

Chapter 3 – Planning of Railway Electrification Projects

Audit selected 36 Railway Electrification (RE) Projects for detailed review. This included 17 completed projects, 12 work in progress and 7 new projects. The main objective of Project Management is to ensure timely completion of works for meeting operational needs, getting returns on investments and to avoid time and cost over runs. The following elements of Project Management including project proposal, execution and post project utilisation were reviewed in detail in audit:

- i. Justification
- ii. Techno-economic feasibility assessment
- iii. Administrative approval
- iv. Detailed Project Report (DPR)
- v. Sanction
- vi. Preparatory work for project implementation
- vii. Identification of implementing agency
- viii. Contracting
- ix. Implementation of contract
- x. Completion of project
- xi. Utilization of the electrified section
- xii. Closure of project
- xiii. Post Project Assessment with respect of estimations in Techno-economic feasibility assessment
- xiv. Post contractual activities viz. arbitration and judicial proceedings

The above includes identification of work/project, preparation and approval of abstract estimates, authorization by the Union Parliament, inclusion of the project in Annual Works Programme, allotment of work to Executing Agency – CORE, RVNL, Zonal Railways, preparation and sanction of detailed estimates, invitation of bids and awarding of contracts, approval of layout plan, coordination with utility providers for power supply and transmission lines (land and Right of Way issues), Over Head Equipment (OHE) Wiring, Service Building, Traction Sub Stations (Power Supply Installation), Switching Posts (SP), Signaling modifications and post completion of physical work, inspection by Commissioner of Railway Safety (CRS) and final commissioning.

The Project approval process at Zonal Railway and Railway Board include consultation with various Departments at Zonal Railways and Railway Board level, finance vetting, financial appraisal by Economic Directorate of Railway Board, 'in-principle' approval by NITI Aayog and inclusion of the project in the Annual Works

Programme of the Indian Railways. The complete process is diagrammatically explained in **Appendix II**. The pictorial representation of sequence of activities for different activities viz. overhead equipment (OHE), Traction sub-station (TSS), Supervisory Control and Data Acquisition (SCADA), Civil Engineering, Signaling & Telecom and Zonal Railways is enclosed in **Appendix III**.

3.1 Process of approval of projects including sanction of Abstract Estimate at concerned Zonal Railways and Railway Board

For an RE project, the cost estimation, consultation with stakeholders and stakeholder identification is done through the process of preparation of abstract estimate. The procedure for preparation of abstract estimate and its sanction is governed as per laid down instructions⁶. It involves processing at Zonal Railways and Railway Board wherein the consultation process with multiple stakeholders (departments and hierarchical formations of Indian Railways) takes place. Preparation of abstract estimate includes assessment of Internal Rate of Return (IRR) for the project, termed as Rate of Return (RoR) in Indian Railways, RoR requires assessment of cash flows for elements identified by Indian Railways through methodology, process/data prescribed⁷ by the Railway Board. Abstract estimate also contains an estimate of the project cost and the expected/estimated date of operationalization of the electrified link/section.

Review of the process of approval of Abstract Estimates in respect of 36 projects selected in Audit showed that

- The basis adopted in respect of cash flow elements for calculation of ROR in various selected projects was not as per norms⁸ prescribed by the Railway Board. Some of the elements of cash flow including loco utilization, repair and maintenance cost of locos, Capital at charge on account of OHE, depreciation /internal charges of OHE/locos, expenditure on electric loco and OHE, Statistical data on Specific Fuel Consumption (SFC) & Specific Energy Consumption (SEC), lube oil consumption, cost of electrification of sidings, capital cost of OHE Car etc. were not incorporated for calculation of ROR. The estimated ROR was not calculated as per the prescribed methodology in 31 out of 33 projects reviewed by audit. The consultation process was also deficient in 28 out of 31 projects, where all departments were not consulted as required. Information was not made available in respect of remaining five projects. **Annexure 3.1**

⁶ Railway Board Circular/letter no. 2000/PL/29/150 Pt. dated 12.02.2002

⁷ Railway Board Circular/letter No. F (X) II – 2008/RE/1 dated 12.06.2008

⁸ Final report of the Committee on Methodology and Evaluation of Railway Electrification Projects issued in April 2007

- All the four elements considered in sanctioning of abstract estimate, viz., process of preparation of abstract estimate and consultation with stakeholders, elements of cash flow, estimated cost and scheduled date of operationalization take a long time for preparation and have no bearing on the actual execution/ implementation of the project. It is seen in Audit that the total processing time for an RE project (time period taken for sending the abstract estimate by the concerned Zonal Railway to the Railway Board and its approval by Railway Board) ranged from 1.17 months to 59 months in 24 projects for which information was available. On average the time taken was 29 months per project with a median value of 30 months. The total time taken for processing of the RE project was more than 36 months in Ujjain-Indore and Dewas-Maksi, Jhansi-Kanpur, Daund-Manmad, Roza-Sitapur-Burhwal, Alwar-Rewari, Itarsi-Katni-Manikpur-Chheoki, Jhansi-Manikpur, Erode-Tiruchirapalli and New Katni-Singrauli projects. **Annexure 3.2**

- In respect of 31 RE projects, the detailed estimates were six *per cent* to 62 *per cent* more than the respective abstract estimates. On an average this difference was 26.39 *per cent* with a median value of 22.59 *per cent*. In respect of three RE projects viz. Jharsuguda-Sambalpur-Titlagarh, Itarsi-Katni-Manikpur-Cheeki including Satna-Rewa and Khana-Sainthia Pakur including Pandeshwar-Sainthia, the abstract estimates were less by four, seven and 12 *per cent* respectively. For the remaining one project the information was not available. The percentage variation was more than 40 *per cent* in respect of Karepalli-Bhadrachalam, Shakurbasti-Rohtak, Jhansi-Kanpur, Barauni-Katihar-Guwahati and Guntakal-Kallur projects. **Annexure 3.3**

- The main objective of preparation of an abstract estimate⁹ is to enable the authority competent to give administrative approval to the expenditure of the nature and the magnitude contemplated, to form a reasonably accurate idea of the probable expenditure and such other data sufficient to enable that authority to gauge adequately the financial prospects of the proposal and also to avoid the expense and delay of preparing estimates for works in detail at a stage when the necessity or the general desirability of the works proposed has not been decided upon by competent authority. In 23 selected projects, it was seen that the time taken for preparation and approval of abstract estimates was up to 59 months, and therefore the objective of saving time was not fulfilled. Further, as far as the general desirability of taking up the project is

⁹ Para 702 of the Indian Railways Code for the Engineering Department

concerned, electrification has been considered a more cost-effective and environment friendly option for traction and abstract estimate are therefore not required to aid the decision of whether or not to take up the project.

Thus, the objective of saving time as well as aiding the decision of whether or not to take up a section for railway electrification is not being fulfilled due to delays in processing the proposals and preparation of abstract estimates. Variations between the abstract and detailed estimates indicated that the system of abstract estimates was hardly adding value to the process and was thus not fulfilling the objective of the process.

As the items and processes for an RE project are more or less consistent, the costing per track kilometer (TKM) can be standardized with specific desirable inputs and the benefits of electrification can be standardized in terms of Gross Tonnage per Kilometer (GTKM). The GTKM and track length at which railway electrification is likely to be beneficial can be determined on a simplified basis of assessment like potential GTKM to be handled on the electrification project. A standardized procedure may be considered to be applied to a proposal. An illustrative example is discussed below:

Illustrative example for granting go-ahead sanction for a project based on benchmark

The analysis of the process of sanction of abstract estimate in **Mathura- Alwar Project (Group 163)** was carried out in audit.

The abstract cost of this RE project was calculated differently thrice during a six-month period April 2008 and October 2008 (₹ 80.00 crore, ₹ 77.42 crore and ₹ 163.81 crore in April 2008, September 2008 and October 2008 respectively). Finally, the abstract estimate of ₹ 99.71 crore was approved by the Railway Board in October 2010. As such, the assessed cost of abstract estimate varied between ₹ 77.42 crore and ₹ 163.81 crore and was approved at ₹ 99.71 crore. The projected Rate of return (ROR) in the abstract estimate was assessed at 17.74 *per cent*. The detailed estimate of ₹ 119.83 crore was sanctioned in May 2011. The sanction was given by Commissioner of Railway Safety (CRS) in March 2015. As of October 2016, the expenditure incurred was ₹ 82.08 crore and the physical and financial progress of the project was 99 *per cent* and 68.5 *per cent* respectively.

The calculation of financial appraisal was based on projected traffic, estimated saving in energy consumption, saving in lubricant consumption, etc. (on saving side) and locomotive capital cost, cost of project, repair and maintenance cost of locomotives etc. (on expenditure side). The savings were based on present traffic and projected traffic in terms of Million Gross Tonne Kilometer per annum (MGTKM per annum) and difference in Specific Fuel Consumption (SFC) for diesel

locomotives and Specific Electrical Consumption (SEC) for electrical locomotives as per latest statistical data that would be available.

In this RE project, a benchmark value of cost of the project per TKM could have been assessed at ₹ 0.49 crore per TKM (*the cost per TKM taken from the detailed estimate for Jhansi-Kanpur Project (Group 148) of CORE approved in December 2008 was ₹ 0.49 crore*). For 160 TKM for Mathura- Alwar RE Project the estimated cost on this yardstick would be ₹ 75.4 crore.

The ROR for the project was to be greater than 14 *per cent* (as per the prescribed benchmark) and accordingly the minimum annual saving @ 14 *per cent* would be by $0.14 \times 75.40 = ₹ 10.56$ crore.

Adding 50 *per cent* enhancement in the savings for compensating other costs (loco cost, shed cost, project cost etc.) for assessing the viability of project for the purpose of go ahead sanction, the benchmark saving for the project would be ₹ 15.84 crore.

The saving as per projected traffic on account of saving of fuel and lubricant and repair and maintenance (of locomotives) was assessed at ₹ 17.84 crore.

Since the saving in ₹ 17.84 crore is above the benchmark saving of ₹ 15.84 crore, go ahead sanction could have been given.

It is recommended that

- 1. The viability of RE project will depend on (i) the anticipated saving by use of electric traction as compared to diesel traction and (ii) capital cost of electrification. Electric traction being more economical than diesel traction, the saving will be directly related to the Gross Tonne Kilometers (GTKM) transported using the electric traction. Since electrification involves significant capital cost, an RE project would be viable only if certain threshold level of GTKM is achieved. If the prices of diesel fall, for an RE project to become viable, higher GTKM will need to be transported. Similarly fall in electricity rates or increase in diesel prices would make RE projects viable at lower level of GTKM expected to be transported. Therefore broadly higher the expected traffic in terms of GTKM to be hauled, higher will be desirability of the RE. The process of preparation of Abstract Estimate may be simplified by replacing it with a 'Go Ahead Sanction' based on simple essential parameters like potential Gross Tonne Kilometers (GTKM) to be transported on the electrified track/section. The other detailed aspects being covered under Abstract Estimate should be incorporated in Detailed Project Report (DPR).***

During Exit Conference (Dec 2016 and March 2017), Zonal Railways, CORE and RVNL agreed that the process was time consuming and needed to be simplified.

Member (Traction) during Exit Conference (March 2017), stated that GTKM alone could not be a good criteria for taking up an RE Project due to existing requirements of railway procedures and many other factors such as traction change, construction of RUB/ROB etc. would not be covered under the proposed GTKM criteria. Audit stated that the objective of electrification is change of traction and estimated cost and savings can be incorporated in deriving parameters for GTKM for the electrified section as demonstrated in the illustration above. Where the RE project requires shifting/lifting of existing ROB/RUB, the number, length and height of the existing ROB (already available with railway administration) can be collected in a template and estimated cost for this activity incorporated in the decision making for such projects in addition to GTKM. It was also suggested by audit that present process of preparation of abstract estimate involves a large number of field formations and the process is complex, leading to very large time being taken for preparation of the abstract estimates. Replacing the current procedure and simplifying the process would save time without any adverse consequences, as project implementation would still be on the basis of detailed project report (DPR).

Railway Board in their reply stated (March 2017) that as per the instructions of Railway Board, GTKM to be transported on electric traction is one of the factors considered for inclusion of the RE Project in Annual Works Programme. However, they stated that, the matter 'Go ahead Sanction' would be examined and put up for consideration of the Board.

3.2 Electrification of New Line Projects

In a New Line project on Udi-Bhandai section in Agra Division of NCR, it was seen that the project was included in the Works Programme 1999-2000 and the detailed estimate of ₹ 214.09 crore (Oct 2002) for the same was prepared without including electrification in its scope. In August 2008, Railway Board advised GM, NCR to include the electrification of the section as Material Modification to the New Work after eight years of starting the project. However, this was not agreed to by Chief Administrative Officer (CAO)/Construction, NCR. As on August 2016, an expenditure of ₹ 450.67 crore has already been incurred on the project. Though CRS sanction was given on October 2015 and operation of single pair of passenger train was started in December 2015, due to non-electrification of the section, the utilization of the new line remains meagre. This also indicated that planning for the project was not comprehensive. The abstract estimate of ₹ 105.77 crore for the electrification project for this line has been submitted by NCR Administration to the

Railway Board in 2015-16 and remains to be sanctioned by Railway Board, despite identification of its need in August 2008.

It is recommended that

2. All new line projects should be assessed simultaneously with and without electrified routes instead of current practice where new lines are assessed without electrification and electrification is added as a supplementary and subsequent activity. This way if viable, the line project can be taken up with electrification from the beginning.

Railway Board in their reply stated (March 2017) that instructions (June 2015) already exist for provision of TRD estimate in proposal for doubling/3rd line in electrified/undergoing electrification sections. They stated that for electrification of new line, the matter will be examined with Civil and Traffic Directorates and separate instructions will be issued.

3.3 Identification of executing agencies

Subsequent to sanction of abstract estimate, the RE Project is incorporated into the budgetary process for approval by the Union Parliament. After approval by the Union Parliament, the project gets reflected in the Annual Works Programme¹⁰. The Railway Board then allocates the execution of the project to Central Organization of Railway Electrification (CORE) or any other implementing agency such as Zonal Railways. In a few cases, projects are assigned to RVNL on nomination basis. RVNL is provided management consultancy fee of 8.5 *per cent* of the cost of the project and 0.25 *per cent* as Direction and General (D&G) charges payable to concerned Zonal Railways as prescribed by Railway Board¹¹. The management fee is linked to the cost of the project and increases, if the cost of the project increases.

It was observed that

- The work was assigned to RVNL on the basis of operational needs of the Zonal Railways in cases where RVNL was also the executing agency for associated New Line/Doubling Projects/Gauge Conversion. Railways also stated that as the existing workload of CORE was in excess of their capacity, RVNL was assigned these projects.

¹⁰ Also known as the Pink Book

¹¹ Letter no. 2004/W-1/RVNL/15 dated 04.11.2012

- There are no milestones fixed between Railway Board and RVNL regarding delivery of the project. There are no penalties on RVNL for not delivering a project in time or for any deficiency in the quality of work.
- Time period taken by Railway Board after inclusion of the RE project in the Annual Works Programme to assign CORE as executing agency was up to 337 days in 17 projects (13 days before in case of RE project of Alwar-Rewari), whereas for RVNL, it was up to 202 days in six projects (29 days and 12 days in case of RE projects of Daund-Manmad and Jakhhal-Dhuri-Ludhiana respectively). The average time taken for allotment of project to CORE was three months with a median value of one month. This time was on an average three months for RVNL with a median value of two months.
- Subsequent to assigning agency by Railway Board, CORE/RVNL assigned projects to their respective Chief Project Director/CORE or Chief Project Manager (CPM)/RVNL for execution. It was seen that
 - While CORE took up to 229 days for assigning project to CPDs, RVNL took up to 40 days in assigning project to their CPMs.
 - The time taken for assignment of work to CPD's by CORE was up to 605 days after inclusion of RE project in the Annual Works Programme in 24 projects, with a mean value of six months and median value of six months (In case of two projects, the time period of assignment by Railway Board to CORE has been adopted as the time period of subsequent assignment of work by CORE to CPD was not made available). Corresponding figures for range, mean and median for RVNL were up to 202 days, three months and three months in six projects. (The time period of assignment by RVNL to CPM was not made available in four projects, accordingly the time period of assignment by Railway Board to RVNL has been adopted).

Annexure 3.4 and 3.5

Thus, substantial time was taken for assigning the work to the respective field formations of the implementing agencies.

It is recommended that

3. The identification of executing agency and its field formations should be expedited.

Railway Board in their reply stated (March 2017) that the process of identification of executing agencies (CORE, RVNL, other PSUs and Zonal Railways) for further

entrusting of RE work has been expedited as RE works are entrusted to them immediately after sanction of Budget so that these agencies can start preparing DPRs immediately based on realistic assessment of site. They further stated that identification of executing agencies depends upon other factors such as strength of the organization in area of project execution etc.

3.4 Preparation of Detailed Project Report and sanction of detailed estimates

Subsequent to allotment of the work to CORE/RVNL, the work is assigned by CORE/RVNL to their field formations viz. Chief Project Director (CPD)/CORE or Chief Project Manager (CPM)/RVNL for preparation of Detailed Project Report (DPR). The Detailed Project Report (DPR) includes detailed estimate. Detailed estimates are prepared by officials of CORE and approved by appropriate authorities at CORE and Railway Board as per delegation of power contained in Schedule of Powers (SoP), for projects assigned to CORE. For projects assigned to RVNL, the detailed estimates are prepared through consultants and approved by RVNL.

3.4.1 Elements included in DPR and timeliness of their preparation

‘Manual on Policies and Procedure for Procurement of Works’ issued by Ministry of Finance lays¹² down in detail, various components of Detailed Project Report.

1. Background of the work/project justifying the need for the work.
2. Details of scope of the project.
3. Exclusions (if any) – This will cover part of the work, which is not included in this particular project estimate.
4. Availability of land – There should be a clear indication about the availability of land required for completion of whole project. The land shall be made available free of all encumbrances.
5. Reference to Concept Drawings and their acceptance – This shall indicate the details of concept drawings prepared and their approval by the prescribed authority.
6. Cost benefit analysis of the project including projected Internal Rate of Return and projected traffic of electric traction on the electrified route.
7. Time of the completion – This will consist of two parts, one for pre-construction activity till award of the work and the other one for the execution using time scheduling activities like CPM, PERT etc.¹³

¹² Para 2.3.2 and Para 2.5.1

¹³ The components of a DPR include use of time scheduling activities such as PERT and CPM. In project management, CPM is the sequence of project network activities that add up to the longest overall duration and determines the shortest time possible to complete the project. It is a commonly used project management tool and any project with interdependent activities can apply this method of mathematical analysis. Another similar technique is PERT used to schedule, organize and

8. Environmental Impact Assessment (EIA) of the project and approval thereof, wherever applicable.
9. Source and availability of funds – The manner of transferring the fund to the executing agency to be spelt out.
10. Approval of Statutory Bodies for Site Plan, Architectural Drawings etc. as required.
11. Detailed soil investigation.
12. Detailed architectural drawings.
13. Detailed structural drawings.
14. Detailed Cost Estimates based on specifications and schedule of rates.
15. Annual plans and consequential projected allocations and cash flows.
16. Systems to be adopted for project monitoring.
17. Work accounting system.
18. Quality assurance system/mechanism.
19. Bidding systems – Single part, two parts, pre-qualification, etc.

To be comprehensive, a DPR should include the above mentioned elements. In addition, the DPR should also include project execution methodology to be adopted viz. EPC, Turnkey, quasi-turnkey, conventional with/without material supply and identification of the Implementing Agency and its field formations.

The DPR prepared for RE projects comprises of survey report of the section to be electrified, technical requirements under different activities viz. Operating, Electrical, Civil Engineering, Signal and Telecommunication and Construction Department, basis of estimate and detailed estimate. Detailed estimates comprises of item wise estimate of cost containing head of account and department wise (Civil, Electrical, Signal and Telecom) element of cost in each item. The source of financing (Depreciation Reserve Fund, Development Fund, Extra Budgetary Resource, etc.) for each item is also a part of the detailed estimate. The cost is estimated on the basis of applicable Schedule of Rules (SOR) and pattern indicated through Latest/Last Accepted Rates (LAR). The detailed estimate is not supported by any time or resource data.

At present, DPRs for RE Projects are being prepared after identification of agencies responsible for execution of the project, which is given the responsibility of preparation of DPR. Due to adoption of different elements, the cost per TKM vary for various implementing agencies preparing DPRs. The project execution

co-ordinate tasks within a project and also helps in determining the shortest time required for completion of a project with interdependent activities.

methodology is not identified in the DPRs prepared for RE Projects. Identification of agency for preparation of DPRs (irrespective of the implementing agency) will facilitate specialization and also completeness and comprehensiveness of DPRs prepared, which will assist in project planning, implementation and monitoring.

The DPRs prepared by CORE or RVNL also do not contain use of scheduling or monitoring tools over time or resources such as Critical Path Method (CPM), Program Evaluation and Review Techniques (PERT), Gantt. Chart etc. in any of the projects. Elements such as exclusions, time to be taken pre-construction and during execution, Environment Impact Assessment, approvals of statutory bodies, system of project monitoring, quality assurance, bidding systems etc. are also not part of the DPRs being prepared at present.

During the Exit Conference with CORE and RVNL (December 2016), Railway Administration admitted that completion targets of Railway Projects are not supported by any reasonable and scientific basis and time scheduling of activities is not done. It was also agreed that Date of Completion (DOC) of activities in a tender are not determined on any scientific basis.

Analysis of the time taken in preparation of DPRs including detailed estimates was done for 36 selected projects in Audit. It was observed that

- For the projects assigned to CORE, the time taken from 1st April of the year when the project appeared in the Annual Works Programme, to the approval of the detailed estimates was one month to 35 months with a mean value of 11 months and median value of 10 months in 27 projects.
- For projects assigned to RVNL, the time taken was 2 months to 18 months with a mean value of 11 months and median value of 11 months in seven projects.
- In case of CORE seven months to 69 months were taken from preparation of abstract estimate to approval of detailed estimates with a mean value of 39 months and median value of 39 months. The corresponding range for RVNL was 30 to 50 months, with a mean of 27 months and median of 26 months. The time taken was more than three years in respect of 11 Projects assigned to CORE and two projects assigned to RVNL.

Annexure 3.4 and 3.5

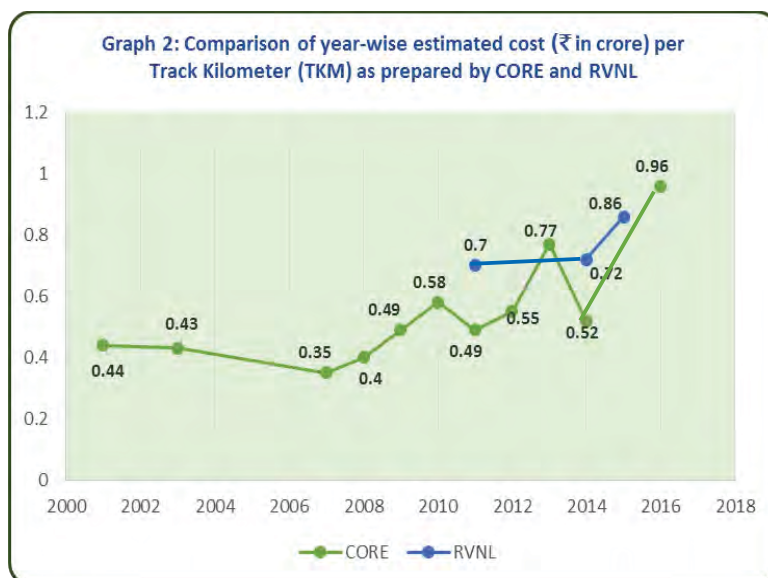
- Detailed estimate was yet to be prepared in one project assigned to RVNL. Part of one project, viz., Barauni-Katihar-Guwahati, approved by Railway Board and assigned to CORE in August 2008 was assigned to RVNL in July 2015. One

project, viz., New-Katni-Singrauli was assigned to CORE in Annual Works Programme for 2015-16 and has been subsequently transferred to Indian Railway Construction Company Limited (IRCON) in January 2017.

It was also observed that there were wide variations between the cost of the abstract estimate and approved detailed estimate. The differences in cost ranged between 6 per cent to 62 per cent (4, 7 and 12 per cent below in respect of RE projects of Jharsuguda-Sambalpur-Titlagarh, Itarsi-Katni-Manikpur-Cheoki-including Satna-Rewa and Khana-Sainthia-Raipur including Pandabeswar-Sainthia respectively) with mean value of 23 per cent and median value of 21 per cent in case of CORE in 27 projects. Similarly, it ranged between 15 to 62 per cent with mean value of 28 per cent and median value of 20 per cent in seven projects of RVNL. The overall variation for both CORE and RVNL projects was 6 to 62 per cent with mean value of 23.38 per cent and median value of 21.5 per cent. The percentage variation was more than 40 per cent in respect of Karepalli-Bhadrachalam, Shakurbasti-Rohtak, Jhansi-Kanpur, Barauni-Katihar-Guwahati and Guntakal-Kallur projects. **Annexure 3.3, 3.6 and 3.7**

The above positions reflect that considerable time was taken from the preparation of abstract estimate to approval of detailed estimate and the variation between these two costs are also large.

3.4.2 Comparison of detailed estimates prepared by CORE and RVNL



Year wise (Financial year) comparison of cost of detailed estimate per Track Kilometer showed that the detailed estimates prepared by RVNL were higher than detailed estimates prepared by CORE by 36 per cent to 37 per cent during the period

2010-11 to 2014-15¹⁴ as can be seen in **Graph 2**. Besides, a variation in costs as per

¹⁴ Comparable data for both the organization was available only in 2010-11 and 2014-15

detailed estimates and abstract estimates was higher for RVNL in comparison to CORE. This is despite the fact that, a significant part of work in RVNL projects including the work of sanction with CRS, is executed by Zonal Railway in terms of Memorandum of Understanding (MoU) between Ministry of Railways and RVNL.

Annexure 3.8

It is recommended that

- 4. For preparation of DPR the designated agency should be given a fixed timeline say three months for completing the work.**
- 5. Since inputs from the Divisional Railways, Zonal Railways and Railway Board are crucial for DPR, involvement of Railway Board officials would be a significant positive in preparation of DPR in time and of desired quality. The preparation of DPR should be done by agencies other than RVNL/other executing PSU, as remuneration to RVNL/other executing PSU in the form of management fees has a positive linear relationship with the cost of the project.**

In their reply, Railway Board stated (March 2017) that the Audit Recommendation for timeline of three months for preparation of DPR by designated agency is acceptable and they would be communicating the same to the executing agencies in due course. Railway Board, however did not agree with the Audit Recommendation regarding preparation of DPR by agencies other than RVNL, as it is a PSU of Ministry of Railways and is governed by GFR and CVC guidelines. RVNL in this regard stated that the differences in the cost of detailed estimates between those of RVNL and CORE arose due to difference in scope of work (including signaling works, wiring trains, utility vehicles etc.) CORE officials agreed with the need for consistency in the elements and the relative costs during preparation of the detailed estimates, development of a specialized agency for preparation of DPRs of RE projects and suggested elements and process for preparation of DPR. Audit emphasized that preparation of DPR by an entity other than RVNL, would benefit railways in form of realistic cost and documented plan enabling execution of RE projects in time and of desired quality. Audit stated that realistic and reasonable estimation of cost in Detailed Estimates should be done, keeping in view the project execution methodology, time period of completion (which impacts resource requirement of men and machine for the contractor) and tendered terms and conditions. During Exit Conference (March 2017) CORE stated that this could result in significant increase in the estimated cost of the project. Audit opined that

it would be a financially prudent decision to look at a higher cost estimate, keeping in view the loss of projected savings due to delays, low productivity of deployed manpower and time cost of idle investment holistically and incorporate the same in decision making.