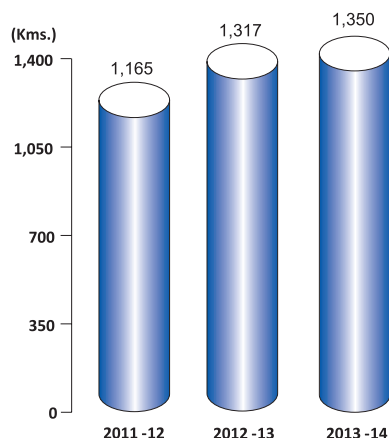


## RAILWAY ELECTRIFICATION (ROUTE KILOMETRES)



# 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 the Country's energy security, 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, 2,667 RKMs have been electrified in the first two years of XIIth plan i.e. (in 2012-14) as against the proportionate target of 2,600 RKMs. Upto March 2014, 24,891 RKMs\* of the total Railway network has been electrified. On this electrified route, 66.5% of freight traffic and 51.40% of Passenger traffic is hauled with fuel cost on electric traction being merely 30.99% of the total traction fuel cost on Indian Railways.

## 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	1,678
5.	Annual Plan - 1966 – 69	814
6.	4th Five Year Plan – 1969-74	953
7.	5th Five Year Plan – 1974-78	533
8.	Inter Plan – 1978-80	195
9.	6th Five Year Plan – 1980-85	1,522
10.	7th Five Year Plan – 1985-90	2,812
11.	Inter Plan – 1990-92	1,557
12.	8th Five Year Plan – 1992-97	2,708
13.	9th Five Year Plan – 1997-02	2,484
14.	10th Five Year Plan –2002-07	1,810
15.	11th Five Year Plan – 2007-12	4,556
16.	12th Five Year Plan – 1st year 2012-13	1,317
17.	2nd year of 12th Five Year Plan	1,350
18.	<b>Grand Total</b>	<b>25,034</b>



*Railway Electrification Works In Progress In Shoranur-Kozhikode Section, Southern Railway*

\*Note : (Exclusive of Dismantled MG Electrified line of 168 RKM on Southern Railway & inclusive of 25 RKM of Kolkata Metro in 11<sup>th</sup> Five Year Plan)

### III Sections Opened for Electric Traction After Inspection by Commissioner of Railway Safety in 2013-14.

S.No.	Section	Railway	State	RKM
1.	Pandabeswar-Kachujor	ER	West Bengal	23
2.	Moth-Govindpuri	NCR	Uttar Pradesh	174
3.	Dindigul-Madurai-Virudunagar	SR	Tamil Nadu	103
4.	Tandur-Wadi	SCR	Andhra Pradesh and Karnataka	68
5.	Muddanuru-Guntakal	SCR	Andhra Pradesh	120
6.	Bharuch-Samni-Dahej	WR	Gujarat	64
7.	Chakki Bank-Pathankot	NR	Punjab	6
8.	New Morinda-Sanehwal	NR	Punjab	52
9.	<b>Total</b>			<b>610</b>



Staff seen Carrying out Maintenance Work on Electrical Over Head Equipment on South Central Railway

### IV Completion of Electrification from Jhansi to Kanpur to connect two trunk routes i.e Delhi-Jhansi-Chennai and Delhi-Kanpur-Howrah on electric traction

In the year 2013-14, Railway Electrification of Kanpur-Jhansi broad gauge single line section of North Central Railway, covering 231 route kilometers and passing through the State of Uttar Pradesh has been completed. This important rail route connects industrial city of Kanpur (on electrified Delhi-Howrah trunk route) with Jhansi (on electrified Delhi-Chennai trunk route). This has resulted in seamless flow of electric trains in this section as traction changes/detentions at Kanpur and Jhansi ends is eliminated. This route is also important as coal rakes to thermal power plant at Parichha can be fed by seamless electric traction. Important passenger trains running on Kanpur-Jhansi section are Pushpak Express, Lucknow Garibrath Express, Rapti Sagar Express, Gorakhpur Express, Udyog Nagari Express, Jhansi-Lucknow Intercity Express, Lucknow Super Express, Pune-Lucknow Express, Barauni Mail, Yeshwantpur-Gorakhpur Express, Lokmanya Tilak-Sultanpur Express, Sabarmati Express, Kushinagar Express, Indore-Patna Express etc.

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

Initial electrification in India was on 1500 volt DC which included Mumbai Division of Western Railway and Mumbai,



*Railway Electrification Works In Shoranur-Kozhikode Section, Southern Railway*

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 and 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 and 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 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 and reduced energy consumption due to regenerative braking.

On the Central Railway system, which is much larger than the Western Railway system, 82.31% of the physical work has been completed with conversion of Vasai-Diva-Jasai, Panvel-Karjat, Pune-Kalyan, Igatpuri-Kalyan, Karjat-Khopoli, and Kalyan-Thane(exclusive).-Lokmanya Tilak Terminus on 25000 volt AC. Work is in progress for completing the balance main line portion up to Chatrapati Shivaji Terminus and harbour and trans harbour lines.

## VI Major New Electrification Works Sanctioned in 2013-14, under planhead- Railway Electrification.

S.N.	Section	RKM	Railway	State
1.	Delhi Sarai Rohilla - Rewari - Palanpur - Ahmedabad, incl. Kalol - Gandhinagar - Khodiyar and Alwar - Bandikui - Jaipur - Phulera	1087	NR, NWR and WR	Delhi, Haryana, Rajasthan, Gujarat
2.	Jakhal - Hisar	79	NR	Haryana
3.	Rajpura - Dhuri - Lehra Muhabbat	151	NR	Punjab
4.	Jakhal - Dhuri - Ludhiana	123	NR	Punjab
5.	Singapuram Road - Damanjodi	152	ECoR	Odisha
6.	Katwa-Azimganj-Nalhati and Azimganj-Tildanga/New Farakka incl. Nalhati and Azimganj bypass line	200	ER	West Bengal
7.	<b>Total</b>	<b>1792</b>		



USBRL Project