2011-12 to 27% in 2019-20 in pre-COVID times & to 20% in 2020-21. Also, total transactions at PRS counters have also decreased from 17.8 crore in 2011-12 to 11.3 crore in 2019-20 in pre COVID times & to 4.4 crore in 2020-21. Additionally, since the requirement for physical print out of e-tickets has been dispensed, e-ticketing is now paperless and has become popular amongst passengers.



11-May-2020 [14:38:28] **ALERTS** A A A* CONTACT US REGISTER **LOGIN** AGENT LOGIN ASK DISHA हिंदी

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Batteries Made Efficient

On an experimental basis, RDSO has given go-ahead for providing Lithium Ion phosphate batteries in 2 coaches, which will be scaled up further. These batteries are lighter in weight and size with longer codal life



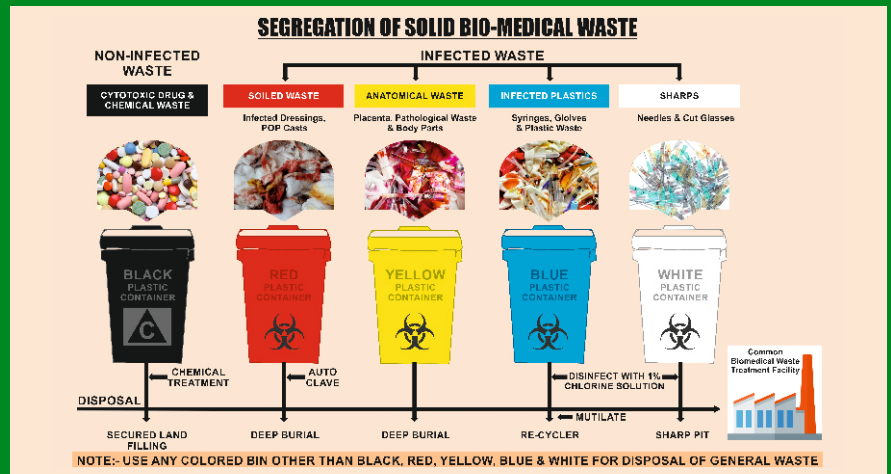
Acs Made Better with Optimal Temperatures and Newer Technology

For improving energy efficiency of the equipment used in IR, a policy decision has been taken to use equipment with a rating of 3 stars and above. In this regard, directions have been issued to the railways. For ACs in buildings, directions have been issued for temperature settings to be maintained between 24 degree Celsius to 26 degree Celsius. This will help in improving energy efficiency and energy consumption. RDSO has finalised technical specifications for AC coaches which have inverter based compressor and reverse cycle features.



Hospital and colony waste management for a cleaner environment

Biomedical waste management is an important responsibility of hospitals in order to eliminate or reduce the risk of infections produced from the waste products generated during patient care in hospitals. Especially the infectious waste which contains sharps/human blood or body fluid/body parts/used disposables.



- The Central Pollution Control Board issues policy which is implemented by individual states through Biomedical Waste Rules.
- Waste is segregated at the point of generation at various sites in OPD/Injection Clinics/wards/operation theatres. Bio-medical waste is put in colour coded bins with polythene bags (yellow, red and blue) and black bins for general waste as per latest guidelines of State Pollution Control Board. The sharp wastes like needles/blades are collected in puncture proof containers. The bio-medical waste is then collected at a centralised biomedical waste collection point in the hospital, where it is kept, segregated and collected by the biomedical waste disposal agency nominated by state authorities.
- All 128 Hospitals and 586 health units of Railways follow proper biomedical waste management as stipulated by the state pollution control board.
- Colony waste management: All Railway colonies which are managed by the medical department, waste generated in the colonies are segregated and disposed off at the state authorised sites.

Plan Bee of the Indian Railways

A large portion of Indian Railways track passes through vast areas of forest land which are home to various wild animals including elephants. Elephant dashing with trains is a serious threat for passengers and for elephants which are a protected species under the Wildlife Protection Act.



Plan Bee is an innovative method of Indian Railways for prevention of elephants dashing with trains. Amplified Honey Bee sound is used for the purpose to move elephants away from train tracks. This is very effective and helpful in diverting herds of elephants, especially when trains are approaching. Due to this initiative, dashing of elephants near the Level Crossing Gates has been reduced to zero. Till May 2021, more than 950 elephants are saved all over Indian Railways due to Plan Bee since the initiation of the program in 2017.



Decongesting the BG 3 elephant corridor in the Alipurduar division of NFR

The elephant corridor in BG 3 section of Alipurduar division of NFR has been decongested by construction of an innovative 6 km long Y leg between the Main line and the BG4 sections in 2016. It has improved the operational efficiency and protected the elephant population in North Bengal. Increased operational efficiency has also resulted in better environment protection as detention of trains has also reduced significantly. It has also helped in proper implementation of the Supreme court's decision of 2013 for decongesting the BG 3 section with a view to provide protection to the elephant population. The percentage of trains run via Y leg went up from 28% to 68% between 2016 and 2019. The average line capacity utilisation of BG 1 section has reduced by 25 to 32%. **This has resulted in the possibility of diverting trains away from BG3 to BG1. The elephant corridors in BG3 are therefore safer for the elephants as well as for the passengers**



Green Certifications and implementation of Environment Management System

MoU signed between IR and Confederation of Indian Industry in July 2016 for facilitation of Green initiatives on IR. 39 Workshops, 7 Production Units, 8 Loco Sheds and one Stores depot have been 'GreenCo' certified. These include 2 Platinum, 15 Gold and 18 Silver ratings.



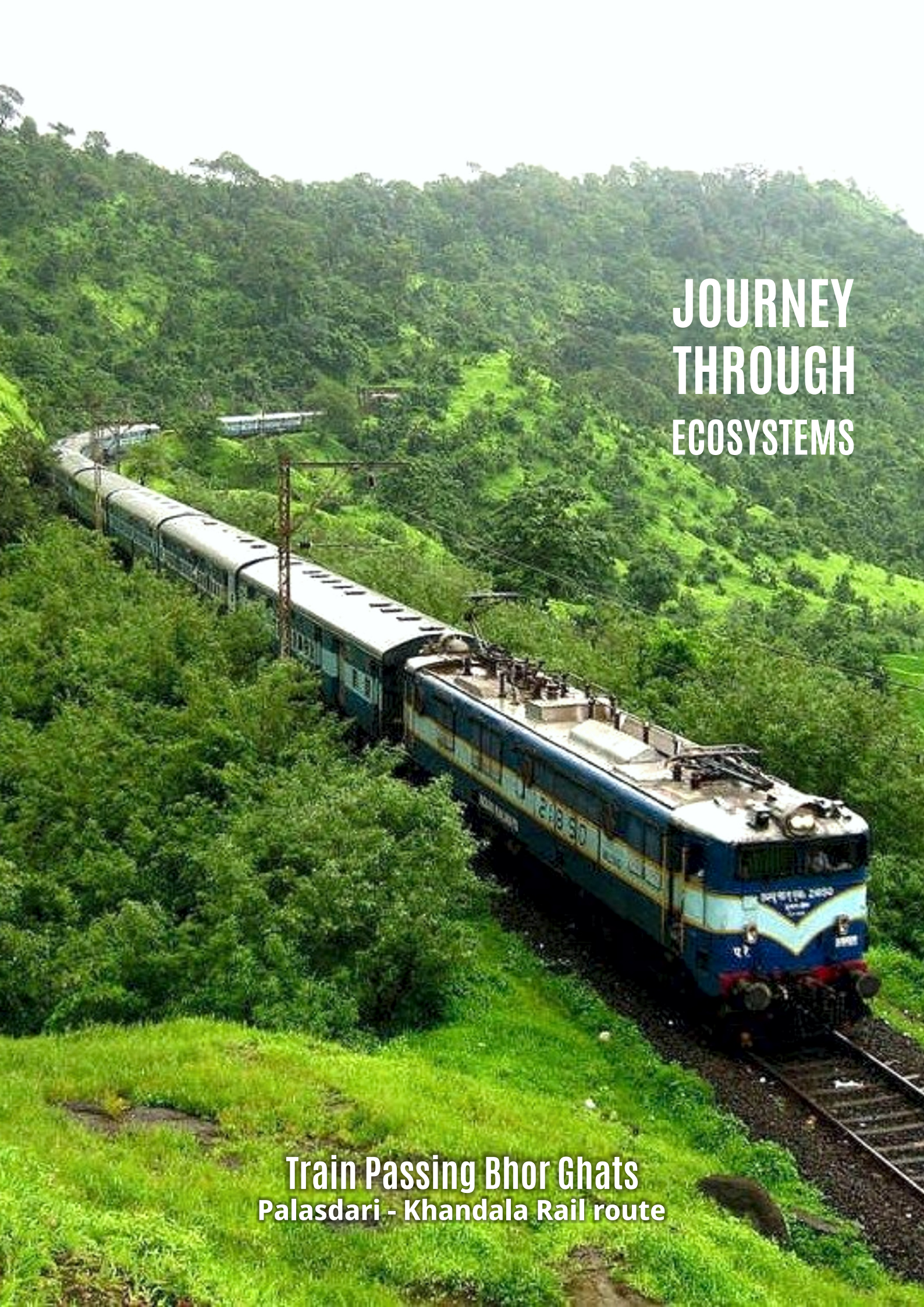
- Green certification mainly covers assessment of parameters having direct bearing on the environment, such as, energy conservation measures, use of renewable energy, Green House Gas emission reduction, water conservation, waste management, material conservation, recycling etc.
- 19 Railway Stations have also achieved **Green Certification** including 3 Platinum, 6 Gold and 6 Silver ratings. 27 more Railway Buildings, Offices, Campuses and other establishments are also **Green certified** including 15 Platinum, 9 Gold and 2 Silver ratings.
- In addition, over 600 Railway Stations have been certified for implementation of the Environment Management System to ISO: 14001 in the last two years. A total of 718 stations have been identified for ISO: 14001 certification.



Third party Audit/Survey including Passenger feedback on Cleanliness

Independent third party audit-cum-survey of Cleanliness standards including passenger perception on Cleanliness of 407 major Railway stations was carried out first time in 2016 and repeated in 2017 and 2018. In 2019, this survey was carried out at 720 Stations. Third party audit-cum-survey on Cleanliness of 209 important trains covering 485 rakes was completed first time on IR in 2018, including a survey by independent auditors travelling on all rakes in both directions and passenger feedback. Such surveys provide independent assessment and also instill a sense of healthy competition among Railways in improving cleanliness standards in passenger interface areas.



A high-angle photograph of a train traveling through a dense, green forest on a hillside. The train consists of a blue and white electric locomotive at the front, followed by several green passenger coaches. The locomotive has the number '4350' visible on its side. The train is moving along a track that curves through the forest. The surrounding landscape is covered in lush green vegetation, including trees and grassy slopes. The sky is bright and clear.

JOURNEY THROUGH ECOSYSTEMS

**Train Passing Bhor Ghats
Palasdari - Khandala Rail route**



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