

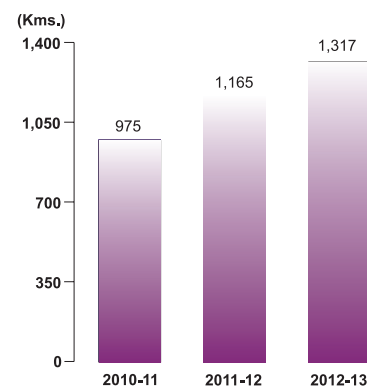
Railway Electrification

I Executive Summary of Railway Electrification

With a view to reduce the Nation's dependence on imported petroleum based energy and to enhance energy security to the Country, as well as to make the Railway System more eco-friendly and to modernize the system, Indian Railways have been progressively electrifying its rail routes.

In pre-independence period, electrification remained confined to 388 Route Kilometers (RKms) and it is only in the post independence period that further electrification was taken up. While, 1,810 RKms were electrified during Xth five year plan (2002-07), the progress increased to 4,556 RKms in the XIth plan, 2007-12 (against the target of 4,500 RKms). In XIIth plan(2012-17), the target has been further enhanced to 6,500 RKms, out of which, 1,317 RKms were electrified in the first year of XIIth plan i.e. (in 2012-13) as against the proportionate target of 1,300 RKms. By March 2013, electrification on Indian Railways has been extended to 31.92% of total rail network. On this electrified route, 65.60% of freight traffic and 50.40% of Passenger traffic is hauled with fuel cost on electric traction being merely 38.72% of the total traction fuel cost on Indian Railways.

**RAILWAY ELECTRIFICATION
(ROUTE KILOMETRES)**



II Plan Period wise Progress of Railway Electrification

S.N	Plan Period	RKM Electrified
1.	Pre-Independence –1925-1947	388
2.	1st Five Year Plan – 1951-56	141
3.	2nd Five Year Plan – 1956-61	216
4.	3rd Five Year Plan – 1961-66	1678
5.	Annual Plan - 1966 – 69	814
6.	4th Five Year Plan – 1969-74	954
7.	5th Five Year Plan – 1974-78	533
8.	Inter Plan – 1978-80	195
9.	6th Five Year Plan – 1980-85	1522
10.	7th Five Year Plan – 1985-90	2812
11.	Inter Plan – 1990-92	1557
12.	8th Five Year Plan – 1992-97	2708
13.	9th Five Year Plan – 1997-02	2484
14.	10th Five Year Plan –2002-07	1810
15.	11th Five Year Plan – 2007-12	4556
16.	12th Five Year Plan – 1st year 2012-13	1317



Under construction Rail Flyover at Tundla, North Central Railway



OHE erection and installation of Diamond Crossing, South Eastern Railway



Casting of Wheels at RWF for Wagon builders and ROH/POH of wagons/coaches



A view of 4 Beam Headlights to Improve Proper Visibility at Curvature Locations- Designed And Developed East Coast Railway

III Sections Opened for Electric Traction After Inspection by Commissioner of Railway Safety in 2012-13.

S.No.	Section	Railway	State	RKM
1.	Chhapra Kachehary-Barauni via Shahpur Patoree	ECR	Bihar	146
2.	Indore-Ujjain & Dewas -Maksi	WR	Madhya Pradesh	116
3.	Trivendrum-Kanyakumari	SR	Kerala & Tamil Nadu	87
4.	Nagarcoil-Tirunelveli	SR	Tamil Nadu	72
5.	Tamluk- Digha	SER	West Bengal	89
6.	Moradabad-Lucknow-Mughulsarai	NR	Uttar Pradesh	645
7.	Suchipind - Chakki Bank	NR	Punjab & Himachal Pradesh	107
8.	Shakurbasti- Rohtak	NR	Delhi, Haryana	60
9.	Jhansi- Moth	NCR	Uttar Pradesh	55
10.	Kaddapa-Muddanur	SCR	Andhra Pradesh	63
11.	Chhapra Kachehari- Chhapra	NER	Bihar	03
12.	Gokulnagar-Joypur-Maynapur	ER	West Bengal	06
13.	Talpur-Arambag	ER	West Bengal	20
14.	Total			1469

IV Completion of 'B' Route Electrification from Amritsar to Mughalsarai, via Moradabad, Lucknow

In the year 2012-13, Railway Electrification of Moradabad-Lucknow-Mughalsarai section via Utratia (645 Route KMs) has been completed, with which the complete 'B' route from Amritsar to Mughalsarai (1,168 Route KMs), has been put on electric traction. This would de-congest the heavily saturated "A" route from New Delhi to Mughalsarai via Kanpur and Allahabad, providing an alternative route. More number of goods trains carrying important commodities like steel, iron, ore, food grains, coal and other coaching trains can be run after electrification.

V DC-AC conversion in Mumbai area of Western & Central Railways

Initial electrification in India was on 1500 volt DC which included Mumbai Division of Western Railway and Mumbai, Pune Divisions of Central Railway. Electrification in Indian Railways started on 1500 volts DC on the sub-urban system

of Central Railway with first electric train running on the historic day of 3rd February, 1925. Subsequently, Western Railway was electrified on 1500 volt DC in the year 1928. Electrification of Howrah-Burdwan section was taken up on 3000 V DC during the First Five Year Plan and the same was completed in 1958. Changing times and a series of events led Indian Railways to switch over to 25000 volt AC electrification; the first section being Raj Kharswan- Dongaposi of South Eastern Railway in the year 1960. Howrah-Burdwan of Eastern Railway & Madras Beach-Tambaram sections of Southern Railway were subsequently converted to 25000 volt AC by the year 1968.

Post independence, the electrification was done on 25000 volt AC, which was a far superior technology, keeping in pace with the changing times. In the year 1996-97, decision was taken to convert Mumbai Division of Western Railway and Mumbai & Pune Divisions of Central Railway from 1500 volt DC to 25000 volt AC. The complete section of Western Railway from Virar to Churchgate was converted from 1500 volt DC to 25000 volt AC on the historic date of 5th February, 2012. This work, of very complex nature, was carried out in the busiest suburban section of Mumbai Division of Western Railway without any disruption to traffic or causing inconvenience to the commuters, with daily ridership of approximately 3.48 million. This has resulted in reduction in cost of operation apart from improving speed and sectional capacity. This project has also helped to induct more suburban services, augmentation of suburban services from 9 car to 12/15 car services, thereby leading to substantial improvement to commuter's comfort and satisfaction. This has also resulted in reduction in maximum power demand by 20% to 25% for same level of traffic, reduced transmission line losses, improved energy efficiency, reduced energy consumption due to regenerative braking.

On the Central Railway system, which is much bigger than the Western Railway system, 61.5% of the physical work has been completed with conversion of Vasai-Diva-Jasai, Panvel-Karjat, Pune-Kalyan, Igatpuri-Kalyan, Karjat-Khopoli, Kalyan-Diva (5th & 6th line) on 25000 volt AC. Work is in progress for completing the balance portion.



DC-AC conversion work in progress on Central Railway



15-car EMU rake

VI Major New Electrification Works Sanctioned in 2012-13, under planhead- Railway Electrification.

S.N.	Section	RKM	Railway	State
1.	Andal-Sitarampur via Jamuria-Ikra and Sripur	57	Eastern	West Bengal
2.	Coimbatore North – Mettupalayam	33	Southern	Tamil Nadu
3.	Manheru -Hisar	74	North Western	Haryana
4.	Jharsuguda-Sambalpur-Titlagarh section including Jharsuguda-Ib (Bye-Pass) line	238	East Coast	Odisha
5.	Kumedpur-Malda-Singhabad and Pakur-Malda	153	Eastern & Northeast Frontier	West Bengal, Jharkhand
6.	Guntakal-Bellary-Hospet section including Tornagallu-Ranjitpura branch line	138	South Central & South Western	Andhra Pradesh & Karnataka
7.	Itarsi-Katni-Manikpur-Chheoki including Satna-Rewa	653	West Central & North Central	Uttar Pradesh & Madhya Pradesh
8.	Sambalpur-Angul	156	East Coast	Odisha
9.	Garwa Road-Chopan-Singrauli including Karaila Road-Shaktinagar	257	East Central	Uttar Pradesh, Jharkhand & Madhya Pradesh
10.	Nallapadu-Guntakal including Gooty-Pendekallu	426	South Central	Andhra Pradesh
11.	Amla-Chhindwara-Kalumna	257	Central & South East Central	Madhya Pradesh & Maharashtra
12.	Total	2442		



Train passing through tallest railway viaduct over Panvalnadi near Ratnagiri Station on Konkan Railway route