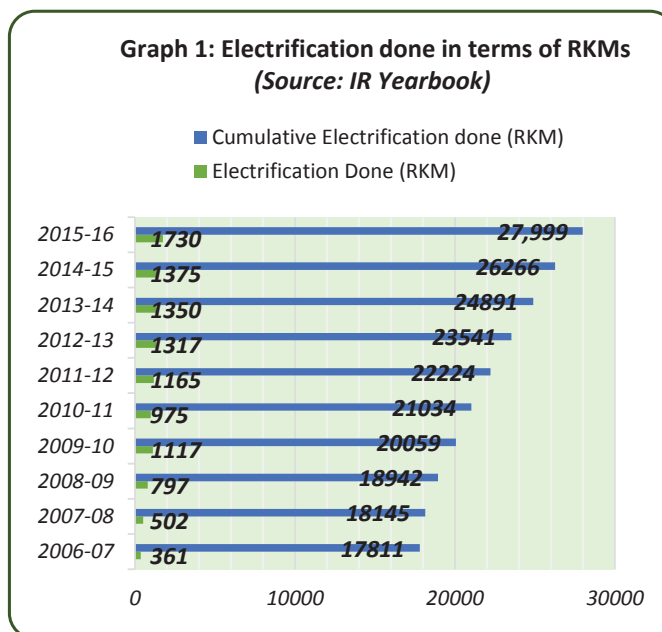


Chapter 2 - Progress of Electrification in Indian Railways

2.1 Progress of RE projects in IR

2.1.1 Electrification so far

With 388 RKM electrified pre-independence, IR have come a long way and has completed electrification of 27,999 RKM up to 31 March 2016. During the past decade the pace of railway electrification has gathered momentum and around 10,000³ RKM have been electrified. Status of year-wise RKM electrified during the past ten years and total cumulative RKM electrified is depicted in the



Graph 1.

2.1.2 Expenditure on Electrification Projects in IR

The budget estimates, final allocations and expenditure on Railway Electrification projects during the past six years are given in the table below:

Table 2.1 – Expenditure incurred for implementation of RE projects (₹ in crore)			
Year	Budget Estimate	Final Allocation	Actual Expenditure
CORE			
2010-11	598.05	644.58	643.21
2011-12	757.00	680.03	678.15
2012-13	691.32	792.66	798.42
2013-14	862.90	1073.90	1077.46
2014-15	978.19	1143.43	1136.70
2015-16	1718.87	1670.99	1667.77
RVNL			
2010-11	37.00	6.09	6.09
2011-12	221.00	162.00	153.95
2012-13	141.57	85.30	171.57
2013-14	128.09	178.09	178.09
2014-15	204.00	247.00	242.50

³ From 17,786 RKM in 2006-07 to 27,999 RKM in 2015-16

Table 2.1 – Expenditure incurred for implementation of RE projects (₹ in crore)			
Year	Budget Estimate	Final Allocation	Actual Expenditure
2015-16	309.77	412.42	412.42
DEP - RVNL			
2015-16	5.00	15.87	2.32
Zonal Railway-ECOR*			
2015-16	55.00	72.35	0
Zonal Railway-CR*			
2015-16	0.02	0	0
Zonal Railway-WR*			
2015-16	0.01	0	72.35

*Three Zonal Railways have been allotted RE works 2015-16 onwards

2.1.3 RKM's electrified, energized and CRS sanction obtained during the past seven years

Since 2009-10, CORE and RVNL have completed electrification of 6,709 kms and 1,623 kms respectively. Against this, 4855 kms and 1,095 kms only have been energised⁴ till March 2016. As per rules⁵, sanction of Commissioner of Railway Safety (CRS) is required for the execution of any work on the open line, which will affect the running of trains carrying passengers and any temporary arrangement necessary for carrying it out, except in cases of emergency. Final inspection by CRS for the introduction of commercial services involves permission (sanction) by CRS for commercial operations based on results of trial run. This is a safety assurance issue. CRS works under Ministry of Civil Aviation and is independent of the Railway Administration. Year-wise status of electrification completed, energized and CRS sanction obtained from 2009-10 to 2015-16 is given in the table below:

Table 2.2 – Details of RKM's electrified, energized and CRS sanction obtained						
Year	Electrification (RKM's)	CORE		Electrification (RKM's)	RVNL	
		2.2 to 25 KV Energization (RKM's)	CRS sanction (RKM's)		2.2 to 25 KV Energization (RKM's)	CRS sanction (RKM's)
2009-10	916	0	420	92	92	92
2010-11	740	956	74	177	159	159
2011-12	804	694	451	214	114	114
2012-13	937	609	1158	301	198	198
2013-14	1033	595	374	240	185	185
2014-15	1089	974	1097	264	81	81
2015-16	1190	1027	1174	335	266	266
Total	6709	4855	4748	1623	1095	1095

Source: Records of CORE/Allahabad and RVNL

⁴ Energisation is the process of connecting the Over Head Equipment (OHE) with suitable Power Supply, i.e., Electric Current of desired strength starts flowing after energisation of the line.

⁵ Para 1302 of Indian Railways Permanent Way Manual 1986, Under Section 23 of Railways Act, 1989 (24 of 1989) and Chapter VII of the Railways (Opening for Public Carriage of Passengers) Rules, 2000

As can be seen, the RKMs energised were less than the RKMs electrified and RKMs which were cleared by CRS for running of trains were less than the RKMs energised. However, the figures of RKMs electrified as mentioned above did not match with the figures of RKMs electrified as mentioned in the Indian Railway Year Book of the respective years. The reasons for the mismatch could not be ascertained in Audit.

2.2 Status of RE Projects as on 31 December 2016

As on 31 December 2016, 102 Railway Electrification projects covering 24,241 RKMs were appearing in the project monitoring database of Indian Railways Project Sanction and Management (IRPSM) (Appendix I). Year-wise breakup of these projects, RKMs covered, their physical progress, expenditure incurred on them so far and their throw forward for 2017-18 are detailed below:

Table 2.3- Status of 102 Ongoing RE Projects as on October/November/December 2016 as reflected in IRPSM							
Year of sanction	Number of ongoing RE projects	Total RKM	Physical progress ranging between (in %)	Latest sanctioned cost (₹ in crore)	Up to date expenditure (₹ in crore)	Throw forward 2017-18 (₹ in crore)	Remarks
1991-92	1	434	100	282.39	266.61	15.77	Completion Report (CR) under preparation.
1992-93	3	780	98 to 100	828.81	828.72	19.06	MM of one RE project still in progress, one RE project completed and in one RE project residual work is in progress. CR in one project was under preparation.
1995-96	1	540	99	445.84	430.17	15.71	Work completed. Revised estimate along with Completion Estimate sanctioned by Railway Board.
1996-97	1	254	96	236.44	253.45	5.78	Residual work in progress.
1997-98	2	763	98 to 99	470.92	383.78	85.90	In one project, one TSS is yet to be commissioned and CR yet to be drawn. Another project completed.
1999-00	2	519	95 to 100	308.26	297.29	11.42	One project completed and CR drawn. One project in progress.
2003-04	1	562	100	386.18	386.18	0	Completed and CR drawn.
2005-06	2	426	90 to 98	324.80	519.59	7.39	One section commissioned, though progress is 90 per cent. The second project is completed and trains being run on electric traction.

Table 2.3- Status of 102 Ongoing RE Projects as on October/November/December 2016 as reflected in IRPSM							
Year of sanction	Number of ongoing RE projects	Total RKM	Physical progress ranging between (in %)	Latest sanctioned cost (₹ in crore)	Up to date expenditure (₹ in crore)	Throw forward 2017-18 (₹ in crore)	Remarks
2006-07	5	890	90 to 100	702.50	1010.60	6.65	Though all five projects are almost completed, balance activities are yet to be done in three projects, which included electrification of Yard, work of patch doubling, augmentation of TSS and construction of railway quarters.
2007-08	4	1246	75 to 99	1117.37	1538.19	69.12	In two projects, though almost completed, balance works such as work of SP, Tower erection/ overhead Line work in progress. CR in one project was under preparation.
2008-09	4	1545	65 to 98	1408.03	1359.52	232.71	In three projects, works such as TSS yet to be commissioned or commissioned late, wagon shed, siding work yet to be completed. Traction change points not planned in two projects.
2009-10	1	140	85	151.91	156.48	8.21	Work in progress
2010-11	9	2363	2 to 99	2656.80	2386.33	667.53	In four projects, though physical progress of work was more than 90 per cent, balance activities such as commissioning of TSS, were yet to be completed.
2011-12	1	82	95	118.48	126.23	13.30	One TSS yet to be commissioned.
2012-13	11	2442	12 to 95	2916.79	1671.12	770.41	In six projects the progress of work was less than 50 per cent.
2013-14	6	1592	5 to 24	1920.99	273.97	945.10	All works in progress.
2014-15	2	462	10 to 24	555.15	252.21	262.20	All works in progress.
Total	56	15040		14831.66	12140.44	3136.26	
2015-16	28	6632	just started/ yet to start	3413.80	26.58	6442.60	In 12 projects detailed estimates were yet to be approved.
2016-17	18	2569	just started/ yet to	402.32	0	2957.78	In 15 projects detailed estimates are yet to be sanctioned. No expenditure

Table 2.3- Status of 102 Ongoing RE Projects as on October/November/December 2016 as reflected in IRPSM							
Year of sanction	Number of ongoing RE projects	Total RKM	Physical progress ranging between (in %)	Latest sanctioned cost (₹ in crore)	Up to date expenditure (₹ in crore)	Throw forward 2017-18 (₹ in crore)	Remarks
			start				incurred on any of the projects.
Grand total	102	24241		18556.79	12167.02	12536.64	

It was observed that

- As many as 56 projects covering 15,040 RKMs, which were included in the Works Programme 1991-92 to 2014-15 were still appearing in the list of projects in IRPSM. Of these,
 - Only in four projects (1313 RKMs), completion reports had been drawn and in two projects (740 RKMs), the same was in process. However, a throw forward of ₹ 0.70 crore is still reflected in respect of these four projects.
 - In 20 projects (4047 RKMs), the physical progress was more than 90 *per cent* and these projects were in the advanced stages of completion. However, in most of these projects balance activities remained to be completed/were going on. The oldest project related to year 1991-92 and latest related to 2012-13. In these projects, against the latest anticipated cost of ₹ 3782 crore, an amount of ₹ 3972 crore has already been incurred. In ten projects, the excess expenditure ranged between seven per cent and 74 *per cent* of the last sanctioned cost.
 - In seven projects, the physical progress was between 76 *per cent* and 90 *per cent*.
 - In another seven projects, the physical progress was between 51 *per cent* and 75 *per cent*.
 - In three projects, the physical progress was between 26 *per cent* and 50 *per cent*.
 - In 11 projects, the physical progress was less than or equal to 25 *per cent*, and in seven out of these, less than 11 *per cent* physical progress was reported.
 - In respect of two projects, physical progress was not reported by the concerned railway.
- The latest anticipated cost of the 56 projects was ₹ 14,740 crore. Against this, an expenditure amounting to ₹ 12,140 crore has already been incurred. A

throw forward of ₹ 3136 crore during 2017-18 is required for completion of these projects, as of now.

- In 45 projects, detailed estimates have been revised/under revision, indicating that the initial estimates were not accurately prepared by the Zonal Railways. Further, due to reasons such as Material Modification and delays in completion of projects, the cost of the projects had to be revised.
- Further, in the last two years (2015-16 and 2016-17), 46 projects covering 9,201 RKMs were added to the shelf of RE projects.
- Out of these 46 projects, in 26 projects, detailed estimates were under preparation, under vetting in one project and sanctioned in 18 projects. Information in respect of one project was not available.

Thus, a large number of projects taken up in earlier years, were yet to be completed in all respects, in order to derive full benefits of electrification. 16 out of 17 completed RE projects reviewed in audit, are still appearing in the list of IRPSM, where, though the work of electrification has been completed, in majority of cases, balance activities are pending as a result of which railways have not been able to derive full benefits of electrification.