

MINISTRY OF RAILWAYS

Initiatives of Indian Railways on Climate Change

Transport Sector

- Key driver of economic growth and social development of the country
- Major Energy Consumer in the country
 - > 50 % of total petroleum consumption
 - > 25 % of overall energy needs
- 13 % GHG emissions are from Transport Sector using Fossil fuels –approx 140 million tons of CO₂ equivalent in 2007

Energy Consumption by Railways

During 2013-14 Railway consumed

- 2.8 Million Litres of HSD Oil for Traction
 - 3.4 % of National Consumption and 6.0% of transport sector consumption
- 14.4 Billion Units of Electricity for Traction
 - 1.8 % of National Consumption

GHG Emissions from Transport Sector (Mt. of CO₂)

Sector	Passenger Traffic (Share in %)			Freight Traffic (Share in %)		
	2005	2010	2015	2005	2010	2015
Road	83.67	84.69	84.81	57.16	58.29	60.51
Rail	15.84	14.60	14.34	42.82	41.69	39.47
Aviation	0.50	0.71	0.85	0.02	0.02	0.02

Comparison of Energy intensity in various modes

- Railways is the most energy efficient mass transport system

• Energy intensity comparison 2004-05

Pass.	Railways	Taxis	Bus
Ton Joule/ BPKM	71	1338	196
Freight	Railways	HCVs	
Ton Joule/ BTKM	91	1125	

Railways is 2.8 times energy efficient in Pass. Traffic and 12.4 times in Freight Traffic

Improvement in Emission Intensity & GHG mitigation programmes over IR

	tCo2/million GTKM	% reduction	Annual savings in million tCo2
2005	12.40	Base year	Base year
2014	10.82	12.7	3
2020	9.44	23	9
2030	8.35	31	23

GHG Mitigation strategies for I R

- Debottlenecking the existing network
- Strengthening the existing network
- Augmentation of network
- Energy efficient operation
- Renewable and Alternate sources of Energy

Mitigation Strategies – Passenger Traffic

- Increasing frequency, speeds & throughput of passenger traffic by Rail mode through capacity augmentation
- Use of MEMU/DEMU as better option for medium distance transport
- Introduction of High Speed Rail service(HSR)

Mitigation Strategies – Freight traffic

- Stepping up rail share is the need of hour
 - Share of rail in freight decreased from 80% in 1950-51 to 36% in 2013-14
 - But absolute freight traffic increased from 44 BTKM in 1950-51 to 601 BTKM in 2009-10
- Dedicated Freight Corridor
 - 3376 km of Eastern and Western corridors by 2020
- Electrification – 10000 KM by 2020, further 15000 KM by 2030

Other important augments-----

- Doubling - 10000 km by 2020
 - Further 16000 km by 2030
- Gauge Conversion – 3500 km by 2020
- New lines - @ 400 km p.a. up to 2020
 - @ 500 km p.a. up to 2030

Rolling Stock augmentation

- 4000 locomotives to be manufactured/ procured by 2020, further 7500 by 2030
- 9000/12000 hp energy efficient electric locos and 6000 hp state of the art diesel locos to be inducted.
- To procure 83000 wagons by 2020, further 195000 by 2030
- To manufacture/procure 34000 coaches by 2020, further 83000 by 2030
- To introduce distributed powered electrical multiple unit train sets

Projected Traffic Growth in Rail Mode

- Passenger traffic set to grow at CAGR 6% from 1158 BPKM in 2013-14 to 2904 BPKM by 2029-30.
- For freight transport the traffic will grow at CAGR of 8 % between 2013-14 and 2029-30 from 666 BTKM to 2158 BTKM
- This is in line with Low Carbon Strategies for Inclusive Growth report of the Planning Commission (2014)

Mitigation measures

Energy Efficiency – Diesel Traction

- Improvement in Fuel Efficiency–
 - Passenger Traffic- 5.37% by 2020 compared to 2013-14 and further 4.23% by 2030
 - Freight traffic- 3.71% by 2020 compared to 2013-14 and further 3.86% by 2030
- Provision to handle Hotel load by Diesel Locomotives
- Guidance for optimised Loco Driving (GOLD)
- Alternative Fuels in Traction
- Other Diesel engine specific Improvements

Energy Efficiency – Electric Traction

- Improvement in Energy Efficiency–
 - Passenger Traffic-2.12% by 2020 compared to 2013-14 and further 2.7% by 2030
 - Freight Traffic-7.22% by 2020 compared to 2013-14 and further 6% by 2030
- Switch over to 3 phase energy efficient Locomotive / EMU technology
- Introduction of latest Energy Efficient Locomotive technology
- Regenerative Braking features
- Hotel load provision in locos
- Energy cum speed Monitoring System (EMSON) for energy efficient driving

Efforts on improving Energy efficiency Trailing Rolling Stock

- Pay load to tare ratio to be increased- 3.44 to 4.0/4.21
- Commodity specific wagons for better through put & logistic advantages for customers
- S.S. Coaches with higher C.C. To improve PKM to GTKM ratio

Energy Efficiency on Non-Traction side

- Many of GOI initiatives on energy efficiency to be adopted /intensified
- Green building concepts to be inducted in an appreciable manner

Use of Renewable Energy Sources

- Commitment to source at least 10% of electric energy through Renewable
- Includes 1000 MW of solar energy & 170 MW of wind energy

Bio – Toilets

- Developed indigenously with DRDO
- 17388 bio toilets installed in about 7000 coaches upto 2014-15
- 17,000 bio toilets to be fitted in 2015-16
- 4711 bio toilets fitted in 1347 coaches up to Aug. 2015
- All coaches to be fitted with bio toilets by 2021-22
- Kanalas- Dwarka- Okha – is the first section with zero train toilet discharge

Water Management

- Water Recycling Plants provided at 29 locations resulting in savings of 12 million litres of water per day.
- Further plans to set up WRPs at 32 major stations and 10 coaching depots.
- Rain Water Harvesting systems provided at 1864 locations across the IR and 326 more locations planned by 2015-16.
- Water Audit planned at 152 major stations in 2015-16 to achieve reduction of losses/leakages and to identify conservation measures.

Other Green Initiatives

- Waste to Energy conversion plants planned at major coaching terminals for disposal of solid waste in environment friendly manner. One pilot plant to be set up within a year
- Green Buildings
 - Rail Nirman Nilayam at Secundrabad, the first Green Building of IR, is accredited as 3 star rated building under GRIHA.
 - IRICEN New Administrative Building constructed as a Green Building is accredited as a Platinum rated building by LEED-INDIA and 5 star rated building by GRIHA.
- 40600 hectare of railway land is under afforestation. About 61 lakhs saplings planted in 2014-15

- Investing in Railways is necessary for India's ecological sustenance.
- Hon' ble Minister for Railways Sri Suresh Prabhu said during his Rail Budget Speech (Feb. 2015)

"Investment in Indian railways is an investment in our future. It is an investment in our sustainability. It is an investment for posterity."

Thank
You