HUNDRED AND TWENTY-THIRD REPORT

PUBLIC ACCOUNTS COMMITTEE

(1987-88)

(EIGHTH LOK SABHA)

RAILWAY ELECTRIFICATION

MINISTRY OF RAILWAYS

(RAILWAY BOARD)

Presented in Lok Sabha on 12 April, 1988

Laid in Rajya Sabha on 25 April, 1988

LOK SABHA SECRETARIAT

NEW DELHI

April, 1988/Chaitra, 1910 (Saka)

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(1987-88)

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INTRODUCTION

I, the Chairman of the Public Accounts Committee, as authorised by the Committee, do present on their behalf this 123rd Report on paragraph 9 of the Report of the C & AG of India for the year 1984-85, Union Government (Railways) on Railway Electrification.

2. In this Report, the Committee have observed that though there may be number of benefits of electrification and there is need to reduce consumption of imported diesel oil and to use the energy generated by thermal plants, yet the fact that this is most capital invensive cannot be easily ignored. The Ministry have not been able to prove that the electric traction is the cheapest of the three modes of traction viz. steam, diesel and electric as was initially claimed by them. The Ministry of Railways have contended that the price of diesel is regulated and controlled under the powers of the Government whereas there is no control on the tariff charged by State Electricity Boards for supply of electricity for railway traction. The Committee have expressed the view that the Railways being a public utility of national importance and electrification having been declared as a national policy it becomes all the more necessary that they get electricity at a price which is commensurate with the cost. For this, Department of power should render all possible help to the Railways in seeking cooperation of the State Electricity Boards in this regard.

3. The Committee have found that even after spending almost the entire plan outlays and Budget Allocations, there was considerable shortfall in the achievements of targets envisaged for electrification during Fifth and Sixth Plan periods. The Committee have concluded that Railways have failed to exercise proper control over the timely execution of the projects in these periods leading to considerable cost escalation and resultant increase in cost of electrification per RKM. The Committee have also adversely commented upon the Railways' Policy to spread the available resources on far too many projects leading to patchy electrification of sections/routes.

4. Another disquieting feature about the execution of various projects, according to the Committee, has been the failure of the Railways to complete

the spill over works during the following Plan periods. The Committee have expressed the hope that Railways would ensure that in no circumstances the spill over works are allowed to again spill over. They have suggested that Railway should strengthen their planning implementation and monitoring machinery so that there are no time and cost over-runs.

5. The Committee have been constrained to observe that the Railways have failed to adopt and introduce technological upgradation in electrification although these have been taking place abroad since long. It is only recently that some steps have been contemplated by the Railways in this direction. The Committee have expressed the view that, it is necessary to keep track of the proven technological changes relevant to Indian environment and adopt them at the earliest so that research and development being done abroad could be advantageously utilised with a view to increasing the efficiency and effectiveness of Railway electrification.

6. Planning and execution of certain electrification projects viz. Waltair-Kirandual, Vijaywada-Gudur, Delhi-Jhansi, Ahmedabad-Sabarmati etc. has revealed delays in execution, non-materialisation of the expected benefits, lack of proper planning and instances of extra expenditure. The Committee have expressed the hope that Railways would draw appropriate lessons from the execution of these projects with a view to avoiding time and cost over run in the future projects and would take appropriate steps to draw realistic project plans and strengthen project planning and implementation.

7. The Public Accounts Committee examined this Paragraph at their sittings held on 10 September, 1987 and 29 October, 1987. The Public Accounts Committee considered and finalised this Report at their sitting held on 28 March, 1988. The Minutes of the sittings form Part II* of the Report.

8. For reference, facility and convenience, the observations/recommendations of the Committee have been printed in thick type in the body of the Report and have also been reproduced in a consolidated form in Appendix III to the Report.

9. The Committee would like to express their thanks to the officers of the Ministry of Railways (Railway Board) for the cooperation extended by them in giving information to the Committee.

*Not printed. One cyclostyled copy laid on the Table of the House and five copies placed in Parliament Library.

10. The Committee also place on record their appreciation of the assistance rendered to them in the matter by the office of the Comptroller and Auditor General of India.

NEW DELHI
4 April, 1988
15 Chaitra, 1910 (Saka)

AMAL DATTA,
Chairman,
Public Accounts Committee.

RAILWAY ELECTRIFICATION

CHAPTER I

BRIEF HISTORY

Electric traction was first introduced in India in 1925. By 1936 about 388 route Kms. had been electrified, all on 1500 VDC system serving mainly the suburban sections of Bombay and Madras, with the only exception of Bombay-Pune and Bombay-Igatpuri main line section where heavy gradients on the ghats favoured the introduction of electrification.

1·2 The electrification of Howrah-Burdwan suburban section (142 Kms) of Calcutta on the Eastern Railway was taken up during the first Five Year Plan (1951-56) and completed in 1958. Ministry of Railway have contended that owing to inherent operational and cost advantages of electric traction over other modes it has been progressively extended from the Second Five Year Plan to busy main line sections to cater to the requirements of growing industrial infrastructure.

1·3 Early in the Second Plan, a new 25 KV 50 cycles single phase AC traction system gained recognition abroad. In 1959, based on the experience of French Railways, a decision was taken to adopt 25 KV AC, 50 cycles system as the standard for future electrification schemes on Indian Railways. This system was first commissioned in August 1960. With nearly 405 route Kms in the Bombay area still continuing to be operated on 1500 VDC system, the total route Kms electrified on Indian Railways works out to 7,474 by the end of March, 1987.

1·4 The progress of electrification on Indian Railways in various plan periods was as under :

Plan	Route Kms electrified	Route Kms electrified per year
Prior to 1956	529	—
Second Five Year Plan (1956-61)	216	43
Third Five Year Plan (1961-66)	1,678	336
Inter Plan (3 years) period (1966-69)	814	271
Fourth Five Year Plan (1969-74)	953	192
Fifth Plan (4 years) period (1974-78)	533	133
Rolling Plan (2 years) period (1978-80)	195	98
Sixth Five Year Plan (1980-85)	1,522	304
Ist two Years of Seventh Plan (1985-87)	1,034	517

1·5. The rate of electrification per year picked up after 1980 due to the need to reduce consumption of imported diesel oil and to use the energy generated by thermal plants. The Railways, on the recommendation of the Committee of Secretaries on Energy, decided (January 1981) to step up the pace of electrification during the Sixth Plan (1980-85) and onwards so as to achieve energisation of about 1,000 RKMs per year and a ten year programme of elcctrification was formulated taking into account the high density routes carrying coal, iron ore, etc. in addition to electrifying the routes connecting the metropolitan cities, viz., Delhi, Bombay, Calcutta and Madras. The programme envisaged energisation of about 2,800 RKMs during the Sixth Plan and 5,049 RKMs in the Seventh Plan (1985-90)

1·6. However, there has been patchy electrification of sections/routes comprising 1522 RKMs only during the Sixth Plan i.e. about 46 per cent short of the target (2800 RKMs) and the target for Seventh Plan has been reduced from 5,049 RKMs to 3400 RKMs. It is yet to be seen whether Railways are able to achieve this target.

1·7. According to the Railways, the total electrified route by the end of Seventh Plan will be 9,500 or 10,000 RKMs and the programme envisage further electrification at the rate of 3,000 or 3,500 RKMs during the next plan period also. By continuing this pragramme upto the end of century, the Railways expect the traffic hauled by electric traction to increase from 30 per cent at present to 75 percent in 2000 A.D.

1·8. Thus, according to Railways, electrification on Indian Railways is going to make a very significant contribution to planned growth of railway transport. In view of these considerations, the Committee have thought it fit to examine in detail certain aspects of Railway Electrification programme. The background for this examination has been provided by Audit paragraph* 9 of the Report of the C & AG of India for the year 1984-85, Union Government (Railways).

*Appendix I

CHAPTER II

JUSTIFICATION OF ELECTRIFICATION PROGRAMME

2·1 Ministry of Railways have justified the programme of Electrification on Indian Railways by explaining that it reduces transport and energy cost. Other benefits are stated to be reduced locomotive maintenance cost, increase in train speeds due to higher horsepower of electric locomntives, some increase in line capacity, higher availability of electric locomotives and increased utilisation potential of locomotives as compared to diesel traction. It is further claimed that potential benefits from electrification are even greater on unadulating terrain.

2·2 During evidence it was brought out by the representative of the Railways that India is not self-sufficient is diesel oil and the requirements are met mainly through imports. Further there are little chances of India becoming self-sufficient as indigenous oil resources are limited. Whereas there is no alternative energy source for road transport, there is one in the case of rail transport. Thermal energy can be utilised for electric traction as the coal stocks in the country are in abundance. After 1973, when the fuel crisis was at its peak, a policy decision was taken to conserve diesel oil and the various measures suggested, included *inter-alia*, the declaration of railway electrification as a national policy hi 1978 or so.

2·3 It was further brought out by the representative of the Railway Board that out of the three modes of traction—steam, diesel and electric, the capital investment in the steam is the lowest. In case of diesel traction the capital investment is slightly higher than that in the steam whereas the electric traction is the most capital intensive. But as regards the cost of fuel and the maintenance, the electric traction is the cheapest.

2·4 However, if the cost of operation inclusive of fuel, maintenance and repairs, depreciation and interest charges; and other overheads is calculated, then it is seen that there is not much difference in operation cost of diesel and electric traction. From a statement supplied by Ministry of Railways regarding line haul traction cost per 1000 GTKMs—goods services, it is seen that the cost inclusive of depreciation, interest, over-head and central charges in respect of diesel traction and electric traction on BG was Rs. 25·72 and Rs. 24·61 in 1984-85 and Rs. 26·61 and Rs. 25·46 in 1985-86 respectively. Likewise, the linehaul cost of diesel and electric traction on Metre Guage was Rs. 47·14 and Rs. 38·67 in 1984-85 and Rs. 45·90 and Rs. 46·86 in 1985-86 respectively.

2·5 It is, however, seen that line haul cost in case of diesel traction is, in fact, less than that of electric traction if the cost of taxes is excluded from the total cost of diesel. For example, the line haul cost per 1000 GKTMs—goods services in case of diesel traction (ecluding taxes) on BG in 1984-85 was Rs. 23·67 as compared to that of Rs. 24·61 in case of electric traction. Similar figures for 1985-86 were Rs. 24·51 and Rs. 25·45 respectively. The representative of Railway Board explained the position by stating that the prices of diesel and electricity have varied over the years. According to him from 1971-72 to 1978-79, the rate of rise of diesel price was more than the rise of electricity cost; between 1978-79 and 1980-81, it was lower than the electricity cost; and from 1980-81 to 1983-84, the rate of increase of diesel price was more than that of electricity; but from 1984-85, the rate of increase of diesel price has been much lower than that of electricity. It is due to this reason that the line haul cost in case of electric traction has increased from 1984-85 and has come near that of diesel traction.

2·6 In this connection he further stated that the price of diesel is regulated and controlled under the powers of the Government whereas the electricity tariff is in the hands of the State Electricity Boards, which are autondmous bodies. According to him the Railways do not want any subsidy from the State Electricity Boards but they should charge what it cost them plus a reasonable profit. For a priority sector like Railways, he submitted that the electricity tariff charged from them should be commeusurate with the cost. The matter with regard to the electricity tariff was, therefore, taken up by the Committee of Secretaries, who appointed a Sub-Committee to determine the rational tariff policy for traction and the methodology to implement it. According to the Railways the report by the sub-Committee was submitted to the Secretary, Department of Power on 10 November, 1987. However, the Report is yet to be considered by the Committee of Secretaries.

2·7 According to Ministry of Railways* NTPC's share of power generation in the country was about 5·2% at the end of the Sixth Five Year Plan. With the coming up of the other super thermal power projects under the NTPC, the share is expected to be 23% by the end of the Seventh Five Year Plan. In addition to NTPC, hydro and nuclear power plants in the Central sector are on the anvil and the share of the Centre in power generation is bound to go up. Railway's requirement of power presently is only about 2·5%. During evidence, the Railways expressed the hope that super-thermal power stations being established in the country would be in a position to contribute more than 45% of the total power [illegible] in the country by the end of this century.

Vide para 7·15 of 5th Report of RCC (1985)

2·8 The Committee have been informed that an attempt is being made in the Economic Adviser's office in the Railway Board to study the effects of changing the market prices of HSD oil and electric power into the social costs. For this purpose the duty on HSD oil is being removed, out a margin for scarcity of foreign exchange is being applied as being used by the Planning Commission in their social cost benefit appraisal. The rate for power is replaced by approx. cost of generation and distribution taking into account the prevailing mixtures of the three modes of power generation viz. thermal, hydel and nuclear. This study is yet under way and is expected to be completed soon.

2·9 Though there is a point in Railways' contention that there are number of benefits of electrification and there is need to reduce consumption of imported diesel oil and to use the energy generated by thermal plants, yet the fact that it is the most capital intensive cannot be easily ignored. The Ministry have not been able to prove that the electric traction is the cheapest of the three modes of traction viz. steam, diesel and electric as was initially claimed by them. The figures of latest years reveal that there is hardly any difference in operation cost (inclusive of fuel, maintenance and repairs ; depreciation and interest charges ; and other overheads) of diesel and electric traction. On the other hand the line haul cost in case of diesel traction was less in 1984-85 and 1985-86 if the tax element is excluded from the cost of the diesel. The Ministry have tried to explain that the rate of rise of diesel price from 1984-85 has been much lower than that of electricity. Further, they have also contended that the price of diesel is regulated and controlled under the powers of the Government whereas there is no control on the electric tariffs for railway traction and that the State Electricity Boards fix their tariffs without any consideration for the Railways. The Committee feel that Railways being a public utility of national importance and the electrification having been declared as a national policy it becomes all the more necessary that they get electricity at a price which is commensurate with the cost. For this the Ministry of Energy (Department of Power) should render all possible help to the Railways in seeking cooperation of the State Electricity Boards in this regard. It is also pertinent to note that the matter regarding the electricity traiff was taken up by Railway Board at Secretaries Committee level as a consequence of which a sub-Committe was set up to determine the rational tariff policy for traction and the methodology to implement it. The sub-Committee submitted its report on 10 November 1987 which is yet to be considered by the Committee of Secretaries. The Committee desire that this report should be considered by the Committee of Secretaries at the earliest

and a decision taken so that the Railways are supplied electricity at reasonable tariff for electric traction.

2·10 Since Centre's share in the power generation in the country through thermal, hydro and nuclear plants is going to increase substantially by the end of Seventh Plan (NTPC's share alone is likely to increase from the present level of 5·25% to 23%), the Committee recommend that the Ministry of Energy should examine the matter in consultation with the Ministry of Railways taking into account the overall national perspective so that Railway's demands for power are met, at reasonable price. The Committee would like to be aprised of further development in this regard.

2·11 The Committee find *that* an attempt is being made by the Railway Board to study the effect of changes in the market prices of HSD oil and electric power into the social costs. This study is stated to be yet under way and is expected to be completed soon. The Committee would like to be apprised of the results of such a study and the action proposed by the Ministry thereon.

CHAPTER III

SELECTION OF LINES/SECTIONS FOR ELECTRIFICATION

3·1 Following the oil crises in 1973 the Railways felt the need for fresh study on the relative economics of diesel and electric traction and decided to constitute a Committee with specialised training drawn from Indian Railways and Planning Commission. This Committee with Shri J.A., Raj, as convener, submitted a report in June, 1978 called as 'Study of Relative Economics of Diesel and Electric Traction on Indian Railways'. This Committee assessed that about 30 million GTkm/route km/annum was the level (called the break-even-level) above which capital investment was economically and financially viable. According to Ministry of Railways the break-even-level varies for different sections and is sensitive to cost of capital, cost of fixed installations, cost of diesel and power, growth of traffic, traffic mix (passenger, goods) etc. Various Committees are stated to have worked out the break-even-level of traffic densities for justifying electrification from time to time. Since submission of Raj Committee, the Railway Officers Committee on Accelerated Electrification (1980) and Railway Reforms Committee (1982) calculated the levels at 21·8 and 19·47 million GTKms/RKm/annum respectvely. Further, according to Ministry of Railways, their Economic Adviser has carried out a hurried exercise recently for the limited purpose of identifying proposals for electrification during the 8th Plan, according to which, the break-even level traffic densitites for various as sumptions of traffic mix and growth of traffic range between 22 to 32 million GTKMs.

3·2 Ministry of Railways have asserted that the change of break-even-levels worked out by different Committees has not actually posed any special Problem in drawing up a perspective plan as the perspective plan itself is not a static document, but undergoes continual revision/updating warranted by changing environment/condition. As electrification is done essentially on high density routes/sections, the change in break-even-levels has not really disturbed the priority for electrification.

3·3 The selection of sections/lines for 'electrification' is done at the Board level. In making such selections, the Board are assisted by the concerned Directorates of Planning, Traffic-Transportation, Statistics and Economics, Railway Electrification and the Economic Adviser.

The general criteria adopted by Railway Board for selection of lines for Railway Electrification is as under :

(i) The traffic hauled should be beyond the capability of steam traction ;

(ii) Working the section through electric traction should be cost effective compared to diesel haulage, giving a return of at least 10% on the investment ; and

(iii) Electric traction may be the only choice as in heavily graded sections or suburban sections for EMU services.

3·4 The representative of Railway Board brought out during evidence that when a project is selected for electrification, its financial costs and the rate of return is worked out. Only when it is justified that the project would pay 10% return on the capital, it is sanctioned and included in the works programme. It is learnt that the cost of the projects and the internal rates of return on investment required for electrification are worked out on the basis of the relative costs of handling the projected level of the traffic through diesel and electric traction adopting Discounted Cash Flow method. The basic norms adopted are the costs of locomotives, power packs, fuel/energy consumption, repairs and maintenance costs of locomotives and fixed installations, etc. According to the Ministry the rates of return are worked out by taking the prices prevailing during the year of survey. Thus any change in the pattern of cost of diesel and electric traction automatically gets reflected, in the analysis. However, it has been admitted by them that while computing rates of return no attempt is made to assume any relative change in prices over the period of analysis, which is normally kept at 30 years, the normal life of such projects.

3·5 By and large all the sections progressively electrified so far are stated to have satisfied the general criteria fixed for track electrification. The Ministry nevertheless could not furnish the comparative figures of the actual and projected rate of returns of electrified sections. The reason advanced therefore by the Ministry is that the post project evalutions have not been carried out by them and only the projected rates of return are available. In this connection, the Financial Commissioner of Railway Board has informed the Committee that they are now going to take up studies in three electrified sections to find out projections, investment and operational costs in relation to the target. The projects selected for post evaluation are Virar-Sabarmati ; Delhi-Mathura-Jhansi and Arakkonam Renigunta. These sections are stated to be of different types belonging to there different zonal Railways and three different geographical parts of the country.

3·6 The Ministry of Railways have asserted that since electrification is done essentially on high density routes/sections, the change in break-even-levels has not really disturbed the perspective plan of electrification. The Committee are, however, of the opinion that since the break-even-level of traffic density also depend inter-alia, on the cost of fuel and the rate of increase in diesel price has been much

lower than that of power since 1984-85, it would be better to select sections, other than those falling on trunk routes connecting four metropolitan cities, for electrification with projected break-even-level of traffic densities on the high side, say, near to 30 to 32 GTKMs/ RKm/annum so that the electric traction is not proved uneconomical as compared to diesel traction even in adverse conditions in future.

3.7 The Committee also desire that while computing the rate of returns, which also depend among other things on the cost of fuel, the Railways should examine the feasibility of assuming relative change in the pattern of cost of diesel and electric traction over the period of analysis i.e., the life of the project so that the electrified project keeps on giving at least 10 per cent return on the capital as compared to diesel haulage.

3.8 The contention of the Ministry that by and large all the sections progressively electrified so far have satisfied the general criteria fixed for track electrification is indicative of the possibility that there may be certain electrified sections or sections being electrified which may not satisfy the general criteria. The Committee are of the view that this aspect needs to be critically analysed with a view to identifying such sections and exploring the reasons due to which the prescribed criteria was not satisfied. The Committee would like to be apprised of the results of such examination. They have also been informed that studies in the three electrified sections to find out projections, investment and operation costs in relation to the targets are being undertaken. The Committee would like the post-project evaluation studies being conducted in these sections in different Zonal Railways completed expeditiously and they would like to be apprised of the results thereof. They are also of the opinion that projection in regard to rate of returns, traffic density etc. of every section after a specified period of its getting electrified should be evaluated as a matter of general practice so that reasons for shortfall in projections are critically analysed and appropriate remedial measures taken for the future selection of sections.

CHAPTER IV

PRIORITIES FOR ELECTRIFICATION

4·1 It is learnt that in the meeting of the Controlling Committee for electrification held in July 1972 the Railway Board had indicated the tentative priorities for new electrification schemes to be taken up during the Fifth Five Year Plan. According to the criteria laid down for priorities in this meeting, the sections forming part of the important trunk routes, specially the the quadrilateral and the diagonal routes connecting the four main metropolitan cities of Delhi, Calcutta, Madras and Bombay were to be given the first preference.

4·2 Again, while chalking out a ten year programme of electrification during the period from 1980-81 to 1989-90 it was decided (January 1981) to give first priority to the sections mentioned above and the other high density routes were to follow thereafter.

4·3 The sanctioned electrification works at present are stated to have been categorised priority-wise, and are listed as under :

Priority A : Spillover works from earlier plans on sections falling on the quad-lateral linking Delhi-Bombay (via Western Railway), Delhi-Madras (G.T.) route, Bombay-Howrah (via Nagpur) route and excepting for Itarsi-Bhusawal, and the Chandrapura Colliery lines Complex.

Priority B : Electrificaion on sections contiguous to existing electrified routes to improve operational efficiency such as Kharagpur-Midnapore, Tundla-Agra, Bayana, Champa-Gevra Road, Krishna Canal-Guntur-Tenali section, Dive-Panvel, Koraput-Damonjodi.

Priority C : Sanctioned works other than the above but not yet started such as Bina-Katni, Katni-Bilaspur Railway Electrification, Nagda-Bhopal Railway Electrification, Jolarpettai-Erode, Salem-Mettur Dam Railway Electrification, Kazipet-Sanatnagar and Jolarpettai-Bengalore electrification.

4·4 One major section Walt air-Kirandul comprising 471 R kms (discussed later in detail) was completed and electrified at a cost of Rs. 53.31 crores during Sixth Plan although it did not form part of any trunk routes nor it was contiguous to the electrified tracks necessitating its electrification to avoid change of traction etc. The project was sanctioned in 1970 before the priorities for electrification were identified in 1972, yet the optimisation

scheme was approved in 1973 necessitated by the optimisation of the track survey carried out by the Railway in 1972 and the Railway Administration submitted revised estimates of modified electrification scheme to Railway Board in June 1974 only. The project targetted to be completed in March 1976 was energised in December, 1982. Even after a delay of six years one of the objectives of this electrification scheme viz. optimisation of the Capacity for increasing the throughout from the then existing 6 million tonnes to 12 million tonnes per annum and running of heavier trailing loads of 80 Boy wagons (7200 tonnes) for which OHE was redesigned did not materialise as the volume of traffic on the electrified route during 1980-81 to 1983-84 varied between 5·38 and 6·73 million tonnes only, while the trailing load continued to be 50 BOY/BOX (N) wagons (i.e. 4500 tonnes). On an enquiry, the Ministry of Railways have informed the Committee that actual traffic density in terms of million GTKMs per route Km/per annum on the four sub-sections of Waltair-Kirandul during 1985-86 varied from 12·89 to 19·18 only.

4.5 During Seventh Plan, six new electrification works viz. Tundla-Agra-Bayana (sanctioned cost Rs. 22·96 crores) Champa-Gevra Road (Rs. 11·21 crores), Krishna Canal-Guntur-Tenali (Rs 8·59 crores). Diva-Panvel (Rs. 6·29 crores), Koraput-Damanjodi (Rs. 2·31 crores) and Jolarpettai-Erode and Salem-Mattur Dam (Rs. 47·00 crores) having priority 'B' were approved. Out of these, first four sections are stated to have been included on account of operational reasons. The percentage of expenditure incurred on these four works till March 1987 to the total project cost has been 8·75, 13·64, 3·49 and 12·56 respectively. In case of Koraput-Damanjodi, project estimates are under finalisation and in repect of Jolarpettai, Erode and Salem Mettur Dam, preliminary work is stated to be in progress.

4.6 Tundla-Agra-Bayana section comprising 112 R Kms (Traffic density 8·00 million GTKm) between the trunk routes of Howrah-Delhi (electrified by 1977), Delhi-Bombay (via Western Railway) and Delhi-Madras was taken up in 1985-86 and is targetted for completion by March, 1989. According to the Ministry, absence of electrification of this section involves change of traction at both ends for trains from one dense electrified route to the other. This results in uneconomical use of locomotives, considerable detention of trains at either end thus nullifying some of the advantages of electrifying the two main routes.

4.7 Defending the low traffic density on which this section was anticipated to operate, the Ministry of Railways have explained that the traffic density is not the sole criteria for assigning priority. Other factors including contiguity of existing electrified sections and operational consideration are also relevant. The reason advanced by the Ministry for not planning electrification of this section to synchronise with those of Delhi-Jhansi and Mathura-Gangapur city is that due to limited resources for

electrification, it is not practicable to undertake electrification of all sections simultaneously and the preference had to be given to trunk routes connecting four metropolitan cities. On the other hand, Kharagpur-Midnapore Section, not included in the approved ten year programme of electrification of high density trunk routes and having low traffic density (5034 GT Kms per Km per day during 1982-83) was electrified out of turn in May-June 1984 at a cost of Rs. 1·84 crores by reappropriation of funds from the ongoing Delhi-Jhansi priority project. The electrification of one line of Kharagpur-Midnapore double track section has been justified by the Ministry on opertional grounds as that would permit extension of EMU services right up to Midnapore without need for additional EMU stock at a relatively small cost.

4.8 Further, there is one important section on the Delhi-Bombay Trunk route (via Central Railway) where there has been delay in starting electrification work. Delhi-Jhansi route (824 Kms) is targetted to be energised by December 1988 [Delhi-Basai (477 kms) completed by 19 June, 1987 and the remaining expected to be completed by December 1988]. Bhusawal to Bombay section is already electrified. Thus Itarsi-Bhusawal, a priority 'A' section, when electrified would complete the electrification of Delhi-Bombay trunk route (via Central Railway). Though Itarsi-Bhusawal section (projected traffic density 35·50 million GTKm/RKm/Annum and I.R.R. 12·7%) was approved in 1982-83, yet it does not seem to have been accorded due priority for completing its energisation by the end of 1988. The expenditure incurred on this project upto March 1987 was only Rs. 8.52 crores against the sanctioned cost of Rs. 77.13 crores. It is now targetted to be completed by March, 1991. Whereas two other priority 'A' projects with lesser projected traffic densities and internal rates of return, on the Delhi-Madras trunk route viz. Balharshah-Wardha (density 26·60 million GTKm/RKm/Annum and I.R.R. 10·4%) and Itarsi-Nagpur (density 26·60 million GTKm/RKm/Annum and I.R.R. 10·8%), approved in the same year as that of Itarsi-Bhusawal, were taken up earlier and both are targetted to be completed by June, 1989.

4.9 The Committee note that the Railways had indicated priorities to sections falling on quadrilateral and diagonal routes connecting the four metropolitan cities of Delhi, Bombay, Calcutta and Madras with a view to introducing electric traction over the maximum possible distance within a short span of time not only to avoid multiplicity of traction but also for better utilisation of electric locos. The decision regarding this policy was taken by Railways in July 1972 and reiterated in January 1981. The Committee find that

more or less the Railways have followed this policy but there are instances when the sections have been taken up and electrified in violation of the prescribed criteria which are narrated as under:

(i) Waltair-Kirandul section, neither part of a trunk route nor contiguous to any electrified track was completed in Sixth Plan at a cost of Rs. 53·31 crores. Though it was targetted to be completed in 1976, the traffic density of its four sub-sections has been quite low and as late as in 1985-86 ranged between 12·89 and 19·18 million GTKm/RKm/Annum and has yet to achieve the present break even level of 22—30 million GTKm/RKm/Annum. The Committe do not know whether this section is giving 10% return on the investment as compared to diesel haulage as well and would like to be informed of the exact position-

(ii) Kharagpur-Midnapore section, not included in the approved ten year programme of electrification of high density trunk routes and having low traffic density (1·8 million GTKm/RKm/annum during 1982-83) was electrified out of turn in May-June 1984 at a cost of Rs. 1·84 crores by reappropriation of funds from the ongoing Delhi-Jhansi priority project.

(iii) During Seventh Plan six new works having priority as 'B' were approved at a cost of Rs. 98·36 crores. Four out of the six projects are stated to have been taken up on operational considerations and the expenditure incurred thereon till March 1987 was Rs. 4·63 crores and the outlay (RVSD) on these during 1987-88 is about Rs. 27.50 crores. In case of remaining two sections, the preliminary work is in progress. The Committee are of the opinion that taking up these priority 'B' works and incurring expenditure thereon while priority 'A' projects (Sections on trunk routes) are yet to be completed perhaps could have been deferred.

4.10 On the other hand an important priority 'A' project viz. Itarsi-Bhusawal does not seem to have been given due priority. Delhi-Jhansi section is targetted to be energised by December 1988. Bhuswal to Bombay is already electrified. Thus Itarsi-Bhusawal when energised would complete the electrification of Delhi-Bombay trunk route via Central Railway. Though Itarsi-Bhusawal (projected traffic density 35·5 million GTKm/RKm/annum and IRR 12·7%) was approved in 1982-83, the expenditure incurred thereon upto March 1987 was only Rs. 8·52 crores against the sanctioned cost of Rs. 77·13 crores. It is now targetted to be completed by 1990-91. Thus, for at

least 27 months, if not more, the electrification of Delhi-Bombay route (via Central Railway) would remain incomplete. Delay in taking up this section is incomprehensible particularly when sections (Balharshaah-Wardha and Jhansi-Nagpur) with lesser traffic densities and I.R.R.'s and approved at the same time were taken up earlier. If financial constraints was one of the reasons for the delay that perhaps could have been avoided by deferring the work on the four priority 'B' sections taken up in Seventh Plan and allotting the funds earmarked to them to this project. At this stage the Committee can only express the hope that the Government would be careful in future in giving approval to projects which are financially viable and also in overall interests of the country.

CHAPTER V

TARGETS AND ACHIEVEMENTS

Fifth Plan

5·1 At the end of the Fourth Five Year Plan (1969-74), the Railways had about 4190 electrified route kilometres (R Kms). The Fifth Plan had envisaged an outlay of Rs. 120 crores (later reduced to Rs. 101 crores) and energisation of 1800 R Kms. comprising seven sections spread over Southern, South Eastern, northern and Western Railways. Out of these 1800 R Kms., as much as 1463 R Kms. comprised the spill over works on seven sections from the earlier plan. The Railways had asked for Rs. 126 crores from Planning Commission for electrification while formulating the Fifth Plan. According to Ministry of Railways, this demand was actually based on the sanctioned cost of the various projects which did not include any element of escalation in prices.

5·2 Based on their yearly demands, the total funds asked for by the Railways for electrification during six years i.e. 1974-75 to 1979-80 (four years of Fifth Plan as terminated one year earlier and the two years of Rolling Plans) were Rs. 175 crores. The funds allotted to them by Planning Commission during this period were Rs. 122 crores out of which Rs. 120 crores were spent by them.

5·3 However, only 728 R Kms. were actually electrified during this period. Three out of seven spill-over works from fourth Plan could also not be completed. The shortfall in achievement has been attributed by the Railways mainly to the fact that the project estimates went away due to serious inflation following oil crisis and the allocation of funds for electrification was also marked down.

Sixth Plan

5.4 At the time of formulation of the Sixth Plan Rs. 450 crores (at 1979-80 prices) were asked for by the Railways to meet the energisation target of 2800 R Kms. On 14 sections comprising 7 spill-over and 7 new sections and the same were approved by the Planning Commisston. The electrification is stated to have been taken up on a larger scale w.e.f. Sixth Plan (1980-85) onwards in pursuance of directive of Committee of Secretaries to Government of India on energy to step up the pace of electrification in view of the urgency for conservation of oil. Whereas at the beginning of Sixth Plan, work on

7 sections covering 1297 R Kms. was in progress, work on as many as 20 new sections covering 4964 R Kms was sanctioned upto 1984-85.

5·5 The total funds asked for by Railways by way of annual plan outlay for electrification during the Sixth Plan periodamounted to Rs. 642 crores out of which Rs. 437 crores were allotted by the Planning Commission. While the actual expenditure incurred by Railways during the plan period was Rs. 423 crores i.e. 94% of the Plan outlay and 98% of the Budget allocation, they could achieve energisation of only 1522 RKms i.e. about 54% of the target. Out of Rs. 423 crores, Rs. 190 crores were spent on spill-over works and the remaining (Rs. 233 crores) on fresh works taken up in the plan period. 6 spill-over works were completed during the Sixth Plan and the route electrified on these section was 1111 Kms. One spill-over work (186 Rkms) viz. Godhra-Ratlam could not be completed and was eventually energised later in 1986-87. Apart from funds constraints, the other reasons cited by the Ministry for delay in completion of this section are the extensive remodelling of Godhra passing yards and platform extension works, rebuilding of road over bridge and the section being difficult one with 3 single line block sections and terminal lacking approach roads.

5·6. From a statement furnished by the Ministry, indicating the expenditure incurred on the ongoing projects till 31 March 1985, it is seen that in addition to 14 projects targetted to be completed in Sixth Plan, the Railways had also spent funds on the 10 fresh works taken up in the plan period. The expenditure incurred in 3 (Vijayawada—Balharshah, Gangapur City—Ratlam and Arakkonam—Jollarpettai) out of these 10 sections accounted for as much as Rs. 107·68 crores upto 31 March, 1985. Consequently, the Plan outlay got distributed on too many projects leaving less funds for completion of the projects which had been scheduled for completion during the Sixth plan period.

5·7. Defending their action of spending funds on so many projects, the Ministry of Railways have explained that the project for track electrification of a section normally takes around 4 to 5 years from the time go-ahead signal is given and adequate flow of funds is assured. While some projects are programmed during a particular plan period the residual works of few projects progressed substantially in earlier plan periods are completed and likewise for some others preliminary works are taken up for progressing the electrification works during the plan period ahead. Thus, in these circumstances the fresh works are sanctioned to maintain the shelf 'pipeline' and avoid its running 'dry'.

5·8. Out of 14 sections which were to be energised in the Sixth Plan, only 7 were completed during the plan period. Three sections were completed later in 1986-87; one section has been accorded lower priority, and in respect of remaining 3 sections, the Railways expect the work to be completed

during 1987-88. Out of 10 sections completed so far, there has been considerable cost escalation and time over run as many as 8 sections as is evident from the following table showing the original estimated cost, time for completion etc.

Sl. No.	Section	Project Cost (In crores)			Completion Period (Months)		
		Original	Revised	%age increase	Original	Revised	%age increase
1.	Gummidipundi-Gudur	11·14	20·90	88	60	88	47
2.	Gudur-Chirala	22·28	40·10	80	60	88	47
3.	Kirandul-Jagdalpur	19·05	53·31	180	72	144	100
4.	Jagdalpur-Waltair						
5.	Delhi-Mathura	45·06	113·76	152	60	78	30
6.	Mathura-Jhansi						
7.	Vadodara-Ratlam	35·83	91·25	155	60	84	40
8.	Mathura-Gangapur City	18·24	40·58	124	60	69	15

Seventh Plan

5·9. At the beginning of Seventh Five Year Plan, the Railway had spill-over work of 18 sanctioned sections the work on which was either at various stages of completion or yet to be started. The track to be electrified on these sections comprised 4522 RKms. However, Railways programmed to energise 3400 RKMs. during the Seventh Plan for which Rs. 830 crores were asked for by them at the time of formulation of the Plan and the same were allotted by the Planning Commission. According to Railways, the electrification target for Seventh Plan was pegged to 3400 RKms. (instead of 5049 RKms as envisaged while drawing up the 10 year accelerated electrification programme in 1980-81) mainly to ensure a match in locomotive availability and keeping in view the resources made available to the Railways as a whole for the various plan heads.

5·10 Although the Railways had started incurring expenditure on 14 of the 18 carried forward sections in the Sixth Plan period itself, yet only 12 are targetted to be completed by March 1990, i.e. the end of Seventh plan period. Two are slated for completion by March 1991 ; two by March 1992 ; while in respect of remaining two, the target dates are yet to be fixed. Out of the 12 aforesaid sections, 5 have been energised and the physical progress on the

remaining 7 as on 30 June, 1987 ranged from 5% to 66%. While the Railways were not in a position to complete the work on spill over works, they on the other hand, approved six new works comprising 479 RKms during the current Plan and the work on four of them (covering 234 Rkms) has already commenced on opertional considerations and is targetted to be completed during the plan period.

5·11 From the statistics furnished by Railways regarding the progress of electrification during the Seventh Plan, it is seen that 1704 RKms are likely to be electrified at a cost of approximate Rs. 527 crores during the first three years of the current plan. Thus, in order to meet the target of 3400 RKms, 1696 RKms, would have to be electrified by the Railways during the last two years of the plan and as per the plan outlay, the funds at their disposal for the same would be only about Rs. 303 crores. In reply to a query whether Railways do not apprehend non-achievement of Seventh Plan target, the representative of Railway Board stated that for the first time they were getting every year not only Rs. 165 crores (1/5th of Plan outlay) but something more than that taking inflation into account also and for the first time they were ahead of the energisation target. The Ministry have supplemented in this connection by stating that the Plan outlay of Rs. 830 crores was indicated in 1984-85 at the price level then obtaining. For meeting 3400 Rkms. target, roughly an overall outlay of Rs. 1020 crores may be needed to over inflationary element also. Subject to funds to cover inflation also becoming available no difficulty is envisaged in meeting the target of 3400 RKms.

5·12 The Committee find that during 1974-75 to 1979-80 (4 years of truncated Fifth Plan and 2 years of Rolling Plan) the Railways were allotted Rs. 122 crores by Planning Commission for electrification, out of which Rs. 120 crores were spent by them. However, they could energise only 728 RKms during this period against the target of 1800 RKms set by them for Fifth Plan (1974-79) for which a plan outlay of Rs. 120 crores (later reduced to 101 crores) was made. Serious inflation following the oil crisis has been cited by the Railways as the main cause responsible for the shortfall in achievement. Again, while the expenditure in Sixth Plan was 94% of the Plan outlay and 98% of the Budget allocation, only 1522 RKms were energised against the target of 2800 RKms. According to Railways the project estimates are framed at the current prices and do not contain any element of future inflation. However, it is difficult to accept that the Railways could have achieved the targets during the Fifth and Sixth Plan periods even if they were allotted. Rs. 175 crores and Rs. 642 crores as demanded by them during each of the years of these plans respectively perhaps taking inflation aspect also into account. The Committee are, thus inclined to conclude that Railways failed to

exercise proper control over the timely execution of the projects in these plan periods leading to considerable cost escalation and resultant increase in cost of electrification/Rkm.

5·13 Improper planning seems to be the main cause for the delay in completion of the electrification projects. For example while the target for Sixth Plan was to energise 14 sections including 7 spill over sections as many as 20 new sections were sanctioned during the plan period. Consequently, the Budget allocation of Rs. 437 crores against the Plan outlay of Rs. 450 crores, got distributed over 27 sections, instead of concentrating the Budget allocation on 14 targetted sections. While there may be justification to sanction fresh works in order to maintain the shelf 'pipeline' and avoid its running 'dry' but it should be ensured that incurring of expenditure thereon does not result in shortage of funds for the targetted projects. If so many new works were sanctioned with a view to stepping the pace of electrification w.e.f. Sixth Plan onwards, then it was necessary to ensure the availability of sufficient funds for the same. The Committee would like to be informed whether all the fresh works were sanctioned in consultation with the Planning Commission and if so, the reasons why Planning Commission could not make available sufficient funds for the same eventually.

5·14 Another aspect of improper planning is evident from the fact that at the end of Sixth Plan 18 sections were spilled over but only 12 of these are targetted to be completed during the Seventh Plan. On the other hand 6 new sections have been approved so far in the current plan and 4 of them are targetted to be completed during the plan period. It is needless to say that the best the Railways could do was to fix the target for completion of 14 of the 18 spill over sections on which they had started incurring expenditure in the Sixth Plan itself.

5·15 The Committee further note that the enthusiasm with which the Railways took decision in January, 1981 to step up the pace of electrification appears to have been cooled down while formulating the target for Seventh Plan. Against 5049 Rkms as envisaged at that time for the Seventh Plan, the Railways programmed to energise only 3400 Rkms which even fell short of 4522 Rkms comprising of spill over work on 18 sections from Sixth Plan. The reduced target is stated to have been fixed to ensure a match in locomotive availability and keeping in view the availbility of resources. If this was the constraint in setting up higher target, it is not clear on what consideration the Railways had decided in January 1981 to achieve energisation of about 1000 Rkms every year from Sixth Plan onwards.

5.16 The Committee are now informed that the Railways require Rs. 1020 crores against the Plan outlay of Rs. 830 crores for achieving the target of 3400 Rkms in the current Plan. Considering the expenditure incurred and the number of Rkms energised so far, the Committee apprehend that the Railways may have to spend much more than Rs. 1020 crores. The Committee hope that the Planning Commission would allot the necessary funds to the Railways during the current Plan to enable them to achieve the target.

5.17 A disquieting feature about the execution of the various projects has been the failure of the Railways to complete the spill over works during the following plan periods. For example, 3 of the 7 works in Fifth Plan and 1 of the 7 works in Sixth Plan were not completed and again in Seventh Plan, 6 out of the 18 works are not targetted to be completed. It appears that spill over works have not been accorded the priority they deserved. As the track electrification of a section normally takes only 4-5 years, it should not be difficult to complete the spill over works within 2-3 years of the following plan period. The Committee hope that Railways would ensure this and in no circumstances spil over works will be allowed to again spill over. They also expect the Railways to draw a lesson from this experience and strengthen their planning implementation and monitoring machinery so that there are no time and cost overruns.

CHAPTER VI

TECHNOLOGICAL CHANGES

6.1 The 25 KV AC 50 cycle electrification system, essentially of French design, was introduced in India in late 50s. Since then there have been technological developments in Traction Distribution (Fixed Installations) and Traction Rolling stock (Electric locomotives EMUs) abroad, the details of of which have been reproduced in Appendix-II.

6.2 The Ministry of Railways have informed the Committee that in view of the huge finances involved in the matter of switchover to newer technology, Indian Railways have traditionally adopted a cautious approach, going in only for proven technology after extensive service trials wherever needed. To that extent the adoption of some of the technological upgradation measures have been/are in the process of getting cincorporated in electrification schemes and electric locomotives only recently.

6.3 The locomotives being manufactured in Chittranjan Locomotives works, at present, are of 3900 H.P. capacity with technology based on 1960 vintage. According to the representative of the Railway Board, while efforts have been made towards transplantation of the technology obtained from Europe, no significant work for upgradation of this could be done or has been done. In the meantime, the technology has changed in several respects the world over, The technology of thyristors was available in Europe as early as in 1972-73. The thyristorised controlled locomotives are stated to be of modern technology traction motors which is one of the main items to give higher realiabiiity. But at that point of time Indian Railways did not go in for that. Rather, they continued with the same old technology. It was only in 1983, that the tenders were floated for import of 6000 H.P. thyristorised controlled locomotives and technology transfer for the same. Consequently, 18 prototypes viz. six each of 3 designs (two designs from Hitachi, Japan and one design from Sweden) ordered in 1985 are expected to arrive from January 1988 onwards upto June/August 1989. These will be put on service trials under Indian conditions for one year, then evaluated and selected for collaboration and series manufacture.

6.4 However, the technology of 6000 HP. thyristorised controlled locomotives is not the latest state-of-the-art technology. According to the representative of Railway Board what has come up on the horizon is the A/c 3-phase traction motor technology. Though it is slightly costly yet the maintenance cost of the locos based on it is something like 40 per cent less

than those based on the latest state-of-the-art DC technology. Explaining the benefits of AC traction motor over DC traction motor, the witness stated that the maximum output per axle with D.C motor is of the order of 1000 H.P. whereas in AC 3-phase motor 2000 H.P. of output can be achieved per axle. He further stated that this new technology was proved good by 1984-85 and was paying rich dividends is terms of better availability and certain other parameters like better power factor, less energy consumption etc.

6·5 In reply to a query as to why the Railways are importing prototypes of 6000 H.P. thyristorised controlled locomotives when they had information about this new technology, the representative of Railway Board deposed that in the tenders floated in 1983 the tenderer was free to quote either a DC motor technology or any other 3-phase new technology but the only condition was that the technology should be of proven nature. However, none of the tenderers including the people who pioneered 3-phase technology quoted for the same as they felt that it was still under trial for the high horse power range the Indian Railways were looking for. But seeing the latest trend, a loan has been negotiated with the Asian Development Bank for procurement of 30 freight and 10 Passenger high horse power locomotives using 3-phase technology for which tenders have been floated and they are expected to arrive in the next two years.

6·6 On being asked about the steps being taken to upgrade the present design of electric locos, the representative of Railway Board stated that the two parts of the locmotives viz traction motor and the bogie are the main constrants in its satisfactory working and need immediate improvement. For this a traction motor with technology from Japan has been selected and will be manufactured from 1988 onwards. Likewise, search is on for the modern design of bogies and for that tenders have been floated for import of a limited number and technology transfer.

6·7 As regards fixed installation, the Ministry have contended that long creepage insulators for polluted zone, SF6 switchgear, microprocessor based solid state supervisory remote control system, transformers with higher short circuit capability and remote controlled tap changing arrangements and PTFE type phase breakers are getting inducted more and more progressively. Higher performance tower wagons for improved maintenance are also under acquisition. A big step in technological upgradation has been taken in adopting 2x25 KV AT system of Electrification. A heavy freight section Bilaspur Katni-Bina has been selected as the first route for this system.

6·8 According to Railways other areas, where improvements are necessary to meet the future heavy traffic demands on electrified routes, and the steps being taken by them are as under :

(i) To improve the utilisation of the sections, it is necessary that the average speed of the goods trains in increased so as to bring the

differential between the passanger train and goods train down. For this, a wagon which can run fast and is more reliable is required. The speed potential of the present wagon is 75 Kms. per hour and the requirement is of a wagon having speed potential of 100 Kms. per hour. Instead of going in for a complete wagon, the Railways want to go in for a new bogie as the bogies of the existing wagons are giving problems of spring—breakages, bogie—frame cracks etc. To get bogie free from these defects, tenders were invited and orders have been placed for prototype of bogies which are expected to arrive by March 1988. After a trial period of 9 months, the Railways will be in a position by the end of 1988 to select a bogie for series manufacture from the latter part of 1989 or early 1990.

(ii) A similar effort is on to have coaches which are lighter in weight; less energy comusming, better corrosion resistent, and having higher speed potential. Tenders for these have also been floated for the limited import and technology transfer for manufacturing them.

(iii) Healthier tracks are needed to absorb the new technologies to be brought about in locos, wagons and coaches. For this, more and more concrete sleepers, heavier long rails, deeper ballast cushions etc. are being used while laying down the tracks. The Railways are adopting all the feature of the modern track which can take heavier traffic and at higher speed. The Railways expect to wipe out the arrearofs renewals and upgrade the main routes like those being electrified in the next 10 years so that maximum speed of at least some passenger trains could be increased to 140 kms./hr. and of the wagons upto 100 kms/hr.

6.9 The Committee regret to observe that the Railways have failed to adopt technological upgradation developments in traction distribution and traction rolling stock of the electrification system which have been taking place abroad since long and it is only recently that some steps have been contemplated by them in this direction. For example, nothing was done till 1983 to upgrade 3900 H.P. locomotives being manufactured in Chitranjan Locomotive Works based on 1960 vintage technology. The Indian Railways did not opt for the technology of thyristors which came into Europe are early as in 1972-73 and the locomotives based on this technology are stated to be highly reliable. While the Committee can realise the importance of introducing technology changes only when proved successful, they are unable to understand the long delay in adopting the same. The Committee consider that it is necessary to keep track of the proven technological changes relevant to Indian environment and adopt them at the earliest so that research and development being done abroad could be advantageously utilised with a view to increasing the

efficiency of Indian Railways electrification system. As regards the question of the huge finances involved in the process, the Committee consider that it would be worthwhile to electrify less number of route kms. than those being planned in order that the electrification system (both in terms of fixed installation and Traction Rolling Stock) thereon could be maintained up-to-date with latest technological developments.

6.10 The Committee are constrained to point out that even the belated decision of the Railways to upgrade the electric locos with latest technology has not been acted upon. This is evident from the fact that after inviting tenders in 1983 the Railways placed orders for 18 prototypes of 6000 H.P. thristorised control locomotives viz. six each of 3 designs from Japan and Swaden in 1985 and the same are expected to be delivered from January 1988 onwards whereafter they would be put on service trials for one year and then out of these one type will be selected for series manufacture. Apart from slow pace of action in this regard, the decision of the Railways to place orders for these locomotives in 1985 can not be fully justified in view of the fact that a better technology (AC 3 phase) had been developed abroad by then and it was paying rich dividends in terms of better availability of locomotives and certain other parameters. The Railways could have possibly revised their decision at that time in favour of the latest technology or at best simultaneous action could have been taken to import some prototypes of locos based on the latest 3-phase technology. However, it is only now that Railways have floated tenders for 40 high H.P. locomotives using 2-phase technology, supply of which might take a few years if the Railways' experience regarding import of 6000 H.P. locomotives is any indication. The Committee feel that excessive time taken to procure 3-phase locomotives would further delay the selection of a suitable high H.P. locomotive for series manufacture in India since the Railways are unlikely to be able to take a decision before evaluating the performance of 3-phase locomotives under Indian conditions. The Committee at this stage can only hope that action would be taken to procure expeditiously these 3-phase traction motor locomotives.

6.11 The Committee would like to be apprised as to why Railways could not bring about any improvement indigenously in the technology of the current design of electric locos all these years. Since production of High H.P. locos based on thyristors or AC 3-Phase technology is likely to take a few more years, it is necessary that efforts are made, if not already initiated, at the earliest in this direction. There should not be much of a difficulty in the process as

the Committee understand* that CLW has the capacity to uprate the current design of electric locos upto at least 5000 H.P. with the existing resources and infrastructure. They would like to be apprised whether any progress has since been made in this regard. Further, with a view to ensuring satisfactory working of existing fleet of electric locos, the Railways are stated to have taken steps to improve the traction motor and bogie, the two main problem ridden equipments, by import of technology. The Committee consider that other parts of the locos such as transformer, convertor and invertor should also be improved upon either indigenously or by importing the latest technology so that the existing fleet of electric locos could be totally revamped and made more efficient and economical. The Committee further desire that in all these activities as well as for effecting improvements in the fixed installation the RDSO Lucknow should be actively associated. There should be a close and constant interaction between the production and the research wings of the Railways so that the problems of crucial importance are tackled in an effective and conclusive manner. The activities of RDSO should be intensified to enable it to keep abreast with the latest available technology all over the world so as to build up its confidence and strength enabling the Railways to develop latest technology expeditiously.

6.12 The Committee are of the opinion that simultaneously steps should be taken to develop the track and strengthen repair and maintenance organisation as the maintenance work is not at a level where it should be.

*Para 5.16 of the Report of Railway Convention Committee (1985)

CHAPTER VII

PROJECT PLANNING AND EXECUTION

7.1 A review in audit of the planning and execution of certain electrification projects revealed delays in execution, non-materialisation of the expected benefits, lack of proper planning and instances of extra expenditure which are discussed as under—

(i) *Waltai-Kirandul Section*

7·2. The electrification of this Section was sanctioned on 17 December, 1970 at a cost of Rs. 19·05 crores for throughput of 6 million tonnes per annum and for trains with 3200 tonnes trailing loads. Consequent upon indication from Ministry of Steel and Heavy Engineering (on 7 December, 1970) that the section might have to be geared for annual throughput of 12 million tonnes, the Railway Administration was directed (March 1972) to carry out a survey and make recommendations for optimising capacity of this section. Meanwhile, the project had commenced in March 1971 and the expenditure incurred thereon by the end of 1971-72 was about Rs. 1·88 crores. It was only on 14 December, 1972 that the instructions were issued to Railway Administration that no further commitments were to be made in the execution of the electrification scheme. The optimisation survey report submitted by Railway Administration in latter half of December, 1972 was considered dy Railway Board in June/November, 1973 and it was decided to increase the throughput of the section to about 10 million tonnes per annum with trains having 4500 tonnes trailing load. The infrastructure required for this included higher sized contact wire, more number of sub-stations, increased size of telecom able with more number of circuits and provision for sudstantially increased number of staff quarters.

7·3. In June 1974, Railway Administration submitted revised estimates of the modified electrification scheme to the Ministry of Railways at a cost of Rs. 33·59 crores. The increase in estimates, *inter-alia*, was due to escalation from 1969 price level (Rs. 9·66 crores) and change in scope of work (Rs. 4·59 crores). The revised eetimate was sanctioned by the Railway Board in January 1978 i.e. after a lapse of 3½ years. This estimate, sanctioned in 1978, was further revised twice and the final sanctioned cost for electrification of the section stood at Rs. 53·31 crores (Gross.) Thus, the total increase in cost over the original sanctioned estimate amounted to Rs. 34·26 crores. As a sum of Rs. 4·59 crores accounted for change in scope of work following modification for optimisation of the capacity in 1974, the total

escalation in cost of labour and material over the completion period was Rs. 28.46 croses i.e. more than 120% increase.

7·4. Consequent upon the change in the scope of electrification scheme, the target date for completion (March 1975) was revised to March 1976 and finally to 1980-81. The actual energisation of the section was, however, in phases—Kirandul to Jagdalpur (149 RKms) in August 1980 and upto Waltair (472 RKms) in December, 1982.

7·5. The delay of about six years in execution of the project resulted in non-achievement of anticipated savings of Rs. 15·90 crores (at the rate of Rs. 2·65 crores per annum) in working expenses. Besides, the delay resulted in avoidable expenditure on account of payment of compensation amounting to Rs. 45·25 lakhs to CHE contractors, higher minimum guarantee charges of Rs. 56·34 lakhs to Madhya Pradesh Electricity Board (MPEB) upto March 1984 and increased establishment charges estimated at Rs. 182·23 lakhs.

7·6. During evidence the representative of Railway Board attributed the delay in completion of the project mainly to non-availability of adequate funds for this section. Subsequently, Railways in a note emphasised that as the Planning Commission accorded lower priority for Railway Electrification works beginning with the mid term appraisal of Railway's Fifth Five Year Plan, founds under this head were scaled down. Within the Railway Electrification projects also, this section was given the lowest priority. Subsequently, progress of works in this section was basically dictated by the availability of funds.

7·7. However, it is seen from the following table that the project authorities could not utilise whatever funds were allotted to them during each of the years from 1970-71 to 1979-80 :

Year	*Funds Allotted* (Rs. in crores)	*Actual Expenditure* (Rs. in crores)
1970-71	0·50	0·04
1971-72	2·64	0·84
1972-73	3·85	2·72
1973-74	4·19	2·46
1974-75	3·62	3·20
1975-76	5·26	4·53
1976-77	5·00	4·85
1977-78	5·00	5·37
1978-79	7·00	4·60
1979-80	6·00	3·36

7·8. The other reasons for the delay in completion of the project, as explained by the Ministry, were a combination of factors like impact of optimisation study for 10 million tonnes throughout, consequent need for revision in system design for OHE, sub-stations and signalling and telecommunications circuits dispute with MPEB, failure of indigenous suppliers to deliver insulators necessitating import delayed availability of locos for trial, problems due to inaccessible mountaineous terrain of the section etc.

7·9. According to the Ministry, the detailed design for OHE and sub-stations could be finalised in 1974 but those relating to signalling & telecommunications side presented more formidable problems. The design was eventually finalised only on the basis of simulated field trials. As a result while the telecommunication cable was laid in 1978-79 on Jagdalpur-Kirandul section, on Jagadalpur-Kotavalsa Section Cable could be laid only in 1981-82 using specially imported cables like of which were not available indigenously.

7·10. As regards the delay in supply of power by MPEB, it is seen from the chronological sequence of events furnished by the Ministry, that when Railways informed MPEB on 28 April 1975 that they want power supply for the section from June 1978 instead of April 1976, MPEB agreed to slow down their pace of work but desired compensation (w.e.f. June 1976) at the rate of 18% on Rs. 2 crores invested by them till then for power line construction materials for supplying power to Railways according to Railway's requested time table. The Railways sought to disallow the claim for compensation under a particular clause of the draft agreement proposed to be entered into between the Railways and the MPEB. The dispute over this compensation claim raised by MPEB continued till April, 1979 when Railways informed MPEB about decision to energise Jagdalpur-Kirandul section from 11 June, 1979 and the MPEB reciprocated by not agreeing to supply of power till the compensation issue was resolved to their satisfaction. Eventually, the impasse was resolved in August 1980 through intervention of Ministry of Energy, who prevailed upon the MPEB to release power for traction service from August 1980 with simultaneous agreement of both the parties to refer the dispute on compensation claim for arbitration by Member (TRC) Central Electricity Authority. The arbitrator gave an award of Rs. 56·04 lakhs on March 1984 in favour of MPEB.

7·11. The objective of increasing line capacity through electrification of the section from the then existing 6 million tonnes to 10 million tonnes/annum did not materialise and the volume of traffic on the electrified route during 1980-81 to 1983-84 varied between 5·38 and 6·73 million tonnes only.

7·12. Although the Waltair-Kirandul section was energised in December, 1982, yet the diesel traction was discontinued from September 1935 only. The Railways have explained this by stating that the electric locomotives to operate on this section were required to be modified especially for provision

of thrust pads on axle boxes and capability of working with vacuum as well as air brake system.

The number of locomotives deployed in the section progressively increased as and when these were turned out from Chittaranjan Locomotives works. Simultaneously, with the build up of electric loco holding from 1982 onwards to 1984, the diesel holding working on the section was attritioned.

7.13. From the foregoing paragraphs the Committee are inclined to conclude that the planning and execution of Waltair-Kirandul section was casually and ineptly handled which was further aggravated by delayed decisions. Consequently, there was delay of six years in completion of the project and 120% increase in the project cost. The delay in execution of the project not only resulted in non-achievement of anticipated savings (Rs. 15·99 crores) in [illegible] expenses but also in avoidable expenditure on account of payment of compensation to OHE contractors (Rs. 45·75 lakhs) and MPEB (Rs. 56·34 lakhs) and in establishment charges (Rs. 182·23 lakhs).

7.14. There was 15 months delay on the part of the Railway Board in directing the Railway Administration to carry out a survey and make recommendations for optimising capacity of the section keeping in view the expected movement of 12 million tonnes of traffic as indicated by Ministry of Steel; 6 months' delay in consideration of the recommendations of this survey Report and a further 3½ years delay in sanctioning the revised estimate submitted by Railway Administration.

7.15. Though some delay was expected due to provision in system design for OHE, substations and signalling and telecommunication circuits as a result of implementation of electrification survey report and for which the target date was duly revised to March 1976 from March 1975, the utlimate delay of about six years in energisation of the section was certainly not unavoidable. The paucity of funds as one of the main reasons for the delay is unacceptable on two counts first, the project authorities could not utilise the funds made available to them during each of the first 10 years and secondly, the delay would have taken place even otherwise due to Railway's lack of proper planning and anticipation of certain inevitable developments. For example, the Railways allowed the dispute of compensation with MPEB to arise and remain unresolved for quite a long period with the result that when they required this power supply for phase I (Jagdalpur-Kirandul) from June 1979 MPEB insisted for the compensation and did not agree to supply of power. The issue was resolved ultimately in August 1980 and this

precious 15 months were lost on this count. Again due to delay in finalisation of tele-communication design system, the tele-communication cables could be laid in Jagdalpur-Kirandul and Jagdalpur-Kotavalsa sections in 1978-79 and 1981-82 respectively. Further, the delay on account of non-availability of locos for trial purposes had nothing to do with availability of adequate funds and in fact highlights Railway's failure to provide matching facilities with the different stages of project execution. It will not be out of place to mention here that full number of electric locos required for working on the line were not coordinated and got ready for use with the completion of electrification in December, 1982 with the result that diesel traction could not be discontinued on the section till September, 1985. The delay on account of failure of indigenous suppliers to deliver cables and insulators could have been tackled by timely action on the part of the Railway Administration. The explanation that there were technical and logistic problems in execution of the project due to inaccessible mountaineous terrain of the section is also unconvincing as they were already aware of the nature of the terrain before embarking upon the project and laying down the completion target.

7.16. Another disquieting feature of the project has been the poor volume of traffic on the electrified route which varied between 5.38 and 6.73 million tonnes during 1980-81 to 1983-84 against the anticipated figure of 10 million tonnes. Thus, optimisation capacity work, involving increased project cost and the resultant delay, carried out as a result of optimisation study has been entirely infructuous. The Committee would like to be apprised as to why the traffic as projected in optimisation survey report has not materialised even after 7-8 years of the target date (March 1976).

7.17. The Committee expect the Railways to draw appropriate lesson from the execution of the project with a view to avoiding time and cost overrun in the future projects and would take appropriate steps to strengthen project planning and implementation. The Committee desire that the Railways should re-examine the methodology of prediction of traffic and devise suitable technique so as to avoid infructuous expenditure in creating capacity which does not subsequently materialise.

(*ii*) *Vijayawada-Gudur Section*

7.18. The Ministry of Railways (Railway Board) sanctioned (September 1972) a project for electrification of the section between Madras and Vijayawada on the Delhi-Madras trunk route at an estimated cost of Rs. 33.42 crores. In October 1973, Railway Board decided to bifurcate the project into two sections *viz.* Madras-Gudur (141 RKms) and Gudur-Vijayawada

(293 RKms) to be executed by the Southern and South Central Railways respectively. Proportionate cost of VRGE project worked out at Rs. 22·28 crores. The project estimate was revised in April 1976 to Rs. 38·19 crores taking escalation in cost and increase in scope of work into consideration. The Electrification project targetted to be completed in March 1976 was completed after a delay of 4½ years in November 1980. The delay in electrification of this section resulted in non-realisation of expected savings in working expenses amounting to about Rs. 10·41 crores.

7·19. The delay in completion of the project has been attributed mainly to :—

(i) bifurcation of the project into two portions;

(ii) non-availability to requisite funds,

(iii) delays of 3 to 5 years in procurement of critical materials (such as solid case insulators, communication cables, regulating equipments, lightning arresters and transformers), delayed deliveries and delays in approval of prototype by RDSO; and

(iv) diversion of certain critical materials when the project was nearing completion (1979), to other ongoing electrification projects.

7·20. Further, 7 material modification works costing Rs. 2·87 crores were sanctioned between May 1980 and August 1981. According to the Ministry, the need for the above additional works were felt when the electrification works were in progress and hence had to be processed as material modification works to the main estimate. Out of these two have not yet been completed and the Railways expect these to be completed in 1987-88.

7·21. As against the latest estimate sanctioned by Railway Board, including the subsequent material modifications, of Rs. 4·10 crores, the up-to-date expenditure booked upto March 1987 was Rs. 37·79 crores.

7·22. Actual traffic on this electrified route was about 9438 million GT Kms on average per annum during 1981-82 to 1984-85 (upto June 1984) against the anticipation of 11, 143·21 million GT Kms. The position did not improve even thereafter as in 1986-87 (upto Dec. 1986) the actual daily loading of average four wheeled wagons was 1369 against the anticipated figure of 1654 wagons. According to Ministry of Railways, coal requiring movement over this section had to come from Singareni group of coal fields and the production in these fields unfortunately stagnated around 12·00 million tonnes during this period.

7·23. Inspite of non-materilisation of the anticipated traffic, costlier diesel operation was resorted to on this electrified route for 2461·6 million GT Kms. i.e. about 8% of the traffic offering during 1981-82 to 1984-85 as a

large proportion of the traffic on north and south routes was for destinations reached via Gudur Renigunta (un-electrified section) and instead of changing engines both at Vijayawada and Gudur trains were run to their destinations with diesel engines. This entailed an extra expenditure of Rs. 63 lakhs (at 1981-82 rate differential between diesel fuel and electric power) which actually may be more as the rate of increase in price of diesel was more than that of electricity from 1980-81 to 1983-84. Ministry of Railways have justified the operation of diesel engines by saying that once Vijayawada-Gudur-Madras route was electrified, all freight traffic for destinations reached via Gudur Renigunta was moved via Gudur-Madras section. However, passenger services for destinations reached via-Gudur-Renigunta were worked with diesel locos for (a) adequate facilities were not available at Gudur for changing traction; and (b) the total locomotives i.e. both diesel and electric locos required for these service would have been larger if traction was changed at Vijayawada.

7.24. Availability of required locos should however, not have been much of a problem as according to Railways themselves*, the diesel as well as electric locos were surplus continuously from 1977-78 to 1983-84. Further, Audit has pointed out that with actual production of 230 electric locos during 1980-85 and the surplus holding of 138 number as at the beginning of Sixth Plan, the total availability became 408 electric locos against the requirement of 258 locos for 1522 RKms energised during Sixth Plan. This had resulted in surplus of 150 locos at the end of Sixth Plan. Thus it is seen that electric locos were surplus during the whole of Sixth Plan.

7.25. In reply to a query whether it was not prudent to plan electrification of Gudur-Renigunta section alongwith that of Vijayawada-Gudur section, the Ministry have stated that it was not possible due to constraint of resources. However electrification of Gudur-Renigunta was taken up subsequently and completed in November, 1984.

7.26. Execution of Vijayawada-Gudur Section is another instance of delay, cost escalation and lack of proper planning by the Railways in Electrification projects. Apart from delay of four and a half years in energisation of the Section in December 1980 instead of March 1976 and resultant non-realisation of expected savings in working expenses (Rs. 19.41 crores), there has been considerable escalation (39%) in project cost. The oft-repeated plea of funds constraints is hardly convincing as the Railways themselves had spread the scarce resources on far too many projects. Delays in procurement of critical material and approval of prototypes by RDSO point towards project planning/CORE's a lack of planning and coordination

*Para 1.18 of 46th Report of PAC (7th Lok Sabha)

with the concerned Deptts/Agencies in this regard. Diversion of critical materials to other on-going projects when this Section was nearing completion is indicative of bad planning particularly when this was a priority-project on the Delhi-Madras trunk route and the funds from other project (Waltair-Kirandul) were diverted to this project. Further, the quantum of work involved in the project does not seem to have been properly gauged at the project estimate stage as the Railways had to increase the scope of work in April 76 and again 7 material modification works costing Rs. 2·87 crores had to be sanctioned from May 1980 to August 1981. Thus, the delay and cost escalation in the project could have been curtailed, if not altogether eliminated, had there been proper planning and timely anticipation of difficulties involved in procurement of critical materials.

7·27. Apart from non-realisation of expected benefits for 4½ years, the electrified section remained unutilised fully even after its completion in November 1980. Despite non-materialisation of anticipated traffic the Railways operated some passenger services on the section with diesel locos for destinations reached via Gudur-Renigunta (unelectrified section) during 1981-82 to 1984-85 which entailed extra expenditure of more than Rs. 63 lakhs. The Railway's plea that total locomotives required would have been larger if the traction was changed at Vijaywada is unacceptable as there should not have been any problem as such since the diesel as well as electric locos were surplus continuously from 1977-78 to 1983-84. Operation of diesel locos on the electrified section could have been avoided by providing change of traction arrangements at Gudur and, if that was not feasible, electrification of Gudur-Renigunta section (completed in 1984) should have been advanced by 2-3 years and synchronised with that of Vijayawada-Gudur. The Committee recommend that detailed reasons leading to this lapse should be investigated and effective remedial measures taken to obviate recurrence of such lapses in future. They would also like to be informed of the action taken in this regard.

(*iii*) *Delhi-Jhansi Section*

7·28 Electrification of Delhi Jhansi Section (423 RKms) was sanctioned in May 1979 and September 1980 in phases (phase I-Delhi-Mathura and phase II-Mathura-Jhansi) at an aggregate estimated cost of Rs. 45·05 crores. In September, 1983 when the physical progress of work was 76% on Delhi-Mathura Section and 27% on Mathura-Jhansi Section, the origional estimate was revised to Rs. 113·85 crores due to increase in cost of major inputs, changes in specification and the scope of work at the instance of the Railway Board. The revised estimate was sanctioned in July 1985 for Rs. 113·76 crores,

7·29 Out of the total excess of Rs. 68·71 crores, Rs. 39·82 crors and Rs. 5·58 crores were due to escalation in cost of material/labour due to inflation and general charges and increase of Rs. 23.32 crores was due to increase in scope of work. According to Ministry of Railways, the increase in scope of work had to be provided in accordance with decisions taken subsequent to the sanction of the original project report and abstract estimate in May 1979 and September 1980.

7·30 The electrification of Delhi-Mathura section (Phase-I was completed in March 1984 as against the original target of March 1983. Audit para points out that the delay was due to late receipt of materials, delay in finalisation of site for electric locoshed, slow progress of work by OHE and S&T contractors, diversion of their resources to MTP works for ASIAD 82, etc. Elaborating in this connection further, the Ministry have stated that Delhi-Mathura Project provide for use of all aluminium catenary but despite their best efforts it was not possible to develop successfully the prototype aluminium alloy as fast as envisaged and decision was taken in October 1980 only that instead of waiting indefinitely for aluminium catenary, the project may be pushed through using conventional cadmium copper catenary. Further, restricted availability of funds during 1980-81 and 1981-82 also affected progress of the project. The Ministry have further explained that main factor however was the Electrification of Ring Railway in Delhi which had to be completed by June 1982 in time for ASIAD 1982. The OHE contractor M/s IRCON who was common for both these projects had to divert major material and resources to complele the Asiad project even at the cost of delay to Delhi-Mathura contract.

7·31 Phase II (Mathura-Jhansi section) targetted to be energised by March 1984 was eventually completed on 11 March, 1987. Expenditure to the tune of 99·10% of the revised estimated cost (Rs. 113·76 crores) had been incurred upto 31 March, 1987 on the project.

7·32 The fact that the project cost had to be revised from Rs. 45.05 crores to Rs. 113.85 crores just three years after the sanctioning of the estimate on account of escalation due to inflation and general charges (100% increase) and changes in specification and increase in scope of work (52% increase) leads the Committee to conclude that proper estimates of work and expenditure involved had not been made before commencement of the project. Sanctioning of such under estimated projects create financial constraints subsequently as the actual demand for funds from such projects is usually more than that envisaged in the original estimates and the Railways have to allot the limited funds at their disposal on too many such sanctioned projects. Consequently the projects get less allotment than necessary and the period of their execution gets prolonged. For

example, due to these reasons the phase II (Mathura-Jhansi) of the project targetted to be completed in March 1984 was eventually completed in March 1987. Since cost has been revised in other electrification projects also, the Committee consider that there is urgent need to curb the presistent tendency to underestimate the work and the cost of these projects. This is essential to ensure that Railways accord sanctions to such number of projects as could be comfortably executed with the expected limited resources available to them in a particular period of time even though certain unforseen increases in expenditure take place during execution of the project.

7·33 In terms of the OHE contracts concluded (February 1982) with the approval of the Railway Board for Mathura-Jhansi Section, procurement of cement was the responsibility of the contractors. In view of the heavy rise in price of cementon its partial decontrol the contractors requested (August 1982) for supply of the material by the Railways on payment at rates fixed for levy cement. Accordingly, the Project Administration supplied cement to the contractors outside the scope of contract out of the quota allotted for Railway Electrification at an ad hoc rate of Rs. 800 per tonne subject to fixation of final rates by the competent authority.

7·34 The rate of recovery for cement supplied to the contractors was fixed (March 1983) at Rs. 1012 per tonne as against the then market rate of Rs. 1200 per tonne. Para 1269 of the Indian Railways code for the Engineering Deptt. prescribes that if material outside the contract are supplied for use on a work on the application of a contractor or are used in excess of requirements, the Divisional officer, should specify in each case, the rate to be charged, whichever is higher plus departmental charges.

7·35 On enquiry as to why the rate of recovery of cement supplied was fixed at less than the market rate contrary to the provision in the Engineering code, the Ministry of Railways explained that as per clause 1·2·21 of the contract, the recovery is to be effected at book rate or the last purchase rate, whichever is higher plus 5% on account of initiail freight and 2% on account of incidental charges together with the supervision charges at 12½% of the total cost inclusive of materials, freight and incidental charges. Further; according to the Ministry, the Clause 1·2·21 of the Tender papers for OHE contracts has been in vogue since the inception of main line electrification works from 1958 onwards. For pricing, it is in conformity with the stores code but not Engineering code.

7·36 The benefit to the contractors accuring from the extra contractual supply of cement, would be of the order of Rs. 13·43 lakhs, compared to the then prevailing market rate (Rs. 1200 per tonne). Further, the dues amounting to Rs. 15·15 lakhs from contractors at the differential of Rs. 212

per tonne between the ad hoc rate of Rs, 800 per tonne and the March 1983 rate have not been recovered by Railways so far.

7.37 The Committee recommend that the clause 1'2'21 of the Tender paper OHE contracts may be amended ss that for effecting recoveries of the cost of the materials supplied to the contracts it is brought in conformity with the provision in the Engineering Code and the financial intcrests of the Government are duly protected.

(*iv*) *Ahmedabed-Sabarmati Section*

7'38 The abstract estimate sanctioned in October 1967 for electrification of Virar-Sabarmati section provided for electrification upto Sabarmati. The electrification of a short stretch of 6 RKms from Ahmedabad to Sabarmati (involving laying of track equivalent to 28 kms) was adandoned (April 1971) on the plea of the Western Railway that with the establishment of marshalling yard at Vatva (South of Ahmedabad) the loads would advantageously be taken on electric traction upto this yard and worked therefrom by pilot movement to Sabarmati. Although the Railway Board did not initially agree to the proposal on the grounds that non-electrification of track upto Sabarmati would necessitate marshalling at Vatva besides change of traction for through loads upto Sabarmati, they ultimately approved (1971) the proposal. However, the Western Railway Administration approached the Railway Board in April 1979 to sanction electrification of this short stretch as an opertional necessity, as change of traction at Vatva had been causing detention of nearly 2½ hrs. each for 7-8 trains coming from Vadodara side. The project was sanctioned by the Railway Board in May 1979 and completed in 1981-82 at an estimated cost of about Rs. 1'20 crores. Had the electrification of Ahmedabad-Sabarmati been carried out along with Virar-Sabarmati Project, it would have cost Rs. 97 lakhs. Besides, the delayed energisation of this section resulted in detention of loads for change of traction at Ahmedabad during the intervening period in addition to diesel haulage of block loads for Sabarmati from/to Ratlam over the electrified Anand-Ahmedabad section involving extra operating cost of Rs. 53.60 lakhs for 1980-81 and 1981-82 alone.

7'39 The Ministry of Railways have explained in this connection that as the traffic from the Bombay area mostly terminated in Ahmedabad, the goods loads hauled by the electric locos from Bombay area were to terminate at Vatva. On the other hand, traffic to Sabarmati was mostly from Bhopal via Ratlam and these goods loads were hauled through diesel/steam locos. It was accordingly then decided that the section from Ahmedabad to Sabarmati need not be electrified. Further, according to them the diesel haulage of block loads for Sabarmati over the electrified section between Anand-Ahmedabad was opertionally unavoidable as change of traction

facilities like extra loop lines and yard which entail additional cost at Anand were never planned and erected. However, in 1979, with taking up of electrification on Vadodara-Ratlam and Godra-Anand Sections the position radically changed and it was decided to electrify the Ahmedabad-Sabarmati section too for opertional considerations. The electrification of Ahmedabad-Sabarmati section though taken up on an urgency certificate, was carried out as a part of Vadodara-Ratlam-Godra-Anand electrification project and energised in January 1982. Anand-Godhra section was energised in 1983-84, and Vadodara-Godhra section in 1984-85.

7·40 The Committee conclude that if the electrification of Ahmedabad-Sabarmati section had been completed earlier (1974) it would have resulted in saving of operating cost by eliminating detention due to change of traction at Ahmedabad for loads from Bombay side during the period 1975—1982. Further, if the electrification of Ahmedabad-Sabarmati Section was dependent upon the electrification of Godhra-Anand and Vadodara-Ratlam section, the Committee are unable to understand how the former was taken up on urgency certificate and completed in the year 1981-82 where Anand-Godhra section was energised later in 1983-84 and Vadodara-Ratlam section was energised still later in 1986-87. At this stage, the Committee only hope that adequate care would be taken by the Government in future in planning and implementation of projects of large financial value so that Government is not subjected to avoidable expenditure due to lack of proper planning. It is imperative that realistic project plans are prepared and there is intensive monitoring through periodical monitoring system so that effective remedial measures are taken with due promptitude.

NEW DELHI ;
4 April, 1988
15 *Chaitra, 1910 (Saka)*

AMAL DATTA
Chairman
Public Accounts Committee

APPENDIX 1

(*vide* para 1·8)

Railway Electrification

Audit Paragraph

Introduction

9.1. Electrification on the Indian Railways first introduced in 1925 on a small section of the Bombay area was confined till 1957 to less than 400 Kms. comprising the suburban sections of Bombay and Madras and two short main line sections between Bombay-Jagatpuri and Bombay-Pune. The electrification of Howrah-Burdwan suburban section (142 Kms) of Calcutta was undertaken during the first Five Year Plan and completed in 1958. Owing to inherent operational and cost advantages of electric traction over steam and diesel, it has been progressively extended from the Second Five Year Plan to busy main line sections. At the end of the Fourth Five Year Plan (1969—74) the Railways had about 4190 electrified route kilometres (Rkms). The Fifth Plan (1974—78) had envisaged an outlay of Rs. 120 crores (later reduced to Rs. 101 crores) and energisation of 1800 RKms. comprising seven sections spread over Southern, South Eastern, Northern and Western Railways. The actual progress during the six years period 1974—80 was, however, only to the extent of 728 Rkms. at an outlay of Rs. 120·81 crores.

9.2. Keeping in view the need to reduce consumption of imported diesel oil and to use the energy generated by thermal power plants, the Ministry of Railways (Railway Board), on the recommendation of the Committee of Secretaries on Energy, decided (January 1981) to step up the pace of electrification during the Sixth Plan (1980—85) and onwards so as to achieve energisation of about 1000 Rkms. per year and a Ten year programme of electrification was formulated, taking into account the break even level of traffic density (30 million GTKms.) and other high density routes carrying coal, iron ore, etc., in addition to electrifying the routes connecting the four metropolitan cities, viz., Delhi, Bombay, Calcutta and Madras. It was decided to give first priority to electrification of the Delhi-Bombay (both via Western and Central Railways) and Delhi-Madras routes; the other high density routes were to follow thereafter. The programme envisaged energisation of about 2800 RKms. during the Sixth Plan and 5049 RKms. in the

Seventh Plan (1985—90) on 14 and 22 sections respectively spread over all the Zonal Railways except North Eastern and North-east Frontier Railways (details in Annexure VII).

Targets and achievements

9.3. For Railway electrification works during the Sixth Plan a sum of Rs. 450 crores was allocated, part of which was to be utilised for building up organisational base to achieve the energisation target set for the Seventh Plan. Of the total plan outlay, Rs. 9·28 crores was to be met from internal resources and the balance through budgetary support. However, the annual budget allocation and actual expenditure were as under :—

(Rs. in crores)

Year	Budget allocation	Actual expenditure
1980-81	27·05	26·27
1981-82	61·00	63·31
1982-83	109·65	105·97
1983-84	85·75	88·75
1984-85	150·55	138·64
Total	434·00	422·94

9·4. At the beginning of the Sixth Plan, electrification on seven sections covering 1297 RKms. on Central, Southern, South Central, South Eastern and Western Railways was in progress. Work on twenty new sections (4964 Rkms.) was sanctioned upto 1984-85. Consequently, the Plan outlay got distributed over twenty seven ongoing works. The dispersal of funds resulted in patchy electrification of sections/routes over 1522 RKms. during the Sixth Plan (Annexure VIII), *i.e.*, about 46 per cent short of the target (2800 Rkms.); while the actual expenditure of Rs. 422·94 crores would be 93·98 per cent of the Plan outlay and 97·45 per cent of the budget allocation.

Project planning and execution

9·5. A review in audit of the planning and execution of the following electrification projects revealed delays in execution, non materialisation of the expected benefits, lack of proper planning and instances of extra expenditure as mentioned below.

9·6 *Waltair-Kirandul*—Electrification of this section (471 RKms.) on South Eastern Railway had been under execution during the Fifth Plan. In para 7 of the Report of the Comptroller and Auditor General of India—

Union Government (Railways), 1977-78 it was, *inter alia*, mentioned that due to changes in the scope of work (sanctioned in December 1970) in course of execution the original estimates of Rs. 19.05 crores had to be revised (June 1974) to Rs. 33.59 crores. This was followed by further upward revisions to Rs. 51.03 crores in Jaunary 1978 and Rs. 57.24 crores in February 1984, incorporating the cost of additional facilities (Rs. 171 lakhs), besides increases in establishment charges, cost of construction and electrification of additional staff quarters and maintenance and upkeep cost of assets till complete energisation of the section. The booked expenditure on the project upto November 1985 was Rs. 53.84 crores (gross).

9·7 The changes in the scope of the electrification scheme also necessiated revision of original target for its completion from March 1975 to March 1976 and finally to 1980-81. The actual energisation of the section was, however, completed in phases—Kirandul to Jagdalpur (149 Rkms.) in August 1980 and upto Waltair (472 Rkms.) in December 1982. The delay of about six years in execution of the project resulted in non-achievement of anticipated savings of Rs. 15·90 crores (at the rate of Rs. 2.65 crores per annum) in workins expenses. Besides, the delay resulted in avoidable expenditure on account of payment of compensation amounting to Rs. 45.25 lakhs to OHE contractors, higher minimum guarantee charges of Rs. 56·34 lakhs to Madhya Pradesh Electricity Board (MPEB) upto March 1984 and increased establishment charges estimated at Rs. 182.23 lakhs.

9.8 The other objectives of this electrification scheme, *viz.*, optimisation of the capacitv for increasing the throughput from the then existing 6 million tonnes to 12 million tonnes per annum and running of heavier trailing loads of 80 BOY wagons (7200 tonnes) for which OHE was redesigned (cost: Rs. 1.24 crores) did not materialise as the volume of traffic on the electrified route during 1980-81 to 1983-84 varied between 5.38 and 6.73 million tonnes only, while the trailing load continued to be 50 BOY/BOX (N) wagons (*i.e.*, 4500 tonnes).

9.9 The Railway Board stated (February 1986) that the main reasons leading to the revision of original targets of completion and delay in actual execution were :

(a) The need to have a fresh examination of number and location of traction sub-stations and design of OHE to be suitable for increasing throughput in future which led to delay in finalisation of contracts for OHE and sub-stations ;

(b) diversion of funds to other ongoing projects of Tundla-Delhi and Vijayawada-Gudur sections which were given higher priority ;

(c) failure of the indigenous suppliers to deliver insulators necessitating import :

(d) delayed availability of locos for trial ;

(e) rechecking by RDSO of the design of S&T circuits and telecommunication cables because of higher current in the OHE ; and

(f) delayed release of electric power by Madhya Pradesh Electricity Board because of disputes in the payment of compensation/minimum guarantee charges.

9·10 *Vijayawada-Gudur.*—The electrification of this section on South Central Railway was justified on grounds of faster movement of traffic and reduction in the movement of coal and diesel tank wagons. It was anticipated that on completion of electrification work by March 1976, there would be (a) elimination of locking up of large number of coal wagons and release thereof for general loading (b) financial return of 13.4 per cent and 10.77 per cent over diesel and steam traction respectively, and (c) improvement in financial viability of the Railway.

9·11 In para 21 of the Advance Report of the Comptroller and Auditor General of India—Union Government (Railways) for 1980-81 a mention was made of delays in completion of electrificatiou of this section (293 RKms.), resultant escalation in the project cost, non-materalisation of the anticipated traffic, etc. Though the electrified section was opened to traffic in December 1980, seven material modification works costing Rs. 2.87 crores were sanctioned by the Railway Board during the period from May 1980 to August 1981 of which five had been completed and two were still (February 1986) in progress. Against the total estimated cost of Rs. 40.10 crores (including the cost of material modification works) the booked expenditure to end of September 1985 was Rs. 36.90 crores.

9·12 Besides, non-realisation of expected savings in working expenses amounting to about Rs. 10.41 crores on account of delay of about 4½ years in energisation of the section which is attributed to non-availability of adequate funds and difficulty in getting insulators, telecommunication cables, etc., actual traffic on this electrified route was about 9438 million GTKms on average per annum during 1981-82 to 1984-85 (upto June 1984) against the anticipation of 11,143.21 million GTKms. In spite of non-materialisation of the anticipated traffic and electric loco holding of 87 numbers (July 1984) being surplus to the extent of 13.8 per cent, if reckoned with reference to even the lowest engine utilisation of 346 kms. per day per engine on line (1982-83), costlier diesel operation was resorted to on this electrified route for 2461.6 million GRkms., *i.e.*, about eight per cent of the traffic offering during 1981-82 to 1984-85, as a large proportion of the traffic on north and south routes was for destinations reached via Gudur-Renigunta (un-electrified section) and instead of changing engines both at Vijayawada and Gudur trains were run to their destinations with diesel engines. This entailed an

extra expenditure of Rs. 63 lakhs (at 1981-82 rate differential between diesel fuel and electric power).

9·13 *Ahmedabad-Sabarmati.*—The abstract estimate sanctioned in October 1967 for electrification of Virar-Sabarmati section provided for electrification upto Sabarmati. The electrification upto Ahmedabad was completed in 1974. The electrification of a short stretch of 6 RKms. from Ahmedabad to Sabarmati (involving laying of track equivalent to 28 kms.) was abandoned (April 1971) on the plea of the Western Railway that with the establishment of marshalling yard at Vatva (South of Ahmedabad) the loads would advantageously be taken on electric traction upto this yard and worked therefrom by pilot movement (*i.e.*, by shunting engines) to Sabarmati. Although the Railway Board did not initially agree to the proposal on the grounds that non-electrification of track upto Sabarmati would necessitate marshalling at Vatva besides change of traction for through loads upto Sabarmati, they ultimately approved (1971) the proposal accepting the explanation of the Western Railway that electric locomotives would suffer detention at Sabarmati due to slow materialisation of return loads. However, the Western Railway Administration approached the Railway Board in April 1979 to sanction electrification of this short stretch (Ahmedabad-Sabarmati) as an operational necessity, as change of traction at Vatva had been causing detention of nearly 2-1/2 hrs. each for 7-8 trains coming from Vadodara side. The project was sanctioned by the Railway Board in May 1979 and completed in 1931-82 at an estimated cost of about Rs. 1.20 crores. The abandonment of Ahmedabad-Sabarmati section from Virar-Sabarmati electrification project lacked justification, as the operational constraints necessitating its (revival 1979-80) had been visualised by the Railway Board while approving (1971) the proposal of the Western Railway. The delayed energisation of this section resulted in :

(i) an additional expenditure of Rs. 31.80 lakhs compared to the electrification cost of Rs. 3.15 lakhs per Tkm. in Virar-Sabarmati project ; and

(ii) detention of loads for change of traction at Ahmedabad during the intervening period, besides diesel haulage of block loads for Sabarmati from/to Ratlam over the electrified Anand-Ahmedabad section, involving extra operating cost of Rs. 53.60 lakhs for 1980-81 and 1981-82 alone.

9·14 Further, on the electrified Ahmedabad-Surat section two pairs of passenger trains (*viz.*, Bi-weekly Navajeevan Express and weekly Trivandrum Express) are being hauled by diesel locos since their introduction from 6th April 1978 and 26th Jaunuary 1984 respectively, though the concerned Divisional Railway Manager and the Chief Electrical Engineer of the Railway had proposed (December 1983 and February 1984) switching over to electric

traction as it would not require any additional electric locos but result in saving of Rs. 2000 per day in fuel alone. The continued diesel haulage of these trains has entailed additional expenditure of Rs. 3.12 lakhs per annum.

9·15 *Delhi-Jhansi.*—Electrification of this section (422 RKms.) sanctioned in May 1979 and September 1980 in phases (phase I—Delhi-Mathura and phase II—Mathura-Jhansi) at an aggregate estimated cost of Rs. 45.05 crores, was expected to result in increase of line capacity for movement of anticipated increased traffic, besides saving in consumption of imported diesel oil. The original estimate was revised (September/November 1983) to Rs. 113.85 crores due to increase in the cost of major inputs, changes in specification and the scope of work at the instance of the Railway Board. The revised estimate was sanctioned in July 1985 for Rs. 113.76 crores.

9·16 The original estimate provided for use of alluminium catenary, in place of cadmium copper catenary, approved by the Railway Board in March 1978 as a measure of reducing cost of electrification by about Rs. 15000 per RKm. Indents placed (July 1979 and Jaunuary 1980) for 430 M.T. of alluminium catenary having not been processed in the Railway Board till July 1980, Central Organisation for Railway Electrification (CORE) proposed use of costlier copper catenary keeping in view the energisation target for phase I of the project by 31st March 1983. The change over, which involved an extra expenditure of Rs. 1.65 crores for the entire project, was approved by the Railway Board in October 1980. The use of copper catenary was later (February 1981) decided also for other schemes (*viz.*, Vadodara-Ratlam, Mathura-Gangapur City and Chandrapura Complex aggregating to 627 kms.) sanctioned prior to 1981-82 in view of the great urgency of achieving the energisation target set for the Sixth Plan and poor progress in the development of mass production of aluminium alloy catenary. The objective of achieving the Plan target (2800 RKms.) for which use of costlier copper catenary was resorted to, however, remained unrealised as mentioned in paragraph 9.4 above, while the saving of Rs. 2.46* crores expected from use of aluminium catenary on three projects mentioned above was also not achieved.

9·17. In terms of the OHE contracts cohcluded (February 1982) with the approval of the Railway Board for Mathura-Jhansi section, procurement of cement was the responsibility of the contractors. In view of the heavy rise in price of cement on its partial decontrol the contractors requested (August 1982) for supply of the material by the Railway on payment at rates fixed for levy cement. Accordingly, the Project Administration supplied cement to the contractors out of the quota allotted for Railway Electrification

*Worked out prorata from the extra cost of Rs. 165·60 lakhs for Delhi-Jhansi section (422. Rkms).

at an ad hoc rate of Rs.800 per M.T., Subject to fixation of final rates by the competent authority.

9·18. The Railway Board, when approached (August 1982) by the Project Administration, did not agree (April 1984) to its proposal for amending the contracts to provide for price vamation clause or alternatively to allow issue of cement by Railway at controlled price. The supply of cement to the contractors, in the meanwhile, from Railway quota was outside the scope of the contract.

9·19. The rate of recovery for cement supplied to the contractors was fixed (March 1983) at Rs. 1012 per M.T. as against the then market rate of Rs. 1200 per M.T. The dues amounting to Rs. 15.15 lakhs from contractors at the differential of Rs. 212 per M.T. between the *ad hoc* rate of Rs. 800 per M.T. and the March 1983 rate have not been recovered so far (January 1986). Even in the event of this amount being realised, the benefit to the contractors accuring from the extra contractual supply of cement would be of the order of Rs. 13.43 lakhs, compared to the then prevailing market rate (Rs. 1200 per M.T.)

9·20. The electrification of Delhi-Mathura section (phase I) was completed in March 1984 as against the original target of March 1983, the delay being attributed to late receipt of materials, delay in finalisation of site for electric loco shed, slow progress of work by OHE and S&T contractors, diversion of their resources to MTP works for Asiad 82, etc. The delay of one year deprived the saving in fuel cost assessed at Rs. 22.85 lakhs and affected the energisation target of March 1984 for phase II (Mathura-Jhansi section) also which is now scheduled to be completed in March 1986. Out of 276 Rkms. in Mathura-Jhansi section, 101 Rkms. (Mathura-Dhaulpur) was energised by March 1985. Delay in execution of the project deprived the Railways of the benefit of saving in fuel cost, haulage of heavier loads, etc., expected from the electrification scheme. The actual expenditure incurred on the project upto March 1985 was Rs, 91.12 crores representing 80 percent of the revised estimate cost (Rs. 113·76) crores.

9·21. *Sitarampur-Mughalsarai*—Electrification of his section (557 RKms.) was sanctioned in 1981-82 at an estimated cost of Rs. 86.62 crores and targeted for completion in 1985-86 in consideration of traffic density (43.5 million GTKms. by 1988-89) and the need to eliminate diesel/steam operation undertaken on the electrified Howrah-Sitarampur section to avoid change of traction at Sitarampur and also for providing an alternative electrified route to the already saturated electrified Grand Chord line. However, in May 1981 the Railway Board decided to defer the project to the Eighth Plan on the World Bank Mission suggesting (February 1981) a re-evaluation of the line capacity potential of the electrified Grand Chord route to see if the investment on electrification of Sitarampur-Mughalsarai section could be

avoided by optimising output of the existing electrified route. Based on the optimisation study completed in November 1981 the Eastern Railway recommended for providing additional traffic facilities, improved signalling and electrical inputs, etc., estimated to cost Rs. 113.84 crores without, however, specifying whether this would dispense with the need for electrification of the said section. The recommended works were approved by the Railway Board in October 1983. No time frame has, however, been laid down for completion of these works. The cheaper alternative of electrifying the Sitarampur-Mughalsarai section (Rs. 86·62 crores) which was expected to provide relief to the saturated Grand Chord section besides easing operational constraints on the main line was thus shelved perpetuating continuance of diesel/steam haulage on the electrified route (Howrah-Sitarampur) and thereby entailing extra operating cost which for passenger services alone during 1982-83 and 1983-84 amounted to Rs. 2.92 crores. Besides, the deferment of the electrification project is likely to render infructuous the survey expenses of Rs. 1.87 lakhs incurred upto June 1981.

9·22 *Kharagpur-Midnapore*—While electrification of Sitarampur-Mughalsarai section justified on operational considerations was postponed to the Eighth Plan, this 13 kms. section on South Eastern Railway, though not included in the approved Ten year programme for electrification of high density trunk routes was electrified in May-June 1984 at a cost of Rs. 1.84 crores by reappropriation of funds from the ongoing Delhi-Jhansi priority project. The out of turn electrification of this low traffic density (5034 GTKms. per km. per day during 1982-83) section was justified on the grounds of long standing public demands for through services between Midnapore and Howrah, savings in working expenses on steam haulage (Rs. 11.54 lakhs per annum), withdrawal of conventional stock (Rs. 15.65 lakhs). etc. If the above considerations were adequate enough to justify electrification of this section not conforming to the prescribed break even level of traffic and the priorities set for high density routes connecting the metropolitan cities and/or carrying vital goods, what prevented its energisation in earlier years at comparatively less cost is not clear.

9·23 *Tundla-Agra-Bayana*—Electrification of this short link (112 RKms.), between the trunk routes of Howrah-Delhi (electrified by 1977), Delhi-Bombay (via Western Railway) and Delhi-Madras taken up in 1985-86 at an estimated cost of Rs. 15.93 crores has been justified to avoid operational constraints and undue detention for change of traction for the traffic over this section after energisation of Delhi-Jhansi (422 RKms.) and Mathura-Gangapur City (153 RKms.) sections targeted for completion in 1985-86. Till energisation of this short link, for which no target have been set, change of traction will continue causing detention to stock (assessed at 22 and 5.3 wagon days per day for Western and Central Railways respectively) which could have been avoided if electrification of this section had been planned

properly to synchronise with those of Delhi-Jhansi and Mathura-Gangapur City.

Locomotive planning

9·24. According to the norm of 0·17 loco per electrified route km. adopted for assessing the requirements of electric locomotives for the Sixth Plan, the holding of 974 locomotives at the end of March 1980 was surplus by 138 numbers to the requirements of 4918 electrified route kms. as on that date. The Sixth Plan envisaged acquisition of 316 additional locos keeping in view the requirements (476 locos) of the Plan target for energisation of 2800 Rkms. With actual production of 270 locos during 1980—85 and the surplus holding of 138 numbers the total availability became 408 locos as against the requirement of 258 locos for 1529 Rkms, energised during the Sixth Plan. This has resulted in a surplus holding of 150 locos worth Rs. 75·78 crores (at 1980-81 average production cost of Rs. 50·52 lakhs), contrary to the expectation of their being more or less even out by March 1985 (cf. para 1.16 of 167th Report of the Public Accounts Committee, 1983-84),

Non-provision of shunt capacitors

9·25 With progressive electrification of various sections on the Railways the absence/delayed provision of shunt capacitors to arrest the fall in power factor (ratio of energy available for consumption and actually consumed) below the prescribed level, for which penalty is payable under the traiffs of the State Electricity Boards, resulted in payment of penalties amounting to Rs. 4.41 crores by South Eastern, Eeastern, South Central and Northern Railways during the period 1975-76 to 1983-84 as mentioned below.

9·26 For electric traction of Howrah-Durg section of South Eastern Railway power supply is obtained mostly from Bihar State Electricity Board (BSEB) whose revised tariff (July 1970) provided for a penal clause fer levy of low power factor surcharge. The provision of shuht capacitor at Bilaspur (later shifted to Manikui) proposed in August 1972 was sanctioned by the Railway Administration in November 1975 at an estimated cost Rs. 7.99 lakhs. In December 1978 the Railway Administration placed orders on Bharat Heavy Electricals Ltd. (BHEL) for supply of the equipments (costing 7.06 lakhs) by 31st May 1980 which was extended to December 1981. The prices of inputs having nearly doubled in the meanwhile the estimate was revised to Rs. 17.29 lakhs and sanctioned by Railway Board in 1983. The shunt capacitor and its related oil circuit breakers received by the Railway Administration in June 1980 and April 1982 respectively was finally commissioned in January 1994. During the intervening period from 1975-76 to 1983-84, the payments for low power factor surcharge by the Railway amounted to Rs. 59.02 lakhs.

9·27 In para 26 of the Advance Report of the Comptroller and Auditor General of India for the year 1981-82—Union Government (Railways) a mention was made of the failure of the Eastern Railway to take cognisance of the tariff conditions of BSEB and their advice for installation of shunt capacitors, resulting in payment of Rs. 91.39 lakhs towards fall in power factor at Jamalpur (Rs. 4.48 lakhs) Chandauli/Gaya (Rs. 39.13 lakhs) and Sonenagar (Rs. 47.78 lakhs) grids during the period from 1977-78 to 1981-82. While necessary shunt capacitors (costing about Rs. 92,800) were provided at Jamalpur in April 1981, those proposed for Sonenagar and Chandauli in 1976 and February 1982 respectivel at a cost of Rs. 8.5 and Rs. 17.72 lakhs still (January 1986) await installation. Consequently, the Railway had to pay penalty charges amounting to Rs. 81.13 lakhs during 1982-83 to 1983-84.

9·28 The South Central Railway Administration had estimated (1977) that power factor at five substations on the Vijayawada.Gudu section would be below the prescribed level, involving an annual penaity payment of Rs. 52·78 lakhs. However, for improving the power ractor at the Railway installations shunt capacitor was commissioned in December 1982 at one substation (Krishna Canal) only at an estimated cost of Rs. 5.00 lakhs. The absence of shunt capacitor at this point till December 1982 and at five other substantions (including Gudur substation) sofar entailed payment of penalty amounting to Rs. 29.09 lakhs during the period September 1980 to June 1984.

9·29 Similarly for the six substations on the electrified Mughalsarai-Kanpur section provision of shunt capacitors was sanctioned in February and May-June 1984 at an estimated cost of Rs. 103.18 lakhs. The installation work at four substations is expected to be completed by November 1985 aeftr which work relating to other two stations is proposed to be taken up. Meanwhile, Railway Administration had to pay penaly charges amounting to Rs. 1.80 crores for the period February 1983 to July 1985.

9·30 *Summing up.*

(a) Dispersal of available resources over a large number of projects resulted in 'patchy' electrification aggregating to about 1522 Rkms. against the target of 2800 Rkms. for the Sixth plan(Paras 9.2 to 9.4).

(b) Delays in execution of electrification works in Waltair-Kirandul section resulted in cost escalation from Rs. 19.05 to Rs. 57.24 crores besides non-realisation of expected savings in working expenses amounting to Rs. 15.90 crores. The delays in completion of electrification work in Vijayawada-Gudur and Delhi-Mathura sections also resulted in non-realisation of savings in working expenses of Rs. 10.41 crores and Rs. 0.23 crore respectively (Paras 9.6 9.7, 9.12 and 9.20).

(c) The objective of increasing line capacity through electrification of Waltair-Kirandul section remains unfulfilled (Para 9.8).

(d) Despite non-materialisation of anticipated traffic and adequate availability of electric locos costlier diesel haulage had been continued on the electrified Vijayawada-Gudur section entailing extra expenditure of Rs. 63 lakhs. (Para 9.12).

(e) Lack of proper planning for electrification of Ahmedabad-Sabarmati section resulted in additional expenditure of Rs. 31.80 lakhs and diesel haulage over electrified route involving additional operating cost of Rs. 53.60 lakhs. (Para 9.13).

(f) Non-adoption of electric traction for Navajeevan and Trivandrum Express trains between Ahmedabad-Surat resulted in non-realisation of fuel saving of Rs. 3.12 lakhs per annum. (Para 9.14).

(g) Use of copper catenary in lieu of cheaper alluminium catenary in Delhi-Jhansi and three other sections involved non-realisation of sarvings of Rs. 4.11 crores (Para 9.16).

(h) Extra contractual supply of cement to the contractors on Delhi-Jhansi project gave an unintended benefit of Rs. 13.43 lakhs to the contractors. Dues amounting to Rs. 15.15 lakhs also remain unrecovered from the contractors (Paras 9.17 to 9.19).

(i) As a result of deferment of electrification of Sitarampur-Mughalsarai section sanctioned (1981-82) on operational necessity to the Eighth Plan (a) survey expenses of Rs. 1.87 lakhs may become infructuous. and (b) diesel/steam haulage on electrified route continues involving extra operating cost amounting to Rs. 2.92 crores for passenger services alone during 1982-83 and 1983-84. (Para 9.21).

(j) Kharagpur-Midnapore section, though not fulfilling the prescribed criteria for electrification and included in the approved Corporate plan, was energized out of turn (May-June 1984) by diversion of funds from other ongoing priority project. (Para 9.22).

(k) Lack of synchronised planning for electrification of Tundla-Agra-Bayana section with the energisation targets of Delhi-Jhansi and Mathura-Gangapur City sections will cause detention to stock for change of traction. (Para 9.23).

(l) Progress of electrification during the Sixth Plan having not macthed even the scaled down aequisition programme of electric locomotives, resulted in surplus holding of 150 electric locos worth Rs. 75.78 crores. (Para 9.24).

(m) Non/delayed provision of shunt capacitors to arrest fall in power factor led to avoidable payment of penalty charges of about Rs. 4.41 crores to the State Electricity Boards. (Paras 9.25 to 9.29).

APPENDIX II

(*Vide* Para 6.1)

Technoligical Developments in Electrification and Electric Motor Power Technology that have taken Place Abroad.

Traction Distribution (Fixed Instellations)

Some of the aspects relevant to Indian environment where technologieal developments have taken place abroad are :

1. Hybrid/polymer glass insulators for polluted zones.
2. Gas (SF 6) filled switchgear for 220 KV, 132 KV end 25 KV systems.
3. Microprocessor based solidstate supervisory remote control system.
4. Zinc oxide gapless lightning arrestors.
5. PTFE/FRP ceramic bead polymer type short neutral sections for phasebreak.
6. Transformers with higer short circuit withstand capability and remote controlled tap changing arrangements.
7. Use of OHE test car and high performance tower wagons for OHE maitenence.
8. 2x25 KV Auto Transformer system of AC Electrification.

Traction Rolling Stock (Electric locomotives EMUs)

The technlogical advances abroad in this sphere have been mainly in :

1. High horsepower thyristorised controlled AC Locomotives.
2. Traction motor insulation system upgradation giving higher thermal capability.
3. Improved wheel slip detection and control.
4. Improved layout and modular construction and as diagonostic features for ease in maintenance.
5. Changeover from DC Traction to 3 phase traction motor in the lower power range for EMU Stock.
6. Changeover from DC Traction motor to 3 phase traction motor for main line locomotives with greater power per axle and reduced maintenance.

APPENDIX III

Statement of Observations/Recommendations

S. No.	Para No.	Ministry/Deptt. concerned	Observation/Recommendation
1	2	3	4
1	2.9	Railway Power	Though there is a point in Railways contention that there are number of benefits of electrification and there is need to reduce consumption of imported diesel oil and to use the energy generated by thermal plants, yet the fact that it is the most capital intensive cannot be easily ignored. The Ministry have not been able to prove that the electric traction is the cheapest of the three modes of traction viz. steam, diesel and electric as was initially claimed by them. The figures of latest years reveal that there is hardly any difference in operation cost (inclusive of fuel, maintenance and repairs ; depreciation and interest charges ; and other overheads) of diesel and electric traction. On the other hand the line haul cost in case of diesel traction was less in 1984-85 and 1985-86 if the tax element is excluded from the cost of the diesel. The Ministry have tried to explain that the rate of rise of diesel price from 1984-85 has been much lower than that of electricity. Further, they have also contended that the price of diesel is regulated and controlled under the powers of the Government whereas there is no control on the electric tariffs for railway traction and that the State Electricity Boards fix their tariffs without any consideration for the Railways. The Committee feel that Railways being a public utility of national importance and the electrification having been declared as a national policy it becomes all the more necessary that they get electricity at a price which is commensurate with the cost. For this the Ministry of Energy (Department of Power) snould render all possible help to the Railways in seeking cooperation of the State Electricity Boards in this regard. It is also pertinent to note that the matter regarding the electricity tariff was taken up by Railway Board at Secretaries Committee level as a consequence of which a sub-Committee was set up to determine the rational tariff policy of traction and the methodology to implement it. The sub-Committee submitted its report on 10 November, 1987 which is yet to be considered by the Committee of Secretaries. The Committee desire that this report

should be considared by the Committee of Secretaries at the earliest and a decision taken so that the Railways are supplied electricity at reasonable tariff for electric traction.

2	2.10	Do.	Since Centre's share in the power generation in the country through thermal, hydro and nuclear plants is going to increase substantially by the end of Seventh Plan (NTPC's share alone is likely to increase from the present level of 5.25% to 23%), the Committee recommend that the Ministry of Energy should examine the matter in consultation with the Ministry of Railways taking into account the overall national perspective so that Railway's demands for power are met, at reasonable price. The Committee would like to be apprised of further development in this regard.
3	2.11	Railways	The Committee find that in attempt is being made by the Railway Board to study the effect of changes in the market prices of HSD oil and electric power into the social costs. This study is stated to be yet under way and is expected to be completed soon. The Committee would like to be apprised of the results of such a study and the action proposed the Ministry thereon.
4	3.6	Do.	The Ministry of Railways have asserted that since electrification is done essentialiy on high density routes/sections, the change in break-even-levels has not really disturbed the perspective plan of electrification. The Committee are, however, of the opinion that since the break-even-level of traffic density also depend inter-alia, on the cost of fuel and the rate of increase in diesel price has been much lower than that of power since 1984-85, it would be better to select sections, other than those falling on trunk routes connecting four metropolitan cities, for electrificatian with projected break-even-level of traffic densities on the high side, say, near to 30 to 32 GTKMS/RKm/annum so that the electric traction is not proved uneconomical as compared to diesel traction even in adverse conditions in future.
5	3.7	Do.	The Committee also desire that while computing the rate of returns, which also depend among other things on the cost of fuel, the Railways should examine the feasibility of

1	2	3	4
			assuming relative change in the pattern of cost of diesel and electric traction over the period of analysis, i.e., the life of the project so that the electrified project keeps on giving at least 10 per cent return on the capital as compared to diesel haulage.
6	3.8	Railways	The contention of the Ministry that by and large all the sections progressively electrified so far have satisfied the general criteria fixed for track electrification is indicative of the posibility that there may be certain electrified sections or sections being electrified which may not satisfy the general criteria. The Committee are of the view that this aspect needs to be critically analysed with a view to identifying such sections and exploring the reasons due to which the prescribed criteria was not satisfied. The Committee would like to be apprised of the results of such examination. They have also been informed that studies in the three electrified sections to find out projections, investment and operation costs in relation to the targets are being undertaken. The Committee would like the post-project evaluation studies being conducted in there sections in differcnt Zonal Railways completed expeditiously and they would like to be apprised of the results thereof. They are also of the opinion that projection in regard to rate of returns, traffic density etc. of every section after a specified period of its getting electrified should be evaluated as a matter of general practice so that reasons for shortfall (in projections are critically analysed and appropriate remedial measures taken for the future selection of sections.
7	4.9	Do.	The Committee note that the Railways had indicated priorities to sections falling on quadrilateral and diagonal routes connecting the four metropolitan cities of Delhi, Bombay, Calcutta and Madras with a view to introducing electric traction over the maximum possible distance within a short span of time not only to avoid multiplicity of traction but also for better utilisation of electric locos. The decision regarding this policy was taken by Railways in July 1972 and reiterated in January 1981. The Committee find that more or less the Railways have followed this policy but there are instances when the sections have been taken up and electrified in violation of the prescribed criteria which are narrated under :

(i) Waltair-Kirandul section, neither part of a trunk route nor contiguous to any electrified track was completed in Sixth Plan at a cost of Rs. 53.31 crores. Though it was targetted to be completed in 1976, the traffic density of its four sub-sections has been quite low and as late as in 1985-86 ranged between 12.89 and 19.18 million GTKm/RKm/ annum and has yet to achieve the present break even level of 22—30 million GTKm/RKm/annum. The Committee do not know whether this section is giving 10% return on the investment as compared to diesel haulage as well and would like to be informed of the exact position.

(ii) Kharagpur-Midnapore section, not included in the approved ten year programme of electrification of high density trunk routes and having low traffic density (1.8 million GTKm/RKm/annum during 1982-83) was electrified out of turn in May-June 1984 at a cost of Rs. 1.84 crores by reappropriation of funds from the ongoing Delhi-Jhansi priority project.

(iii) During Seventh Plan six new works having priority as 'B' were approved at a cost of Rs. 98.36 crores. Four out of the six projects are stated to have been taken up on operational considerations and the expenditure incurred thereon till March 1987 was Rs. 4.63 crores and the outlay (RVSD) on these during 1987-88 is about Rs. 27.50 crores. In case of remaining two sections, the preliminary work is in progress. The Committee are of the opinion that taking up these priority 'B' works and incurring expenditure thereon while priority 'A' projects (Sections on trunk routes) are yet to be completed perhaps could have been deferred.

8 4.10 Do. On the other hand an important priority 'A' project viz. Itarsi-Bhusawal does not seem to have been given due priority. Delhi Jhansi section is targetted to be energised by December 1988. Bhusawal to Bombay is already electrified. Thus Itarsi-Bhusawal when energised would complete the electrification of Delhi-Bombay trunk route *via* Central Railway.

1	2	3	4
			Though Itarsi-Bhusawal (projected traffic density 35.5 million GTKm/RKm/annum and IRR 12.7%) was approved in 1982-83, the expenditure incurred thereon upto March 1987 was only Rs. 8.52 crores against the sanctioned cost of Rs. 77.13 crores. It is now targetted to be completed by 1990-91. Thus, for at least 27 months, if not more, the electrification of Delhi-Bombay route (via Central Railway) would remain incomplete. Delay in taking up this section is incomprehensible particularly when sections (Balharshah-Wardha and Jhansi-Nagpur) with lesser traffic densities and I.R.R.'s and approved at the same time were taken up earlier. If financial constraints was one of the reasons for the delay that perhaps could have been avoided by deferring the work on the four priority 'B' sections taken up in Seventh Plan and allotting the funds earmarked to them to this project. At this stage the Committee can only express the hope that the Government would be careful in future in giving approval to projects which are financially viable and also in overall interests of the country.
9	5.12	Railways	The Committee find that during 1974-75 to 1979-80 (4 years of truncated Fifth Plan and 2 years of Rolling Plan) the Railways were allotted Rs. 122 crores by Planning Commission for electrification out of which Rs. 120 crores were spent by them. However, they could energise only 728 RKms during this period against the target of 1800 RKms set by them for Fifth Plan (1974-79) for which a plan outlay of Rs. 120 crores (later reduced to 101 crores) was made. Serious inflation following the oil crisis has been cited by the Railways as the main cause responsible for the shortfall in achievement. Again, while the expenditure in Sixth Plan was 94% of the Plan outlay and 98% of the Budget allocation, only 1522 RKms were energised against the target of 2800 Rkms. According to Railways the project estimates are framed at the current prices and do not contain any element of future inflation. However, it is difficult to accept that the Railways could have achieved the targets during the Fifth and Sixth Plan periods even if they were allotted Rs. 175 crores and Rs. 642 crores as demanded by them during each of the years of these plans respectively perhaps taking inflation aspect also into account. The Committee are, thus inclined to conclude that Railways failed to

exercise proper control over the timely execution of the proiects in these plan periods leading to considerable cost escalation and resultant Increase in cost of electrification/Rkm.

10 5.13 Railway Planning Commission

Improper planning seems to be the main cause for the delay in completion of the electrification projects. For example, while the target for Sixth Plan was to energise 14 sections including 7 spill over sections as many as 20 new sections were sanctioned during the plan period. Consequently, the Budget allocation Rs. 437 crores against the plan outlay of Rs. 450 crores, got distributed over 27 sections, instead of concentrating the Budget allocation on 14 targetted sections. While there may be justification to sanction fresh works in order to maintain the shelf 'pipeline' and avoid its running 'dry' but it should be ensured that incurring of expenditure thereon does not result in shortage of funds for the targetted projects. If so many new works were sanctioned with a view to stepping the pace of electrification w.e.f. Sixth Plan onwards, then it was necessary to ensure the availability of sufficient funds for the same. The Committee would like to be informed whether all the fresh works were sanctioned in consultation with the Planning Commission and if so, the reasons why Planning Commission could not make available sufficient funds for the same eventually.

11 5.14 Railways

Another aspect of improper planning is evident from the fact that at the end of Sixth Plan 18 sections were spilled over but only 12 of these are targetted to be completed during the Seventh Plan. On the other hand 6 new sections have been approved so for in the current plan and 4 of them are targetted to be completed during the plan period. It is needless to say that the best the Railways could do was to fix the target for completion of 14 of the 18 spill over sections on which they had started incurring expenditure in the Sixth Plan itself.

12 5.15 Do

The Committee further note that the enthusiasm with which the Railways took decision in Jannary, 1981 to step up the pace of electrification appears to have been cooled down while formulating the target for Seventh Plan. Against 5049 Rkms as envisaged at that time for the Seventh Plan, the Railways programmed to energise only 3400 Rkms which even fell short of 4522 Rkms comprising of spill over work on 18 sections from Sixth Plan.

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			The reduced target is stated to have been fixed to ensure a match in locomotive availability and keeping in view the availability of resources. If this was the constraint in setting up higher target, it is not clear on what consideration the Railways had decided in January 1981 to achieve energisation of about 1000 Rkms every year from Sixth Plan onwards.
13	5.16	Railway Planning Commission	The Committee are now informed that the Railways require Rs. 1020 crores against the Plan outlay of Rs. 830 crores for achieving the target of 1400 Rkms in the current plan. Considering the expenditure incurred and the number of Rkms energised so far, the Committee apprehend that the Railways may have to spend much more than Rs. 1020 crores. The Committee hope that the Planning Commission would allot the necessary funds to the Railways during the current plan to enable them to achieve the target.
14	5.17	Railways	A disquieting feature about the execution of the various projects has been the failure of the Railways to complete the spill over works during the following plan periods. For example, 3 of the 7 works in Fifth Plan and 1 of the 7 works in Sixth Plan were not completed and again in Seventh Plan, 6 out of the 18 works are not targetted to be completed. It appears that spill over works have not been accorded the priority they deserved As the track electrification of a section normally takes only 4-5 years, it should not be difficult to complete the spill over works within 2-3 years of the following plan period. The Committee hope that Railways would ensure this and in no circumstances spill over works will be allowed to again spill over. They also expect the Railways to draw a lesson from this experience and strengthen their planning implementation and monitoring machinery so that there are no time and cost overuns.
15	6.9	Do	The Committee regret to observe that the Railways have failed to adopt technological upgradation developments in traction distribution and traction rolling stock of the electrification system which have been taking place abroad since long and it is only recently that some steps have been contemplated by them in this direction. For example, nothing was done till 1983 to upgrade 3900 H.P. locomotives being manufactured in Chitranjan Locomotive

Works based on 1960 vintage technology. The Indian Railways did not opt for the technology of thyristors which came into Europe as early as in 1972-73 and the locomotives based on this technology are stated to be highly reliable. While the Committee can realise the importance of introducing technology change only when proved successful, they are unable to understand the long delay in adopting the same. The Committee consider that it is necessary to keep track of the proven technological changes relevant to Indian environment and adopt them at the earliest so that research and development being done abrood could be advantageously utilised with a view to increasing the efficiency of Indian Railways electrification system. As regards the question of huge finances involved in the process, the Committee consider that it would be worthwhile to electrify less number of route kms. than those being planned in order that the electrification system (both in terms of fixed installation and Traction Rolling Stock) thereon could be maintained up-to-date with latest technological developments.

16	6.10	Do	The Committee are constrained to point out that even the belated decision of the Railways to upgrade the electric locos with latest technology has not been acted upon. This is evident from the fact that after inviting tenders in 1983 the Railways placed orders for 18 prototypes of 6000 H.P. thristorised control locomotive viz six each of 3 designs from Japan and Sweden in 1985 and the same are expected to be delivered from January 1988 onwards whereafter they would be put on service trials for one year and then out of these one type will be selected for series manufacture. Apart from slow pace of action in this regard, the decision of the Railways to place orders for these locomotives in 1985 can not be fully justified in view of the fact that a better technology (AC 3 phase) had been developed abroad by then and it was paying rich dividends in terms of better availability of locomotives and certain other parameters. The Railways could have possibly revised their decision at that time in favour of the latest technology or at best simultaneous action could have been taken to import some prototypes of locos based on the latest 3-phase technology. However, it is only now that Railways have floated tenders for 40 high H.P. locomotives using 2-phase technology, supply of which might take a few years if the Railways' experience regarding import of 6000 H.P.

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			locomotives is any indication. The Committee feel that excessive time taken to procure 3-phase locomotives would further delay the selection of a suitable high H.P. locomotive for series manufacture in India since the Railways are unlikely to be able to take a decision before evaluating the performance of 3-phase locomotives under Indian conditions. The Committee at this stage can only hope that action would be taken to procure expeditiously these 3-phase traction motor locomotives.
17	6.11	Railways	The Committee would like to be apprised as to why Railways could not bring about any improvement indigenously in the technology of the current design of electric locos all these years. Since production of high H.P. locos based on thyristors or AC 3-phase technology is likely to take a few more years, it is necessary that efforts are made, if not already initiated, at the earliest in this direction. There should not be much of a difficulty in the process as the Committee understand* that CLW has the capacity to uprate the current design of electric locos upto at least 5000 H.P. with the existing resources and infrastructure. They would like to be apprised whether any progress has since been made in this regard. Further, with a view to ensuring satisfactory working of existing fleet of electric locos, the Railways are stated to have taken steps to improve the traction motor and bogie, the two main problem ridden equipments, by import of technology. The Committee consider that other parts of the locos such as transformer, convertor and invertor should also be improved upon either indigenously or by importing the latest technology so that the existing fleet of electric locos could be totally revamped and made more efficient and economical. The Committee further desire that in all these activities as well as for effecting improvements in the fixed installation the RDSO Lucknow should be actively associated. There should be a close and constant interaction between the production and the research wings of the Railways so that the problems of crucial importance are tackled in an effective and conclusive manner. The activities of RDSO should be intensified to enable it to keep abreast with the latest available technology all over the world so as to build up its confidence and strength enabling the Railways to develop latest technology expeditiously.

18	6.12	Do	The Committee are of the opinion that simultaneously steps should be taken to develop the track and strengthen repair and maintenance organisation as the maintenance work is not at a level where it should be.
19	7.13	Do	From the forcgoing paragraphs the Committee are inclined to conclude that the planning and execution of Waltair-Kirandul section was casually and ineptly handled which was further aggravated by delyed decisions. Consequently there was delay of six years in completion of the project and 120% increase in the project cost. The delay in execution of the project not only resulted in non-achievment of anticipated savings (Rs. 15.90 crores) in working expenses but also in avoidable expenditure on account of payment of compensation to OHE contractors (Rs. 45.75 lakhs) and MPEB (Rs. 56.34 lakhs) and in establishment charges (Rs. 182.23 lakhs).
20	7.14	Do	There was 15 months delay on the part of the Railway Board in directing the Railway Administration to carry out a survey and make recommendations for optimising capacity of this section keeping in view the expected movement of 12 million tonnes of traffic as indicated by Ministry of Steel; 6 months delay in consideration of the recommendations of this survey Report and a futher 3½ years' delay in sanctioning the revised estimate submitted by Railway Administration.
21	7.15	Do	Thorough some delay was expected due to provision in system design for OHE, sub-stations and signalling and tele-communication ciruits as a result of imlementation of optimisation survey report and for which the target date was duly revised to March 1976 from March 1975, the ultimate delay of about six years in energisation of the section was certainly not unavoidable. The paucity of the funds as one of the main reason for the delay is unacceptable on two counts.first, the project authorities could not utilise the funds made available to them during each of the first 10 years and secondly, the delay would have taken place even otherwise due to Railway's lack of proper planning and anticipation of certain/inevitable/develop-

*Para 5.16 of the Report of Railway Convention Committee (1985)

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			ments. For example, the Railways allowed the dispute of compensation with NPEB to arise and remain unresolved for quite a long period with the result that when they asked for the power supply for phase I (Jagdalpur-Kirandul) from June 1979. MPEB insisted for the compensation and did not agree to supply of power. The issue was resolved ultimately in August 1980 and the previous 15 months were lost on this count. Again due to delay in finalisation of tele-communication design system, the tele-communication cables could be laid in Jagdalpur-Kirandul and Jagdalpur-Katavalsa sections in 1978-79 and 1981-82 respectively. Further, the delay on account of non-availability of locos for trial purposes had nothing to do with availability of adequate funds and in fact highlights Railway's failure to provide matching facilities with the different stages of project execution. It will not be out of place to mention here that full number of electric locos required for working on the line were not coordinated and got ready for use with the completion of electrification in December, 1982 with the result that diesel traction could not be discontinued on the section till September, 1985. The delay on account of failure of indigenous suppliers to deliver cables and insulators could have been tackled by timely action on the part of the Railway Administration. The explanation that there were technical and logistic problems in execution of project due to inaccessible mountaineous terrain of the section is also unconvincing as they were already aware of the nature of the terrain before embarking upon the project and laying down the completion target.
22	7.16	Railways	Another disquieting feature of the project has been the poor valume of traffic on the electrified route which varied between 5.38 and 6.73 million tonnes during 1980-81 to 1983-84 against the anticipated figure of 10 million tonnes. Thus, optimisation capacity work, involving increased project cost and the resultant delay, carried out as a result of optimisation study has been entirely infructuous. The Committee would like to be apprised as to why the traffic as projected in optimisation survey report has not materialised even after 7-8 years of the target date (March 1976).

23	7:17	Do *	The Committee expect the Railways to draw appropriate lesson from the execution of the project with a view to avoiding time and cost overun in the future project and would take appropriate steps to strengthen project planning and implementation. The committee desire that the Railways should re-examine the methodology of prediction of traffic and devise suitable technique so as to avoid infructuous expenditure in creating capacity which does not sebsequently matarialise.
24	7.26	Do	Execution of Vija yawada-Gudur Section is another instance of delay, cost escalation and lack of proper planning by the Railaways in Electrification projects. Apart from delay of four and a half years in energisation of the Section in December 1980 instead of March 1976 and resultant non-realisation of expected savings in working expenses (Rs. 10.41 crores), there has been considerable escalation (70%) in project cost. The oft-repeated plea of funds constraints is hardly convincing as the Railways themselves had spread the scarce rosources on far too many projects. Delays in procurement of critical material and approval of prototypes by RDSO point towards project organisation's/CORE's a lack of planning and coordination with the concerned Deptts/Agencies in this regard. Diversion of critical materials to other on-going projects when this Section was nearing completion is indicative of bad planning particulary when this was a priority-project on the Delhi-Madras trunk route and the funds from other projects (Waltair-Kirandul) were diverted to this project. Further, the quatum of work involved in the project does not seen to have been properly gauged at the project estimate stage as the Railways had to increase the scope of work in April 76 and again 7 material modification works costing Rs. 2.87 crores had to be sanctioned from May 1980 to August 1981. Thus, the delay and cost escalation in the project could have been curtailed, if not altogether eliminated, had, there been proper planning and timely anticipation of difficulties involved in procurement of critical materials.
25	7,27	Do	Apart from non-realisation of expected benefits for 4½ years, the electrified section remained unutilised fully even after its completion in November 1980. Despite non-materialisation of anticipated traffic the Railways operated some passenger services on the section with diesel locos for destinations reached via Gudur-Renigunta (unelectrified section)

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			during 1981-82 to 1984-85 which entailed extra expenditure of more than Rs. 63 lakhs. The Railway's plea that total locomotives required would have been larger if the traction was changed at Vijayawada is unacceptable as there should not have been any problem as such since the diesel as well as electric locos were surplus continuosly from 1977-78 to 1983-84. Operation of diesel locos on the electrified section could have been avoided by providing change of traction arrangements at Gudur and, if that was not feasible, electrification of Gudur-Renigunta section (completed in 1984) should have been advanced by 2-3 years and synchronised with that of Vijayawada-Gudur. The commitee recommend that detailed reasons leading to this lapse should be investigated and effective remedial measure taken to obviate recurrence of such lapses in future. They would also like to be informed of the action taken in this regard.
26	7.32	Do	The fact that the project cost had to be revised from Rs. 45.05 crores to Rs. 113.85 crores just three years after the sanctioning of the estimate on account of escalation due to inflation and general charges (100% increase) and changes in specification and increase in scope of work (52% increase) leads the Committee to conclude that proper estimates of work and expenditure involved had not been made before commencement of the project. Sanctioning of such under estimated projects create financial constraints subsequently as the actual demand for funds from such projects is usually more than that envisaged in the original estimates and the Railways have to allot the limited funds at their disposal on too many such panctioned projects. Consequently the projects get less allotment than necessary and the period of their execution gets prolonged. For example, due to these reasons the phase II (Mathura-Jhansi) of the project targetted to be completed in March 1984 was eventually completed in March 1987. Since cost has been revised in other electrification projects also, the Commitee consider that there is urgent need to curb the persistent tendency to underestimate the work and cost of these projects. This is essential

to ensure that Railways accord sanctions to such number of projects as could be comfortably executed with the expected limited resources available to them in a particular period of time even though certain unforeseen increases in expenditure take place during execution of the project.

27 7.37 Railway — The Committee recommend that the clause 1.2.21 of the Tender paper for OHE contracts may be amended so that for effecting recoveries of the cost of the materials supplied to the contracts it is brought in conformity with the provision in the Engineering Code and the financial interests of the Government are duly protected.

28 7.40 Do — The Committee conclude that if the electrification of Ahmedabad-Sabarmati section had been completed earlier (1974) it would have resulted in saving of operating cost by eliminating detention due to change of traction at Ahmedabad for loads from Bombay side during the period 1975-1982. Further, if the electrification of Ahmedabad Sabarmati Section was dependent upon the electrification of Godhra-Anand and Vadodara-Ratlam section, the Committee are unable to understand how the former was taken up on urgency certificate and completed in the year 1981-82 whereas Anand-Godhra section was energised later in 1983-84 and Vadodara-Ratlam section was energised still later in 1986-87. At this stage, the Committee only hope that adequate care would be taken by the Government in future in planning and implementation of projects of large financial value so that Government is not subjected to avoidable expenditure due to lack the proper planning. It is imperative that realistic project plans are prepared and there is intensive monitoring through periodical monitoring system so that effective remedial measures are taken with due promptitude.

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