

RAILWAY CONVENTION COMMITTEE (1985)

(EIGHTH LOK SABHA)

FIFTH REPORT

ON

RAILWAY ELECTRIFICATION

Presented in Lok Sabha on 6.5.1986

Laid in Rajya Sabha on 6.5.1986



**LOK SABHA SECRETARIAT
NEW DELHI**

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RAILWAY CONVENTION COMMITTEE (1985).

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PART II*

**Minutes of the sittings of the Railway Convention
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9 & 23 January, 12 February & 30 April, 1986.**

***Not appended (One copy laid on the Table of the House and five copies placed
in the Parliament Library).**

RAILWAY CONVENTION COMMITTEE .
(1985)

Shri Subhash Yadav—*Chairman*

MEMBERS

Lok Sabha

2. Shri Bansi Lal
3. Shri Basudeb Acharia
4. Shri B. Devarajan
5. Prof. Narain Chand Parashar
6. Shri Vijay N. Patil
7. Shri Janardhan Poojary
8. Shri Ram Dhan
9. Shri Ram Ratan Ram
- *10. Shri Madhavrao Scindia
11. Shri S. Thangaraju
12. Shri V. Tulsiram

Rajya Sabha

13. Shri Vishwanath Pratap Singh
14. Shri Dipen Ghosh
- £15. Shri M. Maddanna
16. Shri Bhagatram Manhar

*Nominated on 27.1.1986 *vice* Shri Manvendra Singh resigned.

£Ceased to be a Member of the Committee w.e.f. 2.4.86 consequent on his retirement from Rajya Sabha.

(iv)

17. Shri Kalpnath Rai
18. Shri P. Upendra

SECRETARIAT

1. Shri N.N. Mehra—*Joint Secretary*
2. Shri K.H. Chhaya—*Chief Financial Committee Officer.*
3. Shri Krishnapal Singh—*Senior Financial Committee Officer.*

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**COMPOSITION OF STUDY GROUP-II
OF THE RAILWAY CONVENTION COMMITTEE
(1985)**

1. **Shri Subhash Yadav—*Chairman***
2. **Shri P. Upendra—*Convener***
3. **Shri Basudeb Acharia—*Alternate Convener***
4. **Shri Bansi Lal**
5. **Shri Vijay N. Patil**
6. **Shri Janardhan Poojary**
7. **Shri Ram Ratan Ram**
8. ***Shri Madhavrao Scindia**
9. **Shri V. Tulsiram**
10. **Shri Vishwanath Pratap Singh**
11. **Shri Dipen Ghosh**

*Nominated on 27-1-1986 *vice* Shri Manvendra Singh resigned.

INTRODUCTION

I, the Chairman of Railway Convention Committee (1985) having been authorised by the Committee to submit the Report on their behalf, present this Fifth Report on Railway Electrification.

2. The Committee took the evidence of the representatives of the Ministry of Transport (Department of Railways – Railway Board) on 9 and 23 January, 1986. The Committee wish to express their thanks to the Ministry of Transport (Department of Railway—Railway Board) for placing before them the material and information they desired in connection with the examination of the subject. The Committee also wish to place on record their appreciation of the valuable assistance rendered to them by the Chairman and Members of the Railway Board and Financial Commissioner of Railways and their officers and staff.

3. The Report was considered and adopted by the Committee at their sitting held on 30 April, 1986.

4. For facility of reference the recommendations and conclusions of the Committee have been printed in thick type in the body of the Report.

NEW DELHI ;
May 1, 1986

Vatsakho 11, 1908(S)

SUBHASH YADAV,
Chairman,
Railway Convention Committee.

INTRODUCTORY

Railway electrification is a multi-dimensional project for providing overhead electric traction on the existing railway lines for train movements. It is, no doubt, capital-intensive, It has now assumed national importance because of the paramount need to conserve petroleum fuels. It is essential that the future pattern of energy consumption in the transport sector should conform to emerging trend of energy supply in the country. From national considerations, conservation of energy sources has to be given overriding priority by attempting substitution of oils wherever possible. In the context of providing a viable infrastructure for healthy economic development and rapid industrialisation of the country, Railway Electrification programme on the Indian Railways has to be planned in a very big way and executed expeditiously so as to achieve the following benefits :

- National objective to conserve oils.
- Economical and energy efficient mode of traction consuming less than 2% of national electricity consumption.
- Flexibility of energy resources (hydel, thermal or nuclear).
- Environmental improvement due to pollution-free mode of traction.
- Substantial improvement in throughput capacity of heavy density railway routes.

1.2. The Indian Railways are the main artery of the nation's inland transport, extending over 61,460 route kilometres. Electric traction made its debut in India in 1925, when the first section of 16 km on Central Railway from Bombay to Kurla was electrified on 1500 V.d.c. system to provide fast suburban services. By 1930, the system was extended upto Pune and Igatpuri. The Southern Railway's metre gauge line from Madras to Tambaram was electrified in 1931. By 1936 about 388 route km, were electrified, all on 1500 v.d.c. system, serving mainly the Suburban sections of Bombay and Madras, with the only

exception of Bombay—Pune and Bombay—Igatpuri main line sections, where heavy gradients on the ghats favoured the introduction of railway electrification.

1.3 After a lapse of nearly 20 years electric traction was introduced in 1958 in the Calcutta Suburban Sections from Howrah to Burdwan and Sheoraphuli to Tarakeshwar on 3,000 V.d.c. system. In all these schemes, suburban traffic and steep gradients necessitated introduction of electric traction which was on 1500/3000 V.d.c. system.

1.4 Early in the Second Plan, when it became clear that steam traction would not be able to cope with the expected heavy increase in traffic due to development of mines, steel plants, thermal power houses and other industries on certain sections of Eastern and South Eastern Railways, Indian Railways decided to go in for electrification of main lines also for long distance haulage of freight and passenger trains. At about the same time, a new 25 kv 50 cycles single phase a.c. traction system gained recognition and Indian Railways adopted the same for all their future electrification projects.

1.5 The 25 kv. a.c. single phase system was first commissioned in August 1960 on the 75 route km. section between Rajkharswan and Dangoaposi on S.E. Railway. Since then, nearly 6,035 route km. have been put to 25 kv. of traction system on Indian Railways. With nearly 405 route kms. in the Bombay area still continuing to be operated on 1500 V.d.c. system, the total route kms. electrified Indian Railways works out to 6440 by the end of March 1985.

1.6 Electrified routes on the Indian Railways now constitute 10.4% of the total route kms. and 21.8% of the B.G. route kms. Out of the total electrified route kms nearly 1195 kms. constitute suburban commuter traffic sections and the balance 5245 kms. of electrified sections are on the long distance trunk routes catering to the requirements of heavily worked sections. About 27.1% of total passenger train kms. are getting operated annually on electric traction out of which 12.3% comprise services in suburban sections and 14.6% hauled by electric locos. Freight traffic under electric traction accounts for nearly 34.2% of the total freight tonne kilometres. Electric traction services account for 19.6% of the total annual fuel bill on the Indian Railways.

1.7 It is only now that the Government has accorded high priority for electrification as an instrument of growth coupled with the latest emphasis on conservation and substitution of oil energy. The accelerated programme of electrification, if fully implemented covering all the routes/sections identified for electrification, should enable 65% of the total traffic on Indian Railways to be carried on electric traction. As a consequence of heavy industrial and economic development in the country, the traffic on the railway system has been growing rapidly and the originating freight tonnage is anticipated to grow from about 250 million tonnes at the end of VI Plan to about 350 million tonnes at the end of VII Plan. Thus, Railway Electrification will make a very significant contribution in this rapidly growing transport effort of the Indian Railways. In view of these considerations of national importance, the Committee have thought it fit to examine in detail the various aspects of Railway Electrification programme and to suggest certain measures to overcome some weaknesses.

II

ORGANISATION

The organisational set up for electrification in railways at the Railway Board level comprises a Director, Railway Electrification, Additional Director RE (Signalling & Telecom) and a Joint Director RE (Stores). These officers function under the control of Adviser, Electrical. Member, Engineering is the Member-in-charge of Railway Electrification.

2.2 At the zonal level, the Railway Electrification Organisation presently consists of a Central Organisation for Railway Electrification (CORE) and five field units at Vadodara, Mathura, Kota, Nagpur and Ranchi, each headed by a Chief Project Manager. Another field unit is proposed to be set up at Bhopal shortly to cope with the workload. The CORE provides necessary logistic support to the field units and is responsible for planning, coordination, mobilisation of financial and manpower resources, tendering and contracting, centralised procurement of critical items of stores, inspection and quality assurance standard, development and approval of additional sources of supply of materials and fittings, coordination with outside agencies such as State Electricity Boards and Posts & Telegraph Deptt., monitoring of the progress of works, planning and execution of the work under its charge.

2.3 Besides the five field units mentioned above, there are two more field units functioning at Vijayawada and Madras under the direct control of the South Central and Southern Railway respectively. The field unit at Vijayawada is headed by a Chief Project Manager and that at Madras by a Chief Electrical Engineer. The Central Organisation, however, provides support to these units in respect of procurement of major items of stores along with those of CORE Project.

2.4 The set-up of Central Organisation for Railway Electrification consists of five heads of Departments, one each for Electrical Engineering, Signal and Telecommunication Engineering,

Civil Engineering, Finance/Accounts and Stores. A Deputy General Manager heads the General Administration and Personnel Branch.

2.5 The organisations under the Chief Project Managers at Vadodara, Mathura, Kota, Nagpur and Ranchi consist of Departmental heads in Electrical Engineering, Singal & Telecommunication Engineering, Civil Engineering, Stores Purchase and Finance/Accounts.

2.6 It has been stated by the Department of Railways that the CORE Project was set up to step up the pace of electrification on the basis of a Report by a group of Secretaries to the Government of India, which recommend acceleration of the pace of electrification during the Sixth and the Seventh Five Year Plans.

2.7 On being asked during the evidence the reasons for having different organisations for railway electrification, the Member, Engineering, Railway Board, informed the Committee as follows :

“CORE was formed in 1981-82. Earlier to that, this was under the GMs. It was thought that the projects were being spread out in various areas on various Railways and, therefore, a Central Organisation for this purpose would be helpful and therefore, it was brought in.....We have felt over the years, it was not bringing about that much results, at least in coordination in respect of programmes of work. So, it was decided that the system in future would be that the Chief Project Manager of the Railway Electrification would be administered and controlled by the General Manager.”

2.8 The Chairman, Railway Board added to this :

“You said about South Central and Southern systems. That was extended to Western Railway about two months back. That was done in July. After finding this successful it has now been extended to all the Railways. Orders were issued only today. So, we are doing it now.”

2.9 The Committee pointed out that the progress of work in the South Central and Southern Railways was faster than in other places. The Member, Engineering, conceded by saying :

"I would like to clarify that the General Managers' control and efficiency was available on Southern and South Central Railways where there is better arrangement in regard to coordination, etc. I want to clarify the position that as far as the total project execution time is concerned, the figures available are very obvious to say that this has been the reason. From over 34 projects of railway electrification, I find that at least 25 projects were completed in five years and the other projects could not be completed within five years. One project relates to Southern Railway which took about seven years and one project relates to South Central Railway which took six and a half years. There is another project in Southern Railway which took seven-and-a-half years. So, it is not related to that aspect. But as has been suggested, and we also accepted, that the organisational arrangement of the General Managers is superior there."

2.10 The Chairman, Railway Board, further added :

"The reason why we thought of putting the CPM under the GMs is that the programme of electrification is much larger than what it was. Traffic, at the same time is growing phenomenally. Therefore, the problem of giving blocks is much more acute now. So the necessity of putting CPMs under the open line GMs is more."

2.11 Asked about the status of CORE, the Member, Engineering, replied as follows :

"The jurisdiction of Chief Project Manager was laid down. It is irrespective of the railway boundary or zone. Chief Project Manager, Mathura deals with projects on Western & Central Railways. The same position is there in respect of Nagpur where he deals with Central and South Central Railways. Chief Project Manager reports to the General Managers. It is not difficult. They control their own projects. Coordination is done by General Managers in their own areas. They should report to one General Manager only. The institution of CORE is necessary for

different purpose. GMs are not able to get complete expertise on procurements centrally. As you know some of the projects are assisted by World Bank. Procurement is centralised at one agency. That portion of work of procurement of material and technical guidance is only left with CORE. The institution of CORE is at Allahabad for historical reasons. It first started at Calcutta. Then their office moved to Allahabad. When work is over, there is desire of Railway Ministry that it should go to the centre of the activity but there were some human problems. It is still at Allahabad. This point is under consideration. We have to see how far the human problem has to be given priority and so on. The projects would be administered by the GM for the day to day works and there will be coordination of the progress of these works. But this centralised control in respect of procurement, in respect of technical advice, is by the CORE organisation."

2.12 On the apprehension of the Committee that the Additional General Manager, CORE, because of his low rank, is handicapped in his negotiations with the General Managers of the Zonal Railways, the Chairman, Railway Board, clarified as follows :—

"I wish to mention that in the Railways there is a standard practice of this nature. For example, in the divisional set up, there is a Divisional Railway Manager under whom people of different disciplines are working, like the Divisional Engineer, Divisional Operating Superintendent and so on. They take the guidance from Deputy Chief Engineer etc. on technical matters at the same time they are under the control of DRM. DRM may not be a civil engineer but he is in overall control. We do not find any problem. We do not feel that it will create any problems from that point of view."

2.13 On being asked about the relevance of Allahabad being the headquarters of CORE, around which there are no on going electrification works, the Chairman, Railway Board, stated :

"As Member, Engineering clarified a little bit, there are two

considerations which you may like to keep in mind. One is human problem of shifting people from Allahabad. There are people working there. Particularly, in the new set up it is not so much a field organisation for inspection purposes etc., but a central organisation of giving technical guidance and advice. Therefore, it does not make so much difference now whether it is in Nagpur or Allahabad. It would have made a big difference if the set up is in a different manner. Although Nagpur is a little more central, we have to see whether the location at Nagpur will outweigh the human problems of the people. Now the difference is marginal."

2.14 On request of the Committee, the Chairman, Railway Board, gave the following suggestions for bringing about coordination :

"First, we have put it under the General Manager. Secondly, we are taking the routewise system. And thirdly, close monitoring is being ensured. That is what we are doing."

"It is a very important programme. We are going to monitor it at every level. We have to question people and to say that GM, Open Line, is now incharge, is not what we are to remain content with. We watch the tracks and their achievements. The organisational part is being taken care of. Now we will keep a close eye on this, so that nobody remains idle.

"There is always scope for improvement. In the 6th Plan, they did achieve things on the basis of whatever money was given to them. We were quick to realise the difficulties coming up. Now the traffic has gone up tremendously. During one of the meetings held recently, we found that there was heavy traffic moving. They were not getting the necessary blocks. We took quick action to put them under open line G.M."

2.15 To another enquiry, the Member, Engineering, defined the functions of the Adviser, Electrical as follows :

"Adviser, Electrical, has two functions. He is the senior most Electrical Officer in the Railway Board. He looks after not

only railway electrification, but all other aspects of electrical services on the Railways, All technical matters relating to electric rolling stock, including production and maintenance, generation, transmission and utilisation of electricity by the Railways, are looked after by him. He has got the duties to be in charge of electrification of stations and buildings, electrical aspect of diesel locomotives, scrutiny and sanction of electrification estimates, coordination between Railways, State Electricity Boards and other agencies of electrification proposals, and coordination between the RDSO and Railways on technical matters. These are the total duties which he performs. That is why Adviser, Electrical, is assisted by the Director, Electrical. The function of the Ministry in respect of electrification is done wholly by a separate Director, who is called Director Railway Electrification. There is another Director, Electrical, who looks after the other general services."

2.16 The Committee note that at the Board level, Member, Engineering, is the Member-in-charge of Railway Electrification and that he is assisted by Adviser, Electrical, and Director Railway Electrification. In addition, there is a Central Organisation for Railway Electrification (CORE), set up in 1981-82, to accelerate the pace of electrification. It has its headquarters at Allahabad with five field units at Vadodara, Mathura, Kota, Nagpur and Ranchi, each headed by a Chief Project Manager. The Committee have been told that one more field unit is being set up shortly at Bhopal to cope with the work load.

2.17 Besides these five field units, there are two more field units at Vijayawada and Madras under the direct control of the General Managers of the respective Railways. CORE, however, ensures bulk procurement of material and standardisation of materials and equipment for all the railway electrification projects. It would, thus, be seen that there are two types of organisations—one is CORE and the other is under the General Managers of Zonal Railways. During evidence it was admitted by the Member, Engineering, that "we have felt over the years, it (CORE) was not bringing about that much results" and that it has since been decided that the Chief Project Manager will be under the control of the open-line General Managers. It is also conceded that the projects under open-line General Managers progressed much faster than at other places.

2.18 The Committee are of the view that since the railway electrifi-

cation projects would now be under the control of open line General Managers, for day to day execution of projects, General Manager should be able to effectively coordinate the conflicting requirements of traffic blocks for progressing electrification works and pressure of increased tempo of rapidly growing traffic on one hand; and the regulation of traffic blocks amongst RE projects and other requirements of the open line Railway on the other. The Railway Board must ensure to achieve the desired progress of Railway Electrification projects to complete the programme envisaged for the Seventh Plan.

2.19 The Committee are of the firm view that the Central Organisation for Railway Electrification should be disbanded and made an integral part of the Railway Board to ensure effective and expeditious management of all Railway Electrification projects.

2.20 At present Adviser, Electrical, has dual functions. He looks after not only railway electrification projects, but also all other aspects of electrical services on the Railways. With the increasing tempo of railway electrification and disbanding of CORE, as suggested by them, the Committee feel that a full-fledged Member-in-charge of Electrical Engineering be created in the Railway Board by upgrading the post of Adviser, Electrical, and the Electrical Engineering Branch in the Board should be suitably strengthened.

2.21 The electrification programme envisaged for the Seventh Plan period is very important and crucial in view of the national considerations. The Committee have observed that it is equally important to ensure that the basic inputs are provided immediately for the successful implementation of this programme. The present infrastructure available for Railway Electrification by way of organisation, overall long-term planning, development of adequate and matching production capacities and need for effective coordination with P&T and SEBs does not give the confidence that the envisaged programme can be achieved at the present rate of performance. The Committee think that unless immediate steps as highlighted above are taken early the electrification programme will suffer slippages.

III

IMPLEMENTATION OF RAILWAY ELECTRIFICATION PROGRAMME

The growth of electrified routes up to the end of the Sixth Five Year Plan i.e., 31.3.1985 is as follows :

Plan period	Plan	Route kms.	energised
1956-61	II	216 kms.	
1961-66	III	1746 "	
1966-69	3 Annual	917 "	
1969-74	IV	953 "	
1974-78	V (4-yrs.)	533 "	
1979-80	2 Annual	195 "	
1980-85	VI	1522 "	
Total		6077 kms.	
Total electrified from 1.4.1956 to 31.3.1985		6077 Route Kms which include 166 kms. converted from DC to AC	
Net new route electrified		5911 kms.	
Route electrified before 1.4.1956		529 kms.	
Total electrified route as on 1.4.1985		6,440 kms. including 405 kms. DC system	

3.2 The electrified sections are mainly as follows :—

- (i) Howrah-Delhi trunk route (*via* Grand Chord)—entire route on Eastern and Northern Railways ;
- (ii) Suburban sections on the Eastern and South Eastern Railways around Calcutta ;

- (iii) Howrah-Durg (part of Bombay-Calcutta route) and Sini-Adra-Asansol section of South Eastern Railway. Rajkharswan-Dangoaposi-Bhrajamda-Gua-Bolani iron ore lines South Eastern Railway ;
- (iv) Bombay VT-Bhusaval (part of Bombay-Delhi trunk route) of Central Railway. Suburban sections of Central Railway operated on DC system ;
- (v) Bombay-Baroda (part of Bombay-Delhi trunk route) and Baroda-Ahmedabad of Western Railway, including suburban sections operated on DC system;
- (vi) Delhi-Mathura-Agra (part of Delhi-Bombay trunk route) of Central Railway ;
- (vii) Waltair-Kirandul iron ore section of South Eastern Railway ;
- (viii) Madras-Vijayawada (part of Delhi-Madras G.T. route) and Madras-Villipuram, Madras-Arakkonam-Renigunta-Tirupati-Gudur sections of Southern and South Central Railways.

3.3 The Government of India appointed, in 1977, a working group on Energy Policy. In their report submitted in 1979, they focussed attention on the pressing need of restricting the consumption of oil and on encouraging consumption of alternative fuels and suggested that all possible measures should be examined by which the consumption of oil could be restricted only to uses where it cannot be substituted. The National Transport Policy Committee-1980 also emphasised the need for energy conservation. As a follow-up of the recommendations of the Working Group on Energy Policy of the Planning Commission, the Committee of Secretaries on Energy, in their meeting on 11.6.1980, identified electrification as one of the items to conserve consumption of high speed diesel oil in India. In July 1980, the Committee decided that a follow up on priority basis should be made on 'railway electrification at 100) route kilometres per year'. Further, the Cabinet Committee on Energy, which was formed on 29th October, 1980, presided over by the Prime Minister, and with the Ministers of Railways, External Affairs, Finance, Energy, Petroleum, Chemicals and Planning as Members, directed, in their meeting held on 19.12.1980, that the Secretaries 'Committee on Energy may monitor and review the

implementation of its decision on regular and continuing basis and report back to the Cabinet Committee from time to time. The Secretaries' Committee on Energy requested the Ministry of Railways, in March 1981, to review its programme of energisation in the Sixth and Seventh Plans, in view of the urgency for conservation of oil energy.

3.4 On a review of this programme and considering the lead time for various steps, it was found that the pace could not be made faster. It was, therefore, reiterated to the Secretaries' Committee that although there was no possibility of achieving 1000 rkms per annum earlier than 1984-85, the programme, as advised to the Committee, would be adhered to. In the meeting on 11th June, 1981, the Secretaries' Committee proposed that a "well thought out programme of action be prepared for the above Cabinet Committee" for achieving 1000 rkms electrification from 1984-85, which, in the draft stage, could be considered by the Secretaries' Committee in pursuance of the Cabinet Committee's decision on 19-12-1980. This action plan envisaged electrification of 2800 rkms during the Sixth Five Year Plan and building up of capability for taking up electrification at 1000 rkms. per annum in the Seventh Five Year Plan.

3.5 As at present, because of increased efficiency and higher tractive effort available from other forms of traction, steam traction is being phased out. The manufacture of steam locomotives was completely discontinued in 1971-72. The existing fleet of steam locomotives is being gradually phased out on age-cum-condition basis and replaced by diesel and electric locomotives. The traffic hauled on steam has come down gradually and the traffic on diesel and electric traction has increased.

Policy on Electrification

3.6 Electrification projects are taken up only on high traffic density routes, and that too, only if the project is remunerative i.e., if the internal rate of return on capital invested is more than 10 per cent. However, in view of the national policy to conserve oil, a long-term 10-year electrification programme was made out which includes the main trunk routes between the metropolitan cities of Delhi, Bombay,

Calcutta and Madras and other high traffic density routes. Priority has been assigned to :

- (a) Electrification of the quadrilateral and diagonal main lines connecting Delhi, Howrah, Bombay and Madras ;
- (b) Electrification of other high density routes (not on the main trunk lines) carrying coal, iron ore, etc. ; and
- (c) Small sections considered necessary to promote continuity of traction and fluidity of movement on operational grounds.

Again, electrification projects are sanctioned only if they are remunerative. Opportunity is also taken to modernise the signalling by adopting colour light signalling ; improvements in interlocking and efficient and reliable telecommunication facilities by providing underground cables.

3.7 Electrification projects involve a number of works, to be executed by different Departments either departmentally or through contractors. The construction activities have to be coordinated closely with other agencies such as Open Line Departments of the Railway including Construction Department, P&T Department for shifting of overhead telecom alignments, the State Electricity Boards for power supply arrangements/works etc. The total execution time for an electrification project extends to about four years. It has, therefore, been stated that it is not possible to electrify all the identified sections at the same stage, firstly, because of physical limitations, and secondly, because of non-availability of resources and adequate funds. Therefore, the various trunk routes and other heavy density routes, which have been identified for electrification, are taken up for electrification and energised progressively. The change of traction takes place at the boundary of each section thus progressively energised. Generally, electric traction is introduced on a long stretch of track so that trains can move on the same traction from one big yard to another big yard.

3.8 As stated earlier, electric traction requires heavy initial investment for the overhead equipment (OHE) and power supply installations. The capital investment in fixed installation is incurred once whereas the maintenance and operating cost and expenditure on locomotives are dependent on the traffic level. The investment on fixed assets would become remunerative only if the traffic density is high. There is, therefore, a specific

break-even level of traffic density above which electrification is justified over diesel traction. The various factors taken into account for working out the cost of electrification/dieselisation are as under :

- (i) Cost of providing over head equipment, power supply, colour light signalling, minor yard remodelling to cater for increased traffic and works concerning modification to overhead structures for providing adequate clearances.
- (ii) Determination of loco requirements based on the trailing loads and average speeds of trains i.e., net tonne kilometres moved per day per locomotive in use.
- (iii) Cost of locomotive sheds.
- (iv) Cost of maintenance and repairs of overhead equipment and locomotives.
- (v) Cost of locomotives to move the anticipated traffic.
- (vi) Operating cost :
 - Cost of running staff
 - Cost of electricity/diesel/oil based on specific to consumption figures
 - Cost of lubricating oil

3.9. The Department of Railways, in a note, informed the Committee about the targets fixed for energisation in the Sixth and Seventh Plans as follows :

“In pursuance of recommendations of the Working Group on Energy Policy of the Planning Commission (June, 1980), a 10-year programme of accelerated electrification was drawn at the beginning of the Sixth Five Year Plan and electrification of 2800 rkm in the Sixth Five Year Plan and 5000 rkm during the Seventh Five Year Plan was envisaged. The target for the Sixth Five Year Plan was revised downwards progressively in the course of annual reviews, in consideration of financial and other constraints, escalation in prices, and finally electrification of 1,522 rkms was achieved during the Plan period. The target for the Seventh Five Year Plan has been revised downwards and is now fixed at 3,600 rkms.”

3.10 However, the actual implementation of railway electrification during the Sixth Plan period has been 1,522 rkms as against the target of 5,240 rkms as follows :—

	New projects included in works programme (route kms.)	Projects completed (route kms)
1980-81	563 (in three sections)	440 (in three sections)£
1981-82	2526* (in seven sections)	114 (in two sections)
1982-83	1136 (in five sections)	320 (in five sections)
1983-84	—	271 (in five sections)
1984-85	1012 (in five sections)	735 (in seven sections)
	5240	1,522

* Includes 557 rkms. (Sitarampur-Mughalsarai) which was approved in 1981-82 but execution deferred.

£ These sections do not correspond to the sections included in a particular year in the works programme, except in one year.

3.11 Asked if the 1,522 kms. included the spill over of the Fifth Plan also, the Member, Engineering, admitted by saying that "3400 kms which we are planning in the Seventh Plan include all these works coming from the Sixth Plan. This is the first priority". He went on to say, "The new additions in the Seventh Plan are almost nominal. These are all projects which are already sanctioned and included in the Sixth Plan".

3.12 The details of these projects were submitted by the Railways in a subsequent note as follows :—

Electrification of the following sections, which were taken up in

hand, have been spilt over from the VIth five Year Plan to the VIIth Five Year Plan.

	Projects	RKM's
Western Rly. Route :	1. Dahod-Ratlam	183
	2. Mathura-Gangapur City	153
	3. Gangapur City-Kota	171
Central Rly. Route :	4. Mathura-Jhansi	169
	5. Bhusawal-Badnera	219
	6. Jhansi Bina	151
Colliery Lines	7. Chandrapura Complex	90
	G.T. Routs	
	8. Vijayawada-Kazipet	220
	Total	1356

3.13. On an enquiry by the Committee regarding the amounts asked for from the Planning Commission under each Plan for railway electrification and the amounts actually allocated, the Railway Board submitted the following statement :

	Amount asked for electrification	Actual allocation (Rs. in crores)
1st Plan (incl. new lines) and other electric works	Nil (Original)	34.18
	(Revised)	33.20
2nd Plan	N.A.	65.00
3rd Plan	N.A. (Original)	70.00
	98.00 (Revised)	98.00
4th Plan	73.00	73.00
5th Plan	126.00	101.00
6th Plan	450.00	450.00

3.14 The Committee enquired, why the targets were not fixed in accordance with the amounts asked for. The Member, Engineering, informed as follows :

“The question is that we asked for Rs. 450 crores and it has been provided in the Plan and that, therefore, the target should have been completed. I would like to mention that the fund requirement is given with respect to the base year of the Plan, that is, the starting year of the Plan. We were able to get only Rs. 450 crores which would mean that as far as the escalation of prices, which occurs during this period is concerned, we do not get adequate funds to be able to complete that quantum.”

3.15. The Chairman, Railway Board, further added :—

“The Rs. 450 crores of the Sixth Plan was at the 1979-80 prices and according to the Planning Commission’s own system every year they are supposed to allow for the escalation element. Therefore, the sum total of the five years of the Sixth Plan should have been much more than the Rs. 450 crores. The annual plan allocations were not in keeping with the Five Year Plan allocations which were included in the Plan document. Therefore, there was a shortage of resources. That was one of the reasons We made it clear to the Planning Commission that they should take the escalation every year. Then the sum total in the plan figures should have gone to, say, Rs. 600 crores. I have not calculated. This is just for illustration. But we actually got Rs. 430 crores. We did not even get Rs. 450 crores.”

3.16 The Committee enquired as to how the sanction of Rs. 450 crores for 2800 kms. was reviewed and target reduced, the Chairman, Railway Board, explained :—

“Whenever any five year plan is made, all this was being done and the previous spill overs are included. This 2800 kms. included the spill over also. We had a programme of 563 rkms, included in the works programme but we actually did 440 rkms. Whatever money was allocated for electrification in the various years of the Plan, was almost fully utilised.”

3.17 Member, Engineering, further clarified the position as follows :—

“In 1980-81 the allocation was Rs. 27 crores and actual utilisation was Rs. 26.28 crores. In 1981-82—allocation was Rs. 61 crores and Rs. 63.31 crores were actually utilised and 1982-83—allocation Rs. 109.65 crores and Rs. 106.27 crores were actually utilised. 1983-84—Rs. 85.75 crores and Rs. 86.94 crores were actually utilised. 1984-85—Rs. 150.85 crores and Rs. 141.80 crores were actually utilised.”

3.18 In regard to the allocation and target of the Seventh Five Year Plan, the Member, Engineering, had the following to say :—

“The life of any project is 4-5 years. If the money given in the first year of the Plan is proportionate to our targets then we will be able to achieve the progress. The money was given more in the last two years. The money flow should come properly out of the total allocation. This is the thing which has been remedied in the Seventh Plan. We asked for Rs. 830 crores and we got Rs. 210 crores in the first year. If the flow of money remains at this stage then we will be able to achieve 3400 rkms.”

3.19 The Chairman, Railway Board, however, added :

“High priority is being given to the electrification work. In the Sixth Plan we asked for Rs. 450 crores and we did get the same amount. But the whole rub is in the Annual Plans. The figure mentioned in the Seventh Plan does not mean anything if in the Annual Plan you do not give the money accordingly. The concrete thing is the Annual Plan. In the Annual Plans, during Sixth Plan, the Planning Commission was unable to allocate the funds due to constraints.”

3.20 The present position of progress of work on the trunk routes is as follows :

(a) *Delhi-Bombay (Western Railway) Route :*

The electrification works have been taken up from both the ends. The sections Delhi-Mathura and Bombay-Baroda-

Godhra have already been completed and electric traction introduced. Electrification works on the intervening sections from Mathura to Godhra are expected to be completed, progressively, during 1985-86 and 1986-87, on topmost priority.

(b) *Delhi-Madras (GT) Route :*

This is a very long trunk route. Electrification on the Madras-Vijayawada and Delhi-Mathura-Agra sections on this route has already been completed and electric traction introduced thereon. Major electrification contracts for traction overhead equipments for all the remaining sections of this entire route have been awarded. It is expected to complete energisation of this route by 1987-88.

(c) *Bombay-Calcutta trunk route :*

Electric traction is already in operation on Bombay-Bhusaval (Central Railway) and Howrah-Durg (South Eastern Railway) sections of this route. The missing link from Bhusaval to Durg is 658 route kms. out of which Nagpur-Wardha (79 route kms) section is already covered under the electrification contracts awarded for the GT route. The tenders for traction DHE for the remaining sections, Bhusaval-Wardha and Nagpur-Durg, have just been floated. It is programmed to complete electrification of this route by 1988-89.

(d) *Delhi-Bombay (Central Railway) Route :*

The section from Delhi to Itarsi is already covered under the electrification programme of GT route. Electric traction on Bombay-Bhusaval section (Central Railway) is already operative. The missing link on this route is Itarsi-Bhusaval (301 rkms) section. About 57 rkms of railway track on this section have to be diverted on account of Narmada Dam Project. On completion of this dam, the affected tracks on their existing alignment will get submerged. Electrification of the section Bhusaval-Itarsi is, therefore, dependent on the progress of diversion of the tracks.

(e) *Tundla-Agra-Bayana sections :*

These sections will constitute important links between the three electrified trunk routes and as such are programmed to be electrified on operational considerations. Electrification of this link was approved in the 1985-86 Works Programme and is programmed to be completed during the Seventh Plan.

(f) *The Coal Route Bilaspur-Katni-Bina-Bhopal-Nagda :*

Electrification of Bhopal-Nagda section was approved in the 1982-83 works programme. This is an important link between the two trunk routes between Delhi and Bombay, one via Western Railway and the other via Central Railway. Electrification of the remaining coal route, Bina-Katni-Bilaspur, was approved in the 1984-85 works programme. Only token allotments of funds have been made for these sections in view of shortage of funds.

3.21 Work on the following sections was due to start at the beginning of the Seventh Plan :

(i) *Champa-Gevra Road*

Electrification of the section has been approved in the Works Programme 1985-86 45 rkms

(ii) *Tundla-Agra-Bayana*

Electrification of this section has been approved in the works programme of 1985-86 106 ..

(iii) *Gomia-Barkakana-Garwa Road-Sonnagar*

(This section will have to be electrified on priority as it carries coal and without this electrification, traction will have to be changed at Sonnagar). 396 ..

(iv) *Garwa Road-Chopan Chunar*

(This section will have to be electrified on priority for the same reasons as section (iii) above to avoid change of traction at Chunar). 245 ..

(v) *Purulla-Kotshila*

(Section will be converted from		} 149 ..
NG to BG	35 rkm	
Kotshila-Bokaro	29 ..	
Kotshila-Muri-Chandil	85 ..	

3.22 The Committee were also informed that a World Bank Loan Agreement has already been concluded for an amount of US \$ 280.7 million out of which \$ 140.5 million are meant for funding of the electrification projects for the following sections :

Sections		Route Kms
1. Jhansi-Itarsi	...	381
2. Itarsi-Bhusaval	...	301
3. Bhusaval-Nagpur	...	393
4. Wardha-Balharshah	...	393
5. Balharshah-Vijayawada	...	454
6. Bhopal-Nagda	...	239
7. Itarsi-Nagpur	...	298
8. Nagpur-Durg	...	265
9. Bina-Katni-Anuppur	...	429
10. Anuppur-Bilaspur	...	151

3.23 On an enquiry whether the Railways were taking up the work simultaneously in the remaining sectors of Calcutta-Bombay, Bombay-Delhi and Delhi-Madras trunk routes during the Seventh Plan, the Member, Engineering, informed :

“The route having been identified we start from either end of the route. So, some of the portions would get electrified first but we will be progressing right along the route. Our policy is to do from one loco-changing position to another loco changing position in one go. As the work progresses project-by-project, the whole route will get included.”

3.24 As regards Calcutta-Madras and Madras-Bombay trunk routes having not been taken up for electrification, he stated :

“About the two routes, it was a question of getting maximum out of the investment that was going to be made available to us.

The density of the routes, Delhi-Madras, Delhi-Bombay and Bombay-Calcutta is very high. The return of electrifying these routes is going to be much more. Others have been kept for the Eighth Plan."

3.25 The Committee strongly feel that electrification of the two trunk routes viz. Calcutta-Madras and Madras-Bombay should also be commenced before the end of the Seventh Plan in view of the growing traffic on these routes. The Government should allocate and make available additional funds during the Seventh Plan to enable the Railways to take up electrification on these routes and complete it during the Eighth Plan period.

3.26 In regard to Calcutta-Delhi via main line Mughulsarai-Asansol, the Member, Mechanical, stated :—

"So far as the main line between Asansol-Patna-Mughulsarai is concerned, it was a sanctioned works programme during the 6th Plan, but it was not one of the sanctioned sections by the Planning Commission. The density on the grand chord via Dhanbad is much heavier because of coal traffic. On the main line, primarily, it is the passenger traffic and only two or three goods train move on that. Keeping in view the all-India priority, this section will be given its priority, but where it fits depends on the availability of resources and density of traffic on the other sections and that would be decided in due course."

3.27 On an enquiry of the Committee whether it would not be desirable that work in a project should be continuous under a perspective plan instead of disbanding it once the work was over, the Member, Engineering, informed the Committee as follows :

"All these organisations continue to carry out work for the railways and they shrink or expand as the workload decreases or increases. To that extent there will be some reshuffling. If they are reduced in scope or increased in scope according to the priorities that are given, then gradually we will keep on expanding or shrinking these organisations accordingly. We have never felt any problem in regard to movement of expe-

rienced personnel from one project to another when the need arises because they are all railway personnel, they are not taken from outside. Once the organisation shrinks, they revert back to their Railways and once it expands, they are taken from the Zonal Railway systems. In the new system that we are adopting, there will be no problem at all."

3.28 When another example of the Railway Electrification set-up at Vijayawada was cited, where Balharshah-Vijayawada electrification was nearing completion, but Kazipet-Secunderabad section and Guntur-Tenali sections were on the cards, whether it was not desirable organisationally to take up work on these two projects also, the Member, Engineering, explained :—

"It is a question of utilising the available resources to have the maximum benefit out of railway electrification. The priorities have been given very clearly that we would like to go by route basis so that most of the routes will get electrified. There will be no problem if an organisation is to be set up later because they are railway-men, we can recall them; they are not outsiders. There was the MTP organisation in Bombay. When the number of projects shrank at Bombay, we absorbed them within the same area. Suppose more funds become available two years later, we know where the expertise is available and we will ask them to come back. Similarly, in the case of MTP, Calcutta, we cannot provide another project just to continue that organisation. After all, they remain with us; they are not outsiders. Therefore, to recall them or to reassemble them at another centre would not be difficult."

3.29 During the evidence, Member, Engineering, tried to justify that when projects are completed, the construction organisation has to be wound up. The staff are put on other projects or absorbed for maintenance, and thus there was no problem. The Committee, however, do not feel convinced of applying this explanation to railway electrification projects. The Committee have observed during their inspection of railway electrification projects that it took about 2 to 3 years to build up a project unit with adequate strength of junior officers and technical staff, particularly in the disciplines of Signal and Telecommunication and Electrical

Engineering. There is acute shortage of these categories. The open line Railways, who themselves are short of them, do not like to spare these personnel for railway electrification projects. The Committee, therefore, strongly feel that those units which are about to complete, in the near future, the projects in hand, should be allotted other already approved and contiguous projects.

3.30 The Committee feel that disbanding a field unit at one place and starting subsequently a new unit in another area will only slow down the overall progress and pace of electrification which is so important from national considerations. The Committee have in mind particularly the following situations where it will be unwise to disband the existing units :--

(a) *Railway Electrification Madras :*

On completion of Arrakonam-Jolarpettai project by 1986, this unit could be allowed to take up already approved project of Jolarpettai-Bangalore or Jolarpettai-Erode project.

(b) *Railway Electrification Vijayawada :*

On completion of Bahurshah-Vijayawada project (i.e., GT Route) by 1987-88, this unit, instead of being wound up, could be allowed to take up the already approved project of Kazipet-Sanatnagar.

3.31 The Committee strongly recommend as suggested by them the Government should allocate and make available additional funds to enable the Railways take up electrification of Jolarpettai-Bangalore, and Kazipet-Sanatnagar projects during the Seventh Five Year Plan period itself.

3.32 During visit to Guntur and Tenali a number of local bodies, organisations and legislators presented to the Committee memoranda pressing for electrification of the 53 kms long Krishna Canal-Tenali-Guntur railway line triangle, which, according to them, would cut short the distance and avoid change of traction on trunk route.

3.33 The Committee noted that this work of electrifying Krishna-Canal-Tenali-Guntur has since been included in the 1986-87 works pro-

gramme but the funds allocated are not substantial. Another link which the Committee has in mind is the Tundla-Agra-Bayana where the work due to start in the beginning of the Seventh Plan. Had electrification of this section been planned properly to synchronise with electrification of the Delhi-Jhansi, Mathura-Gangapur city and the Delhi-Kanpur sections, many operational constraints could have been avoided. The Committee recommend that more funds should be allocated for these works, which are vital, so that these sections are covered by electric traction soon.

3.34 The attention of the Members of the Railway Board was drawn to the address delivered by the Minister of State for Railways to the International Seminar and Exhibition on Railway electrification that the planning for energisation was closely coordinated with user traffic departments for a meaningful utilisation of the energised sections as and when they were completed and that construction activities were not progressing with cohesion, revealing big gaps, for example, between the progress of OHE and the modification works of signalling installations. The Member, Mechanical, stated :

“There have been delays on account of lack of coordination between signalling and telecommunication works and the electrification. But with the measures that have been taken, we are quite confident that they will give us handsome dividends and the work will be coordinated much better under the charge of the General Manager.

× × × × With his (Minister of State for Railways) approval only we introduced the new system with the Chief Project Manager in charge of Electrification being under the General Manager open line.”

3.35 During visits to different railway electrification locations, the Committee observed that steam traction was existing side by side with electric traction on many of the routes and practically in major marshalling yards.

3.36 Accepting the need for more electrification, and denying the existence of “a pro-diesel and anti-electrification lobby” in the Railway Department, the Member, Mechanical, said :—

“The electrification projects for the various sections are approved

by the Planning Commission and there is no question of any lobby having any weightage in this respect. A number of Committees have gone into this aspect. The last Committee which considered it was the National Transport Policy Committee in 1980. Electrification is capital-intensive, and according to this Committee, the break-even point is 30 million gross tonnes traffic per km. per annum. But the railways are working on a lower level of 22 million gross tonnes traffic per annum per km. We also see that on these sections, with this break-even point, the return is minimum *i.e.* 10 per cent. Keeping in view the density of traffic and return on these sections, these things are decided. It is in the national interest that we expeditiously electrify, because we have the coal available and the thermal power can be utilised for our transportation purposes. In the case of diesel, we have to import crude oil because despite a lot of new finds, we are no where near self-sufficiency at present. Therefore, there should be no misunderstanding on this account that any lobby has any say against electrification. These things are decided on a very scientific basis. Again, the costs are also misleading because if one State Electricity Board charges 0.50 paise per unit, another Board charges 0.88 paise. There are so many aspects which are quite misleading and I do not think we should give any consideration to these things."

3.37 By way of example, the Department of Railways submitted a statement showing cost of different modes of traction during the years 1982-83 and 1983-84 :

**COST PER 1000 GIKMs (in Rupees)
GOODS SERVICES**

	B.C.		M.G.	
	1982-83	1983-84	1982-83	1983-84
Steam	103.01	126.54	84.83	111.29
Diesel	16.30	18.75	25.37	27.59
Electric	12.44	13.84	17.52	17.13

(The cost is exclusive of depreciation, interest, overheads and other charges)

3.38 The Committee note that the cost of hauling traffic per 1,000 GKM is Rs. 12.654 in respect of steam traffic, whereas it is Rs. 13.84 in respect of electrified traffic movements. Keeping this high cost factor in view, the Committee feel that the process of phasing out steam locomotives should be accelerated. As an immediate measure, co-existence of electric and steam tractions side by side, particularly in the marshalling yards, should be totally stopped. Secondly, they would suggest that in such of marshalling yards, as fall in predominantly electrified areas, steam traction in yards should be done away with on priority basis. This might remove problems connected with setting of OHE also.

3.39 The general question of total replacement of steam traction by other modes needs to be considered in greater depth in view of the fact that steam traction costs much more than the other modes of traction and, therefore, any accelerated investment needed to phase out the steam traction would be well paid off by the lower cost of operation. However, the Committee cautions that this process of phasing out steam traction should not result in retrenchment of the concerned personnel.

3.40 In the Sixth Five Year Plan, the Railways planned for electrification, by including in their yearly works programme, 563 rkm in 1980-81, 2,526 rkm in 1981-82, 1,136 rkm in 1982-83, nil in 1983-84 and 1,012 rkm in 1984-85—totalling to 5,240 rkm as against a target of 2,800 rkm in the plan. The provisions in the works programme should have relevance to the attainable plan targets. Against the Sixth Five Year Plan target of 2,800 rkm, the achievement has been 1,522 rkm i.e. 54.39%, which, however, include works taken up from 1970-71 onwards. The Committee are informed that the spill over of the Sixth Plan to the Seventh Plan is to the extent of 1,356 rkm. Spill over to such a large extent is not healthy. As a railway electrification project takes four to five years for completion, the spill over should be confined only to the last one or two years of Plan-period and not spread over a longer period. The Committee have not gone into the time overrun and cost overrun of the railway electrification projects already completed. If these two aspects are taken care of, the Committee are sure, the spill-over can be drastically reduced.

3.41 The Committee note that, except in the Fifth Five Year Plan, there was no shortfall in actual allocation of fund as asked for by the Railways. In the Sixth Five Year Plan Rs. 450 crores were asked for and

were allotted. The Chairman, Railway Board clarified that 'this Rs. 450 crores of the Sixth Plan was at the 1979-80 prices and as the annual plan allocations were not in keeping with the Five Year Plan allocations, there was shortage of resources'. This phenomenon of the allocations being fixed at the cost prevailing in the base year is not peculiar to the Railways. This principle is adopted for all the projects. The complaint of the Railways that there was inadequate flow of funds during each year of the Plan has been remedied in the Seventh Five Year Plan. The Railways asked for Rs. 830 crores for railway electrification in the Seventh Five Year Plan and have been allotted Rs. 210 crores in the first year of the Plan. The problem of flow of funds having been met, the Committee expect that the Railways would achieve the target of electrifying 3,400 kms. in the Seventh Five Year Plan.

3.42 The Committee note that the trunk routes—Bombay to Delhi (both Western & Central Railways). Bombay to Calcutta and Delhi to Madras are proposed to be energised on first priority and are expected to be completed progressively before the Seventh Five Year Plan is over. On these routes, while keeping in view the rate or return on capital invested to be more than 10%, the electrified stretches have spread over different sections. It is of utmost importance that stretches which have been left out, should be attended to first route-wise, irrespective of rate of return, with a view to introducing electric traction over the maximum possible distances within a short time to avoid multiplicity of traction. This would also result in better utilisation of electric locos.

3.43 As admitted by the Member, Mechanical, there have been delays on account of lack of coordination between signalling and telecommunication works on one hand and the electrification on the other. The Railways have taken steps to improve coordination—one of them being bringing the Chief Project Manager under the control of the open-line, General Manager, and expect that these steps would show better results. It has also been admitted that all electrified sections have not been cleared for 120 kms. p.h. speed, except the Rajdhani routes. In a situation like this, the advantages of electrification do not manifest themselves easily. In the opinion of the Committee, application of modern methods of management and close monitoring at all levels should bring the desired effects. The Committee would await a report from the Railways about achievement of better coordination among different disciplines.

IV INFRASTRUCTURE

A. Components

The indigenous capacity and steps taken to augment the capacity for manufacture of components, which are required in railway electrification, like solid core insulators, power transformers, 132 kv and 25 kv circuit transformers, 25 kv insulation, telecom cables, structural steel sections is as follows :

- (i) *Solid Core Insulators* : The present capacity is about 5000 per month against the requirement of about one lakh for electrification of 700 rkm per annum. Efforts are being made by the existing manufacturers to step up their capacity. New sources are also under development. However, balancing imports would have to continue for some more time, as hitherto.
- (ii) *132/25 kv Power transformers* : The indigenous capacity is adequate. However, it is now proposed to procure this item under the World Bank loan with a view to updating the technology.
- (iii) *132/25 kv Circuit Breakers* : Same as for power transformers.
- (iv) *25 kv Interruptors* : Same as for power transformers.
- (v) *Telecom Cable* : There is only one indigenous source (M/s. Hindustan Cable Limited) for supply of this item. Their capacity is very limited (about 20-25 km. per month) and bulk of the requirement is being imported.
- (vi) *Structural steel sections* : While steel sections required for fabricated structure are available indigenously, special rolled

steel beams/joists are not available in sufficient quantities and balancing imports are being resorted to periodically. The policy regarding rolling of these sections is decided by Joint Plant Committee, keeping in view the country's overall requirements and the balance imports which the country has to resort to.

4.2 In regard to the requirements of copper, zinc and aluminium for electrification of railways, the Ministry have stated in a note as follows :—

“Copper for the manufacture of various overhead equipment conductors, jumper wires and OHE fittings etc. is being procured from M/s. Hindustan Copper Ltd. from their Khetri and Ghatshila works. They have not always been able to supply the full requirement for the RE work and in such cases the copper has been procured from MMTC to meet the shortfall. As for zinc and aluminium, no problem as such has been experienced in respect of their supply.”

4.3 It has been stated that the Railways are not manufacturing any of these items in their workshops and that the Railways are purchasing these items directly (and not through DGS&D).

4.4 During evidence of the representatives of the Railway Board, the Committee was informed that shortage of solid core insulators had not impeded the progress of work of electrification and that there was no longer a shortage. Adviser, Electrical, further stated :

“...There are now three manufacturers, in addition to BHEL, They have, of late, expanded their capacity. For the present, stage of electrification of 700 route kms. per year, our approximate requirement is about one lakh pieces of insulator per year. The present capacity is about 82,000. But, shortly, they will be stepping it up to 1.3 lakhs. In addition, some more new companies are coming up, and have just started producing ceramic insulators. We expect that in two years' time the import of insulators as such would not be required.”

4.5 Being asked about the World Bank's loan for updating the

technology of 132/25 kv power transformers, the Adviser, Electrical, informed the Committee as follows :

“Through the World Bank tender we can get more modern designs for the transformer, and introduce new materials in the manufacture of a transformer. At present, the tender has been called for 30 nos. of such transformers for railway electrification. They have been cleared by DGTD.”

4.6 In regard to indigenous capacity and import of telecom cables, the Electrical, Adviser, had the following to say :

“These particular telecommunication cables required in the railway electrification route are quite different from the other cables, because when these cables are laid along AC electrified track, there is the effect of induction on the cable. To reduce this interference, these cables have to be given special aluminium extruded covering. So, this particular type of cable is manufactured only by Hindustan Cables, and not others.

This cable requirement may be reduced if a policy of using optical fibre cable, which is under consideration, is approved. But this particular type is not covered by the microwave system. Through these cable traction, power control and remote control for traction have to be connected to each station, and also at the intermediate points every km. Out of the total requirements, about two thirds are imported. One third is met by Hindustan Cables at Roopnarainpur.”

4.7 Among the important components which are needed in railway electrification, the indigenous capacity for solid core insulators and telecom cable is short of the actual requirement needing bridging imports. For the other three items viz., 132/25 kv power transformers, 132/25 kv circuit breakers and 25 kv interruptors, though the indigenous capacity is adequate, it is proposed to procure these items under the World Bank loan with a view to updating the technology. While appreciating the efforts being made not only to indigenise the components required but also to update their technology, the Committee would only like to emphasise that process of indigenisation should be expedited.

4.8 The Committee hope that standardisation of components must have been taken care of by the Railways.

B Fabrication and galvanising

4.9 The Committee were informed that the steel sections were procured through SAIL and that fabrication and galvanising of the steel structure was carried out mostly through Trade, but partly in the railway workshops (for fabrication) and the Railway Galvanising Plant at Raipur (for galvanisation).

4.10 To an enquiry if it would be economical to get these structures galvanised near about the place of fabrication, the Department of Railways stated, in a note, as follows :

“While awarding contracts for the fabrication and galvanisation of structures, the freight involved for transportation of steel from the RE depots to the fabricators’ works and back to the work site is taken into account, which ensures’ that the job is got done near about the place of construction, subject to the availability of capacity.”

The Railways have the following workshops :

Bridge workshops at Sini, Lucknow, Jullunder and Manmad (The plant depot at Mughalsarai, which was partly doing fabrication work for RE, is not being used for this purpose).

The galvanising plant at Chittaranjan Locomotive Works, Chittaranjan, was closed sometime back. The other galvanising plant at Raipur is in use.

Fabricators and galvanisers in public and private sectors are functioning in Vadodara, Nagpur, Pune, Jabalpur, Tungabhadra, Nasik, Kanpur and Delhi.

4.11 It has been stated that 25% of the works are fabricated and galvanised by the Railways themselves, though the departmental cost is a little more than the Trade.

4.12 When suggested during the evidence that if the difference between the departmental and trade costs was not much, the Railways should undertake a study of cost-economics, so as to bring down the costs, the Adviser, Electrical, reacted by saying ‘Yes’.

4.13 A suggestion was received by the Committee that Railways should have a long term plan for railway electrification for the next few year. so that the concerned contractors could also plan their expansion/ contraction accordingly. Asked to give their comments on this suggestion. the Adviser, Electrical, stated :

“Even when we have a long term plan for electrification we cannot enter into financial commitments with any particular manufacturing or fabrication agency because we are not sure about the future plan.”

4.14 To a query of the Committee as to why the Railway were having fabrication at one place and galvanisation at another place, the Member, Mechanical replied as follows :

“The engineering workshops where the fabrication is done are located at a large number of places. Northern Railway has a workshop at Jullandhur, Eastern Railway at Mugalsarai, North-Eastern Railway at Gorakhpur. These are traditional workshops where the bridge work and fabrication is done. If you set up a galvanisation unit in all these workshops, it will be highly costly. But we agree with you on this point that both the things should be at one place. We may now consider setting up galvanising facilities at some places keeping in view our plan for electrification in the next 15 years so that in the areas where the fabrication is done. galvanising facilities are also available. This will avoid transportation over long lead also.”

4.15 The fabrication and galvanising work for railway electrification is carried out mostly through the Trade. as the Railways have fabrication facilities at Sini, Lucknow, Jullundar and Manmad and a galvanising facilities only at Raipur, whereas fabricators and galvanisers in public and private sectors are spread over in about eight cities. The Committee note that the ratio of departmental and outside work is 1:3 and that the departmental cost is more than that of the Trade. The Committee would like the Railways to examine the cost of the work done departmentally with a view to bringing it down to the Trade cost level. if not lower.

4.16 In the opinion of the Committee, long distance transport of fabricated steel structures for galvanisation should be avoided. It would be highly desirable and economical if the fabrication and galvanisation facilities are provided under one roof.

ELECTRIC LOCOS

The holdings of different types of locomotives by the Indian Railways from the year 1980-81 to 1984-85 was as follows :

	1980-81	1981-82	1982-83	1983-84	1984-85
Steam	7,469	7,245	6,292	6,217	5,970
Diesel	2,403	2,520	2,638	2,800	2,905
Electric	1,036	1,104	1,157	1,194	1,253

5.2 The index of utilisation of a locomotive *vis.* net tonne kilometres per day per locomotive (NTKM) on B.G. in the years 1980-81 to 1984-85 was as follows :—

	1980-81	1981-82	1982-83	1983-84	1984-85
Steam	11,781	10,085	9,275	7,487	6,864
Diesel	212,502	222,601	216,835	2,14,609	2,22,103
Electric	201,472	252,582	277,890	2,71,121	2,83,560

5.3 The indigenous manufacture of electric locos is done at the Chittaranjan Locomotive works,—a captive plant of the Indian Railways.

A. Chittaranjan Locomotive Works

5.4 The Chittaranjan Locomotive Works started with the production of steam locomotives in 1950. The production of steam locomotives was phased out and production of electric and diesel locomotives started from 1961 and 1968 respectively, the product mix of Chittaranjan Locomotive works presently is as under :—

- (1) 25 KV AC 3900 HP 6-axle freight electric locomotive WAG-5;
- (2) Broad gauge diesel shunting locomotives WDS-4D;

(3) Metre gauge mixed traffic diesel locomotive YDM2;

(4) Narrow gauge mixed traffic diesel locomotive ZDM3, ZDM4A.

5.5 Chittaranjan locomotive works is also entrusted with the responsibility of supplying unit spares and components for heavy repair for different types of locomotives manufactured and supplied in the past. In addition to meeting the locomotive requirements of Indian Railways, CLW has also supplied 138 diesel shunters to power houses, steel plants, etc.

5.6 Chittaranjan Locomotive Works has also a major steel foundry producing annually about 4000 tonnes of castings, mainly locomotive bogies, manganese steel crossings, castings, for traction motors, castings for Defence Departments, etc. CLW produces a large percentage of electric traction equipments used in the production of electric locomotives such as traction motors, smoothing reactors, contactors, reversers, etc.

5.7 Chittaranjan Locomotive Works built 2,351 steam locomotives, 1,054 electric locomotives of various designs and 572 diesel shunting locomotives upto end of November' 1985.

5.8 Besides Chittaranjan, the Bharat Heavy Electricals Limited would manufacture 120 electric locos in their works. The Committee were informed that the Railways and the BHEL were taking several steps in this direction.

5.9 The production capacity, actual production and the quantum and amount of imported components in the CLW-made electric locos from the year 1980-81 onwards was as follows :—

Year	Production capacity	Actual Production	Quantum (%) of imported component (per loco)	Cost of locos (Rs. in lakhs)	Cost of imported component (per Loco) (Rs. in lakhs)
1984-85	60	50	6.27%	95.70	6.04
1983-84	60	47	3.98%	89.40	3.56
1982-83	60	53	6.83%	70.03	4.79
1981-82	60	50	8.19%	63.15	5.17
1980-81	60	60+9*	9.72%	51.10	4.96

*Including 9 stabled locos of previous year.

5.10 When enquired whether in-adequate funds was one of the reasons for shortfall in production, the Member, Mechanical, stated during evidence that :

"Funds were not the only constraint. There were low productivity, labour problems, mismatching of certain imported components, advance planning not being done, etc. We have to take corrective steps and rectify the errors which had crept in".

5.11 On being asked to give an assurance for future, he reacted by saying :

"Keeping in view the capacity of our production units, we have to load them fully, in respect of motive power required—whether diesel or electric locos or coaches. Keeping in view our requirement and capacity, we should manufacture the maximum; and it is in this direction that the Board is taking steps. We are now advising our production units at least two years in advance".

5.12 On an enquiry, the Committee were informed that the following norms have been adopted for providing electric locos :—

"Freight : 2,90,000 net tonne Km.
per day per locomotive.

Passenger : 3,20,000 net tonne Kms.
per day per locomotive."

5.13 In regard to requirements of electric locos in the Seventh Plan, the Railway Board stated, in a note, as follows :—

"In the Working Group Report on the Seventh Plan, the requirement of electric locomotives has been assessed at about 700 for a freight level of 350 million tonnes in the terminal year of the plan. The requirement is proposed to be met by stepping up the production capacity at the Chittaranjan Locomotive Works and supplementing the manufacture thereby getting locomotives from other sources, and the deficiency, if any, will be met by using for an interim period diesel locomotives released consequent to electrification".

5.14 Requirement of electric locos is proposed to be met by—

- (i) CLW is expected to produce 350 electric locomotives.
- (ii) Work for expansion of the existing capacity for production of electric locos from 60 to 80 per annum has been sanctioned.
- (iii) Production at C.L.W. is proposed to be supplemented by obtaining locos from other sources, if required.
- (iv) An order for 18 prototype high horse power (6000 h.p.) locomotives has been placed for 3 types on two manufacturers. These prototypes are expected to be delivered in 1987-88, put on service trials for one year, then selected for collaboration and series manufacture.

5.15 In another note, the Railway Board explained the position further as follows :—

“Replacement of electric locos will be due from mid-1990s. As a first step work, for increasing the capacity for production of electric locos at CLW from 60 to 80 per annum has been sanctioned. Further augmentation to 100 locos per annum may also be considered during the Seventh Plan. Thus, in terms of a number of locomotives, CLW would be equipped by the end of Seventh Plan/beginning of Eight Plan to meet the sustained requirement”.

“Current design of electric locomotives is for 3900 HP, with technology based on 1960 vintage. The technology is being uprated from 3900 HP to 6000 HP. An order for 18 prototypes 6000 HP locos has been placed for 3 types on two manufacturers. 2 types of 6 locos each on M/s Sumitomo/Hitachi, Japan, and one type of 6 locomotives on M/s ASEA, Sweden. These prototypes are expected to be delivered in 1987-88 subject to successful field/service trials for one year; one type will be selected for series manufacture at CLW by the end of VIIth Plan/by early Eighth Plan.”

5.16 After a visit to the Chittaranjan Locomotive Works, the Committee mentioned to the representatives of the Railway Board, during evidence, that the committee had gathered an impression that CLW

has the capacity to uprate the electric locomotive upto atleast 5,000 H.P. with the existing resources and infrastructure. If so, whether it was necessary to go in for an uprated locomotive of 6000 H.P., the import of which would take about 18 months and whose production might take seven to eight years, besides making the Indian Railways dependent on foreign manufacturers the Members, Mechanical, informed the Committee as follows :—

“So far as 6,000 HP electric locos are concerned, the order for prototypes has already been placed. As I had mentioned in the earlier sitting, we are getting six from Sweden and twelve from Japan. But keeping in view the long gestation period, we are taking some parallel action also so that we are able to operate quickly, to meet our growing requirements of traffic in the coming years.

“The methodology which we have adopted is two-fold : first, we are trying to see that we get a top notch electric loco design engineer from one of the European railways where electric traction is predominant, say from West Germany, Sweden or France. We shall be writing to them and getting that particular individual, if it is possible for us to arrange it and attach him with RDSO and CLW. Secondly, with the present specifications, the equipments going into the WAG-5 electric loco which we are manufacturing at CLW include traction motors, transformers, convertors and invertors. With the existing specifications, we are trying to float a global tender. Till indigenous capacity is available, we have to import some balancing items for additional locomotives, instead of importing complete electric locos. With this process, we hope we shall be able to get the particulars of the latest technology, and have the possibility of operating with that equipment.

“During the visit of Railway Convention Committee, what the GM CLW discussed is this : as a result of detailed discussions with the electrical engineers and GM CLW and other officers, as also detailed discussion with the Electrical Directorate Officers and CLW, we are trying to develop these ideas. We shall take parallel action.”

5.17 He went on to say :

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“We are trying for that, because CLW cannot, alone, do it. It will be done with the help of RDSO's engineers, who know about the latest developments in foreign countries—involving BHEL also.

After developing 5000 HP engines, if we find that the imported one is better, we will use it.

We are trying to get the latest technology of various sub-assemblies which go into the locomotives. We shall go into all these things. If we find some good features in foreign products, we will import them.”

5.18 The Committee pointed out that in view of the higher production targets of the Chittaranjan Locomotive Works, was it not advisable to shift the diesel manufacture part of it to Diesel Locomotive Workshop at Varanasi, because there was a lot of duplication in the production process of these locos. The Member, Mechanical, stated as follows :—

“We have examined it. To give relief to CLW, certain steps have been taken. Because of low level of work-load at CLW, we have started POH of diesel shunter locos also. Certain items for the steam locomotives were being manufactured. We have stopped them also. As such, the capacity is generated. So far as diesel hydraulic shunters and narrow gauge diesel hydraulic locos are concerned, because all these developments have taken place at CLW, and technical know how and the machinery are there, it will not be advisable to shift it. Otherwise, we will lose a lot of time. Even at CLW we manufacture things to full capacity. We are taking steps for expanding the CLW works. That is why a Rs. 15 crore project for expansion of facilities at CLW has been sanctioned. We are confident that even though we say it will be 60 to 80, actually we will be able to do upto 100 locos per year”.

“Similarly, in the steel foundry for the casting of bogies certain expansion arrangements have been made. Whatever additional arrangements at CLW are necessary, we will make them”.

“Regarding cylinder heads, certain firms in the South, viz. at Bangalore and Harihar have come up. We shall try to off-load those items there. We can confidently get them at more economical rates there. But shifting of the manufacture of diesel hydraulic locos to another place will be much more expensive, and not an economical proposition.”

5.19 The Committee observed that there has been consistent shortfall in the production of electric locomotives at Chittaranjan Locomotive Works (CLW) in the earlier years. During the Sixth Plan (1980-85), CLW produced only 260 electric locomotives against the production capacity of 300. However, the Committee note with satisfaction that during the current year, 1985-86, CLW would be exceeding the target of 60 electric locomotives. They also note that sanction has been accorded for expanding the existing capacity to 80 electric locos per annum and that further augmentation to 100 electric locos per annum may also be considered during the Seventh Five Year Plan. In the Working Group Report on the Seventh Plan, the requirement of electric locomotives has been assessed at about 700 for a freight level of 350 million tonnes in the terminal year of the plan. The requirement is proposed to be met by gradually stepping up the production at CLW.

5.20 The Committee observed that while the Department of Railways have planned to electrify about 3400 rkm of trunk lines during the Seventh Plan, the equally important planning for production of matching requirements of electric locomotives has lagged behind badly. The Committee suggest that Department of Railways should take steps to ensure that the capacity of CLW is increased to 100 electric locomotives per annum, as planned, so as to reduce the gap between requirements and production of electric locomotives to the maximum extent. Besides CLW, the Bharat Heavy Electricals Ltd. would also be manufacturing 120 electric locos. As pointed out later in this Chapter, there is ample scope to improve the capacity utilisation of the loco fleet. The Committee hope that with the augmentation of production at CLW, commencement of production of electric locomotives at BHEL and with better utilisation of the loco fleet there would be no shortfall of electric locos, when the different trunk routes get electrified by the end of the Seventh Five Year Plan.

5.21 The Committee note that the current design of electric locomotives WAG-5 is for 3900 HP, with technology based on 1960 vintage.

This technology is being uprated by CLW to 5000 HP at its works within the existing equipment and marginal inputs and to 6000 HP by importing 18 prototypes 6000 HP engines of three types from Japan and Sweden. These prototypes are expected to be delivered in 1987-88, whereafter they would be subjected to field/service trials for one year and out of that one type will be selected for series manufacture at CLW by the end of the Seventh Plan or early in the Eighth Plan. Meanwhile, efforts to improve the equipment, which go into the CLW locos (WAG 5) like traction motor, transformers, convertors and invertors are being carried out indigenously as well as by importing the latest technology of various sub-assemblies and balancing equipment. It has been stated by Member, Mechanical, that CLW cannot do it alone and that it will be done with the help of the Research, Designs and Standards Organisation (Lucknow). The Committee are of the view that indigenisation efforts by CLW/RDSO to uprate the horse power of CLW locomotives deserve encouragement and should be pursued with vigour. The Committee would even suggest that for better results and convenience, the research work connected with uprating of horsepower of electric locomotives may be done close to shop floor level at CLW.

5.22 As for import of 18 prototypes from abroad, the Committee would like to sound a note of caution to keep in view the experience regarding import of traction motors from France sometime back, by way of precaution to avoid pitfalls.

5.23 The Committee feel that CLW should be asked to go ahead with uprating of indigenous electric loco to 5000 or 6000 HP and the Railways should not attempt to go for manufacture of imported 6000 HP locos which would lead to a set back to the Railways' indigenisation programme. The imports, already ordered, may be reviewed and cancelled, if possible.

B. Utilisation of electric locomotives

5.24 It has been stated that there are no special arrangements required at the change of traction points except nominating one of the existing lines as engine reversal line to move locomotives from one end to another, and some short dead end sidings to keep locomotives while they are awaiting arrival of trains.

5.25 To an enquiry of the Committee as to what arrangements are made for ensuring that the electric locomotives disconnected at the end of electrified track are put up to effective use immediately, the Department of Railways submitted the following note :

“In order to ensure that electric locomotives are not unnecessarily detained at change of traction points, Control and station/yard staff coordinate and monitor the movements of locomotives. In case of imbalance of traffic, the electric locomotives are returned light to other points for working trains.

“The time of gap depends upon the availability of the loads which varies for different streams of traffic on the Railways from, say, half an hour to two hours.”

The Committee noted from para 4.28—page 51 of the report of the Comptroller and Auditor General of India—Union Government—Railways—1980-81 that :

“A review in audit of the utilisation of selected locomotives revealed that the loads hauled by them were also much below the loads prescribed by the Railway Administration. On the Northern Railway, the maximum load of electric trains (in the months of May 1979, August 1979, December, 1979 and March 1980) ranged between 2530 tonnes and 2960 tonnes, against 3200 tonnes to 4600 tonnes prescribed. On the Western Railway 85% of the trains run during April—June 1979 carried loads less than 2000 tonnes against 2346—2765 prescribed for four-wheelers and 3660 tonnes for BOX wagons.”

The Committee desired to know the reasons therefor and the steps taken to improve the train loads.

5.26 The Department of Railways (Railway Board) submitted the following note :

“The trailing load of trains hauled by an electric locomotive depends upon various factors such as class of locomotive, the terrain, the gradient in the section and the type of stock being hauled by the train. A statement giving the haulage capacity of WAM4, WAG1 and WAG4 types of locomotives, which

form majority of the electric loco fleet different gradients and for different speeds is given at annexure. It would be seen that a single electric loco can haul trailing loads of 3,600 tonnes, on sections with 1/500 and less steep gradients. On Indian Railways, the gradient on most of the electrified sections are steeper. Consequently, trailing loads are mostly in the range of 2000-2500 tonnes. However, higher loads are being hauled by using locomotives in multiples wherever required

The average gross and net loads of trains running on electrified section of the railways during the last 3 years have been as under :

Railway	Gross load			Pay load (Net load)		
	1982-83	83-84	84-85	82-83	83-84	84-85
Central	1309/1522	1312/1482	1303/1584	686/803	684/773	678/832
ER	1692	1702	1763	857	846	816
NR	1922	1896	1874	1088	1014	975
SR	1911	1867	2031	1095	1052	1143
SCR	1741	1746	1872	938	936	1034
SER	1767	1838	1934	1013	1046	1117
WR	1496	1527	1546	766	793	818
Total	1742	1757	1809	952	939	954

It would be seen that both the net loads and the gross loads have been increasing every year.

Most of the freight trains on railways are being hauled by diesel and electric locos. There is very little difference between the gross loads of trains hauled by diesel locos and electric locos as would be evident from the figures given below :

(in tonnes)

BROAD GAUGE

Year	Diesel	Electric
1979-80	1658	1633
1980-81	1671	1671
1981-82	1698	1729
1982-83	1662	1742
1983-84	1671	1757
1984-85*	1732	1809

As the terrain over which trains traverse do not have uniform gradient, loads of trains have been so prescribed as to avoid large scale load adjustment or load shedding not only at change of traction points but also at yards/junctions demarcating sections with different gradients but worked by same traction system. It will be operationally unsuitable if loads were to be artificially broken up/made up. It is necessary to make marginal adjustments in permissible loads to run trains over long distances without detentions enroute. It is the only way to maximise the advantage of long line haul possible with diesel and electric traction.

While in some cases, loads are adjusted to obtain the maximum advantage of traction system in use, another practice adopted is to run heavier trains with a multi diesel with loads matching.

5.27 To another enquiry of the Committee as to the mileages run by the locomotives on different railways during 1983-84 and 1984-85, the Department of Railways (Railway Board) submitted the following note :

“The engine utilisation for electric loco per day per engine in use during the years 1983-84 and 1984-85 on Eastern, Northern, South Eastern and Western Railway is as under :

Railways	1983-84	1984-85
Eastern	334	325
Northern	465	459
South Eastern	415	405
Western	496	501

While there is marginal drop in the utilisation on Northern Railway, the utilisation on Eastern and South Eastern Railways has suffered as the increase in traffic on electric traction is on heavy density routes."

5.28 During evidence the Committee pointed out that from the Report of the Comptroller & Auditor General of India (Railways) 1980-81, it was observed that the use of electric locomotives on the Indian Railways was much lower due to patchy electrification sections and desired to know whether it would be possible to improve the performance of electric locos in terms of tonne km. per day.

5.29 The Member, Mechanical, explained the position as follows :

"As a result of increasing traction on the Indian Railways and the sections where electric traction is taking place, those sections are getting extended. The net tonne kms. per day have already increased. In 1980-81, it was only 986 per wagon; in 1984-85, it was 1150, and we are confident that in 1985-86 the figure will be even much higher. Similarly, the usage of electric locos in 1981-2—the figure was 355; the figure in 1985-86, upto October, is 443. This has been almost 25 per cent higher than the figure compared with that, and we are confident that with the increased electrification taking place longer sections being available for the run of the electric locomotives, the usage will also improve. In the last meeting I mentioned that we were trying to aim at 500 because 435 we had achieved last year. But the figure will depend on every section."

5.30 In a subsequent note, the Department of Railways furnished the engine kms per day per electric loco for the last five years beginning from 1980-81 and the norms fixed by the Railway Board in this respect as follows :

Year	Broad gauge	Metre gauge
1980-81	327	358
1981-82	384	354
1982-83	396	376
1983-84	400	380
1984-85	397	377

The target in view is 450 km. overall, though on individual railways and divisions the targets are to be different taking into account the operating features like short running trains, yard working, extent of repercussion of mail blocks, gradients, etc.

5.31 The Committee observe that the kilometrage logged by the locomotive is improving year by year but is still far below the average norm of 450 kms which it self is on a low side. The Committee find that this low performance is due to multiplicity of traction in the electrified areas. The committee recommend that the kilometrage earned per locomotive per day should be analysed and remedial measures taken to improve the performance. Any improvement in the performance will reduce the requirement of locos and incidental investment in procurement, provisioning and repair cost of locos.

C. Periodical Overhaul

5.32 It is stated that electric locomotives are overhauled after 6,00,000 kms, or 6 years whichever is earlier.

5.33 It has also been stated that development of POH facilities/ Workshops for electric locos has not kept pace with the requirements during the Fifth and the Sixth Plans.

5.34 POH facilities for BG ac electric loco have so far been set up at two workshops.

- | | |
|----------------------------|--|
| (i) Kanchrapara on E. Rly. | (To meet arisings of 450 electric locos) |
| (ii) Bhusaval on C. Rly. | (Facilities set up for arisings of 400 electric locos—full utilisation yet to be achieved) |

5.35 Facilities available at these two workshops are not adequate to meet the arisings of existing holding of 1181 (1124 + ac 57 dc) locomotives as on 1.8.1985.

5.36 The Committee were also informed that further facilities for POH of electric locos have been planned to be provided at :

- (i) Perambur Loco Workshop on S. Railway by conversion of steam POH shop (to meet arisings of 200 locos)—work sanctioned.
- (ii) Kharagpur Shops on South Eastern Railway by conversion under Modernisation of Workshop Programme Phase II (For 250 locos)

5.37 Workshops for electric loco stock are available at :

- (i) Kanchrapara, ER
- (ii) Bhusaval, CR
- (iii) Parel, CR (for d c locos)
- (iv) Tambaram, SR (for MG locos).

5.38 To an enquiry as to the time required for these locomotives to wait before they are taken for POH after reaching the workshop area; it has been stated that the average time locomotives had to wait for POH after reading workshop area has been 10.3 days at Kanchrapara shops and 9.7 days at Bhusaval Workshop in 1984-85.

5.39 It has further been stated that 146 (125 AC & 21 DC) electric locomotives are running overdue POH as on 1.10.1985. As far as liquidation of arrears of POH is concerned, arrears will continue for a few more years till complete facilities are established at Perambur and Kharagpur. However, extended AOH is given to locos till these are taken up for POH.

5.40 In regard to POH facilities for electric locos, the Committee were informed during evidence by the Member, Mechanical as follows :

“It is conceded that the POH capacity for electric locos was not adequately provided. In the Sixth plan period we had asked for our workshops and sheds Rs. 515 crores and we had been allotted Rs. 210 crores. Rs. 180 crores were spent on Wheel and Axle Plant at Bangalore with the result Rs. 30 crores was available. Our capacity when we reviewed was only 14. The POH on electric locos was done by the Eastern Railway at Kanchrapara and on the Central Railway at Bhusawal. As a

result of the measures taken we are increasing the capacity from 14 to 25 per month. Similarly, we are increasing the capacity in the Southern Railway and on the Northern Railway. In the same way for the various components with the help of the BHEL and expanding the capacity at Nasik in order to meet the requirements where there was shortfall earlier and that there is no set-back because electrification is coming up at a fast pace and it is very essential that we set up the workshop facilities for POH and sub-assemblies also to match with our requirements."

5.41 When the Committee pointed out that with some marginal facilities electric loco-sheds like the one at Vijayawada could attend to POH, the Member Mechanical, stated :

"Vijayawada is an electric loco-shed where maintenance upto three yearly shedules is carried out. The POH of electric loco is carried out after 600 thousand kilometres or six years, whichever is earlier. The facilities in the locosheds cannot be there to carry out overhauling. At these places only intermediate overhauling or IOH can be carried out. This is the system for diesel locos also everywhere. In the Southern region the facilities are provided at Parambur where heavy facilities are available and these will be set up. If, in every shed, we start setting up POH capacities, first the investment will be very large and than the quality cannot be controlled. Then it is not only certain maintenance in these places, we have got fabrication facilities and large machines are available there. Foundries and other facilities are also available there. All those facilities are not available in electric or diesel locosheds. Therefore, it would not be correct to say that POH can be done in electric or diesel locosheds. For instance, diesel POH was done in Siliguri with the result we ran into serious difficulties. Therefore, on planned basis what is correct, what facilities are required, only on zonal basis these facilities are set up at the workshop where this work can be done."

5.42 It was conceded by the Member, Mechanical, during evidence that POH facilities for electric locomotives have not gone hand in hand with the progress of railway electrification/acquisition of electric locos

and that 146 electric locos were running overdue for POH as on the 1st October, 1985. The Committee need hardly point out the importance of this facet of railway electrification. The concerned authorities are already seized of the problem and should overcome this handicap early in the interest of safety of passengers. The Committee still feel that marginal facilities may be created in selective electric loco-sheds at junction points so that POH may be undertaken on a temporary basis till the expansion of POH shops is completed and additional capacity created.

D. Speed

5.43 The Committee observed that the average speed of the goods trains hauled by electric locomotives was in the region of 22.8 kilometres per hour in 1982-83. Considering the fact that the electric traction has been provided on important trunk routes which are fit for running trains upto the speed of 120 kilometres per hour, the speed of the electric goods trains seems to be much on the low side and desired to know the reasons for such low performance. The Railway Board stated, in a note, that :—

“While it is true that electric traction has been provided on important routes but the average speed of goods trains cannot be compared with the maximum permissible speed of 120 KMPH for :—

- (a) all electrified sections are not cleared for 120 KMPH speed. It is permitted on the Rajdhani routes only.
- (b) goods stock in use on the Indian Railways are allowed to run at speeds ranging from 32 KMPH to 75 KMPH.
- (c) The average speed of goods trains is calculated by dividing the total train kilometrage by total train engine hours of the concerned services. Average speeds are not a function of only maximum permissible speed for locomotives and/or goods stock. It is largely determined by detentions suffered enroute. First, most of the electrified sections are running to saturation with the result there is difficulty in ensuring free passage for goods trains. Secondly, they have to give way to faster Mail and Express trains. And, during the blocks when a large number of

mail and express trains are run, there is hardly any movement of goods trains which have to remain stationary in the loops and siding for the duration of the block."

5.44 When further enquired if the speed could be increased to reduce the running time by proper scheduling, controlling and managing the movement of trains, the Railway Board had to say :—

"While efforts are continuously being made to reduce the running time by proper scheduling, controlling and managing the movements of trains but under our conditions where every major trunk route is working under a severe constraint of capacity, it is not possible to achieve a major break-through. As a result of the efforts being made, there has been a marginal improvement in the average speed of electric goods trains which would be evident from the figures given below :

Average speed of electric trains (Kilometres per hour)	
Year	Avg. speed
1980-81	22.8
1981-82	23.1
1982-83	23.7
1983-84	23.8
198S-85	23.2 (Provisional)"

5.45 In another note the constraints in increasing the speed of goods trains were stated to be as follows :—

- "(i) conditions of saturation existing on trunk routes which carry bulk of traffic;
- (ii) strain an infrastructure due to intensive utilisation and constraint of resources;
- (iii) arrears of track renewals; and
- (iv) incidence of unusual occurrences including law and order situations in certain areas."

5.46 On being told that one of the major factors for the high turn round time of wagons on the Railways was the want of line capacity, Member, Traffic, replied :—

“It is true that as we are increasing the number of trains, we are getting more and more saturated, so far as the lines are concerned. On some routes it is 100 per cent. It is because of detention of trains and also due to reduction of speed. We are trying to improve the line capacity further. Wherever there is a single line we are doubling the line, because the trains are getting held up. Wherever there are already two lines we are going to have three or four, and so on. As the lines become available we go on increasing. At the same time, we are also improving the signalling system, by introducing automatic signalling between two stations where density of traffic is heavy. The old system of tokens being handed over by the engine crew to the station master is being gradually replaced. It will be automatic operation. It is called tokenless block working. There is a stoppage of five minutes at each station in the old system.”

5.47 The Committee were informed that the load was gradually increasing with the deployment of high power electric locomotives. Asked as to how the problem of change from electric to diesel or vice-versa was being tackled, the Member, Mechanical stated :

“With the diesel we have to use double engine and electric one. We started running 9000 trains which we had also planned on electric traction. From first of February, we are introducing it. It will be two electric locomotives. But on the diesel route, it will be three, because at present we do not have high HP diesel locomotives, although some thinking is there. So, we are trying to work out how it may be feasible. But with the electric locomotives, you will be glad to know that net tonne km. per day used and net tonne km. per engine hour has increased considerably. In 1981-82, it was 252582 ; in July, 1985, the figure was 395537 ; it is almost 70 per cent higher than the previous figure. Similarly, in the case of net tonne km. per engine hour, the figure in 1981-82 was 12756. The latest figure is 16697. Here also almost 40 per cent increase has taken place.”

5.48 On being asked to indicate the terminal detention and the steps taken to reduce the same with a view to ensuring better utilisation

of investment on electrification, Member, traffic, informed the Committee as follows :—

“That is only because they have to wait for the next train. We have been taking action to reduce the turn-round. As you are already aware, electrification is being introduced on the heavy density route. As the number of trains increases, the capacity gets saturated and for that we have to take some other steps like automatic signalling. So, there are various factors to improve utilization of capacity so that the trains would not suffer detention. These are some of the steps we are taking. To start with, we have done it between Delhi and Mathura. Then we have automatic signalling in all these sections. Wherever it is further found, we have done it. We have found that on Allahabad Division we are getting saturated and on Kanpur-Ghaziabad section we could not run more than 22 trains each way. Last year we took steps and I am glad to inform the Committee that instead of 22 trains we are now running 30 trains. We are now pressing five more intermediate block huts next year so that the routes can be fully utilised. What we are doing is: we are diverting the goods traffic to the second line, and giving preference to Mail/Express trains. Electrification is very cheap from consumption point of view. We are also speeding up all the trains. That is another factor which is important. If the average train speed is less, we are trying to increase the speed or even the number of trains. As you know, goods traffic is going up by 15 per cent every year. So, we are ensuring that the mail and express trains are not held up for want of the line then the goods trains are there. Punctuality of mail or express trains is sacrosanct. We are going to have many intermediate block-huts and we are also taking other measures to improve the running of the trains on the dense routes and sections. As our Member, Mechanical, has just now pointed out, this has resulted improvement in the overall picture and the utilisation of the electric engines per day, which was only 355 km. in 1981-82, has increased now. We have consistently improved it, to 380 Km in 1982-83, 396 km. in 1983-84, 437 km. in 1984-85 and this year, so far to 443

km. We are trying to improve further. We are trying to maximise the utilisation and also trying to optimise the cost."

5.49 On this the Committee pointed out that the average speed of the electric trains has remained more or less stationary i.e. 23 kms. Member Traffic, explained as follows :—

"Electric traction is introduced only on certain routes and that too in some sections; the remaining passenger trains are still running by diesel traction, and about eighty per cent of the goods traffic is carried on by the electric trains. Gradually we are improving the speed, as also the average distance covered; from 195 we have improved it to 295 and then to 296 kilometres."

5.50 The Committee note that the average speed of goods trains is a little over 23 kms per hour during the last four years although the trailing load has increased. The Committee feel that with better utilisation of track and rolling stock, in electrified zones, there is scope to increase the speed of goods trains, which would result in quicker turn round of rolling stock and would reduce need for additions. This, however, should be subject to ensuring safety.

VI

EXEMPTION FROM CUSTOMS DUTY

Section 25 of the Customs Act, 1962 stipulates as follows :

“25 (1) If the Central Government is satisfied that it is necessary in the public interest so to do, it may by notification in the Official Gazette, exempt generally either absolutely or subject to such conditions (to be fulfilled before or after clearance) as may be specified in the notification goods of any specified description from the whole or any part of duty of customs leviable thereon.

(2) If the Central Government is satisfied that it is necessary in the public interest so to do, it may, by special order in each case, exempt from the payment of duty under circumstances of any exceptional nature to be stated in such order, any goods on which duty is leviable.”

6.1 The element of custom duty/import duty on the various items dealing with railway electrification is as follows :

(i) <i>Telecom Cables</i>	
Basic Duty	70%
Auxilliary duty	40%
Countervailing duty	20%
Surcharge on CVD	5%
(ii) <i>Power equipments i.e., Transformers, Circuit Breakers and Interruptions :</i>	
Basic duty	40%
Auxilliary duty	25%
Countervailing duty	12%
(iii) <i>Insulators</i>	
Basic duty	75%
Auxilliary duty	40%
Countervailing duty	12%

(iv) *Copper*

Basic duty	75%
Auxilliary duty	40%
Countervailing duty	Rs. 3000/MT
Advalorem on CVD	10%

6.3 On an enquiry by the Committee whether any attempt had been made to obtain exemption from payment of such duties, considering that electrification project is of national importance for providing cheaper infrastructure by way of transport, the Ministry of Transport (Deptt. of Railways) informed in a note as follows :

“The subject of declaring the railway electrification projects as of national importance was taken up with the Ministry of Finance on two occasions so that the concessional rate of custom import duty could be availed of, but the requests were turned down by the Ministry of Finance.”

6.4 On being asked for the reasons advanced by the Ministry of Finance in not acceding to the requests of the Railways, the Financial Commissioner (Railway) informed the Committee, during evidence, that :

“Way back 1982, a reference was made to the Ministry of Finance and they gave an abrupt reply saying that they shall not extend this concessional rate of duty. Again a reference was made and second time also they gave almost the same reply. Since then we got in touch with the officials concerned in the Ministry of Finance and we are being given to understand that we should fill an application in a proper manner to be entitled to concessional rate of duty. We have done it and we will pursue it to the finality. Whatever information is requested by them, we will supply them.”

6.5 In a subsequent note the Deptt. of Railways informed that the Ministry of Finance was addressed by them in this regard on 3rd December, 1985.

6.6 The Committee note that under Section 25 of the Customs Act, 1962, the Central Government, if satisfied, may exempt, generally either absolutely or subject to some conditions, goods of any specified description

from the whole or any part of custom duty leviable thereon. The question of declaring railway electrification project as of national importance, with a view to seeking the above exemption/concession, was taken up by the Railways with the Ministry of Finance twice since 1982, but with no results, mainly because of some procedural lacuna. In December, 1985, the Department of Railways had again taken up this issue, apparently after this Committee had broached the subject. The railway traction is going to be the main stay of surface transport infrastructure. Increase in the capital cost of such basic infrastructure facility of national importance would manifest itself in the form of additional operational cost of railways and ultimately into higher freight charges. Such avoidable increase in freight component of transport of raw materials, as well as finished products, would exert unnecessary inflationary pressure on the general economy on the one hand and tend to inflate Government receipts on the other with no attendant benefits. In view of its national importance the Committee recommend that exemption from custom duty, as admissible under the existing rules, should be granted to the Railways for railway electrification. A decision in this regard should be intimated to the Committee within a period of four months.

6.7 Similar provision also exists in the Central Excise Act 1944 for purposes of excise duty. The Railways should also move for seeking exemption/concession for railway electrification, in case they are using items which attract the said Act or the Rules made thereunder.

VII

TRACTION POWER

Out of three basic forms of energy viz., coal, oil and electric energy, pricing of the first two is controlled by the Central Government for electric energy, which is gradually assuming a more and more important role in railway transport, the Central Government has no control in the present state of affairs. Electricity being a State subject, the State Electricity Boards fix their tariffs without any consideration for the Indian Railways. The tariff offered by the State Electricity Boards to the Railways, are in some cases, even higher than their industrial tariffs, which are, by themselves, considerably higher than ordinary tariffs.

7.2 The details of average cost per unit in paise as paid by the Indian Railways to the different State Electricity Boards since 1981-1985 are given below :—

Electricity Board	Average cost per unit in Paise				
	1980-81	1981-82	1982-83	1983-84	1984-85
UPSEB	38.99	45.77	58.28	68.22	73.37
MSEB	29.56	38.81	47.39	53.53	64.34
DVC	31.93	40.22	48.70	56.25	55.49
WBSEB	42.79	51.20	61.32	66.84	74.65
BSEB	36.80	48.69	66.68	78.03	77.86
TNEB	32.35	34.95	50.41	71.54	81.54
APSEB	—	50.76	54.62	58.29	70.00
OSEB	33.75	39.78	46.77	76.38	89.79
MPSEB	33.57	50.00	56.52	63.17	69.49
GEB	31.66	40.98	49.25	56.67	57.00

7.3 It would be seen that the Railways paid varying rates ranging from 55.49 to 89.79 paise per unit for supply of electricity in 1984-85 to the different State Electricity Boards.

7.4 The issue of tariff for electric energy required for electric traction has been a subject matter of a number of study teams/committees. A review of Fuel Policy in the country with reference to the Railways was made by an Expert Committee in 1958. Subsequently, the Sahai Committee (1963) and the Raj Committee (1978) reviewed the relative economics of diesel and electric traction on the Railways. With world oil crisis in 1973 and subsequent hefty price hikes of diesel and petroleum products, the question of indigenous energy resources and their optimum utilisation was taken up at the highest policy making level and a Cabinet decision was taken in 1980 that extensive railway electrification should be undertaken in India with a pace of 1000 track kilometres per annum. The National Transport Policy Committee-1980 also emphasised on energy conservation. The policy of SEBs in respect of tariff for traction purposes has undergone a sea change—the tariff being subjected to repeated and frequent upward revision during the last several years.

7.5 The Railway Reforms Committee, in their Report—Part XI—Economics have also reiterated the need for evolving a rational tariff for electric traction. The various lacunae, pointed out by RRC, were taken up with the Ministry of Energy. Their response, however, indicated that it is a matter which is entirely a subject within the purview of the State Governments. Repeated references made by the Zonal Railways with the SEBs have also indicated that the response with respect to tariff has never been helpful and, in fact, they have been raising the tariff every now and then without consideration of any economics.

7.6 The Rajyadhyaksha Committee had also earlier commented on the principles guiding the power tariff structure.

7.7 During the evidence of the representatives of the Railway Board, the Committee enquired whether it had been examined that there should be a uniform pricing policy for electricity or the National Thermal Power Corporation/National Hydro Electric Corporation be asked to supply electricity to the Railways at a uniform price throughout the country. The Chairman Railway Board, reacted by saying :

“We find everywhere that the rates charged by the State Electricity Boards are varying from State to State and from Railway to

Railway. They are charging much more than they are charging even from the domestic consumers. Nowhere they are charged at the industrial rates.

We cannot take directly from NTPC. It has to go to the supply system of the State Electricity Boards and they charge at the rate they want. This is one of the issues which we have taken up that is, to get it directly from NTPC, but that has not been possible so far. The State Governments have been reluctant to do that."

7.8 The Member, Mechanical, further added that :

"We further took it up in July and followed it up with another D.O. letter to the Secretary, Energy. Then they told us that we should get in touch with the State Electricity Boards. But they have not agreed to lower the rates or to have uniform rates. Now we have prepared a memorandum and sent it to the Cabinet Secretariat for discussion at the Secretaries Committee level requesting that a uniform reasonable rate should be applied."

7.9 He went on to say that in this connection that the Railway Board had submitted a memorandum on 19 December, 1985 to the Cabinet Secretariat/Secretaries Committee on the following points :

- "(i) Allocate the power required for electric traction on the Indian Railways out of the 15% unallocated portion of the power generated in the central sector;
- (ii) The agreement for supply of power from the Central sector agencies to the State Electricity Boards should contain a specific provision for supplies to be made by the State Electricity Boards to Railways for traction, production units and the railway workshops, major Railway stations and other operational installation;
- (iii) The CEA be directed to examine all aspects of tariff for power supply to Railways including the element of wheeling charges involved in the transmission of power over State Electricity Board's networks and formulate suitable

guidelines to be followed by State Electricity Boards in the fixation of their tariff to the Railways for items enumerated in (ii) above.

- (iv) A representative of the Department of Railways should be associated by CEA before a final decision is taken; and
- (v) With the implementation of these guidelines, State Electricity Boards would supply electric power at the equitable rates which would be based on the price at which they buy from the central sector with a reasonable mark up for wheeling charges."

7.10 It was admitted by the Member, Mechanical, that in case of supply of power for traction the Railways were given the highest priority. Normally, there was no power cut unless there was a break-down in the transmission line or there was some other serious trouble. Normally no power cut was exercised.

7.11 On an enquiry whether there was any proposal to have captive power plants, the Member, Mechanical, stated :

"No. The Ministry of Energy does not permit captive power houses and only the State Electricity Boards and the NTPC and NHPC set up power houses to cater to the requirements of the industries."

7.12 The Chairman, Railway Board, further added :

"This question has been debated many times and the feeling was that the captive power houses with the jurisdiction over different sectors is not desirable or is not an economic proposition. Their contention is that they are less economic than the power houses which will supply in a general way".

7.13 In a note submitted to the Committee, the Ministry of Transport (Deptt. of Railways) have stated :

"Reservation of a part of electricity generated by central power stations for central projects has been accepted in principle by the committee of Secretaries in 1984 and to work out the modalities of implementing the decision, views of the Ministry

of Transport, Deptt. of Railways, were also asked for. The Ministry of Transport, Deptt. of Railways after consideration, had informed the Ministry of Energy that due to the fact that supply to Railways for traction purposes is taken at every 50 kms. of the line as such it was not considered economical to have its own transmission line for each point of supply. The existing SEBs have their transmission line available nearby. From reliability and economic consideration, the Deptt. of Railways is of the view that power for railway traction purposes and production units like CLW/Chittaranjan, DLW/Varanasi, W & A Plant/Bangalore, ICF/Madras and DCW/Patiala, should be allocated out of the 15% unreserved power from central generating stations and for the purpose, the NTPC should be asked to bill the Railways directly after including the wheeling charges as is being done by them for transfer of power from their own generating stations in a State to the other, over the transmission line networks of the other SEBs.

The prices of diesel oil and petroleum products are essentially regulated and the same are not allowed to increase beyond a reasonable limit in view of their impact on industrial and agricultural sectors and thereby national economy as a whole.

In the situation where diesel prices are controlled by the Centre to a reasonable level and the prices of electricity for electric traction escalating without any limits, the economics of savings in fuel bill between electric and diesel operation are getting substantially narrowed down, thus making electrification less attractive than hitherto. Some of the routes earlier identified as qualified for electric traction on the basis of relative economy between diesel and electric traction are now becoming more expensive and as a result cannot be justified on pure financial considerations.

For railway electrification work which is being undertaken on the basis of a national energy policy, the policy is being followed by the SEBs in respect of the tariff for electric traction runs counter to the directive and as a consequence, disincentive for progressing with further railway electrification. This

situation can be remedied only by a pragmatic directive to the State Electricity Authorities that the tariff for electric traction should be realistic and should bear a relation to the cost of electricity generated/purchased from the national agencies like NTPC adding only the wheeling charges involved in the transmission of power to their 132 kv network upto the point of supply for electric traction."

7.14 The Committee sought the views of the Ministry of Energy (Deptt. of Power) on the issue of supply of electricity for traction at a uniform price. The Ministry of Energy submitted their views in the office memorandum dated 5th February, 1986 as follows :

- “(a) The State Electricity Boards are supplying power to the Railways for electric traction at different rates. The power tariff varies from State to State depending upon the cost of generation/purchases of power which, in turn, depend upon a variety of factors such as hydro-thermal mix, capital costs of generation projects, transmission and distribution facilities, capacity utilisation, operation and maintenance expenses, establishment costs etc. Under the Electricity (Supply) Act, 1948, the power tariffs are fixed by respective State Electricity Boards. The respective State Governments can issue policy directions to the State Electricity Boards in this regard under Section 78A of the Act. Under the Act, Govt. of India have no powers to issue any policy direction to any State Government/State Electricity Board for fixation of power tariffs. It is, therefore, not possible for the Central Government to enforce a uniform tariff for any particular category of consumers.
- (b) NTPC and NHPC are setting up regional power generating stations in different regions. They are also constructing transmission lines for evacuation of power and delivery of shares to the beneficiary States/Union Territories in the respective regions. While NTPC is transmitting power mostly at 400 kv to the different beneficiary States, the NHPC is also constructing 220/132 kv transmission lines. The power from Central Stations is allocated to the various States and a small percentage of

power is kept unallocated at the disposal of the Centre to meet the urgent requirement of power in the region. The allocation of this unallocated power to a central organisation, in general is not possible as the unallocated power is utilised to meet the urgent requirements of the region where they arise. The railways require power at different points along the track route, which can be met only through the State grids. It would not be possible for NTPC/NHPC to transmit the required power to different points for Railways directly.

- (c) Rates of power supplied by NTPC/NHPC differ from station to station depending upon the capital cost, cost of fuel, operating conditions, etc. In the case of NTPC power, there is a fuel escalation clause which takes into account any increase or decrease in the price of fuel. The transmission tariff based on the capital cost of associated transmission facilities is also charged. In addition, the intervening States levy wheeling charges for transmitting power through their transmission systems."

7.15 It has been stated in a Memorandum by the Railway Board that NTPC's share of power generation is to the extent of 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 are on the anvil and the share of the Centre in power generation is bound to go up. Railways' requirement of power presently is only about 2.5%.

7.16 The Committee are of the opinion that there is no control over the electricity tariffs for railway traction and that the State Electricity Boards fix their tariffs without any consideration for the Indian Railways. The tariffs varied from 55.49 to 89.79 paise per unit in 1984-85. The Indian Railways are a public utility of national importance and are bulk consumer of electricity. Instead of enjoying any benefits on these two counts, they are made to pay a rate which is, in some cases, even higher, than industrial tariffs. Though a number of committees have examined different aspects of this issue, a solution to the satisfaction of the Railways has not been found—it may be on account of the fact that tempo of

electrification was not at such a height and that share of electricity generation by the Central organisations was poor. The Committee understand that share of National Thermal Power Corporation (NTPC)—a Central Government undertaking—is about 5.2% at the end of the Sixth Five Year Plan and with the coming up of the other super-thermal power projects under the NTPC, its share is expected to go to 23% by the end of Seventh Five Year Plan. In addition to NTPC, Centre has got some hydro and nuclear power Plants under its control, which means further rise in its share of power generation. No doubt, under the Electricity (Supply) Act, 1948, Government of India have no powers to issue any policy direction to any State Government/State Electricity Board for fixation of power tariffs, but in the present day context, the situation has changed. The Committee feel that the entire issue should be re-examined by the Ministry of Energy (Department of Power) in a national perspective keeping in view the increasing share of Centre in electric generation and the need of Railways for electric traction. If need be, the Electricity (Supply) Act, 1948 may be suitably amended to empower central authority or the Government of India to regulate the tariffs for railway traction at least on a uniform pattern throughout the country, if not at a concessional rate. The State Governments should be persuaded to agree to such amendment in the interest of speedier electrification of railway routes in the larger national interest, as well as in the interest of development of the States themselves.

NEW DELHI;
May 1, 1986

Vaishakha 11, 1908 (S)

SUBHASH YADAV
Chairman,
Railway Convention Committee.

APPENDIX

(vide para 4 of Introduction)

Conclusions/Recommendations of the Committee

S. No.	Para No.	Summary of conclusions/ recommendations
1	2	3
1	2.16	<p>The Committee note that at the Board level, Member, Engineering, is the Member-in-charge of Railway Electrification and that he is assisted by Adviser, Electrical, and Director, Railway Electrification. In addition, there is a Central Organisation for Railway Electrification (CORE), set up in 1981-82, to accelerate the pace of electrification. It has its headquarters at Allahabad with five field units at Vadodara, Mathura, Kota, Nagpur and Ranchi, each headed by a Chief Project Manager. The Committee have been told that one more field unit is being set up shortly at Bhopal to cope with the work load.</p>
2.	2.17	<p>Besides these five field units, there are two more field units at Vijayawada and Madras under the direct control of the General Managers of the respective Railways. CORE, however, ensures bulk procurement of material and standardisation of materials and equipment for all the railway electrification projects. It would, thus, be seen that there are two types of organisations—one is</p>

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CORE and the other is under the General Managers of Zonal Railways. During evidence it was admitted by the Member, Engineering, that "we have felt over the years, it (CORE) was not bringing about that much results" and that it has since been decided that the Chief Project Manager will be under the control of the open-line General Managers. It was also conceded that the projects under open-line General Managers progressed much faster than at other places.

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2.18

The Committee are of the view that since the railway electrification projects would now be under the control of open line General Managers, for day to day execution of projects. General Manager should be able to effectively coordinate the conflicting requirements of traffic blocks for progressing electrification works and pressure of increased tempo of rapidly growing traffic on one hand; and the regulation of traffic blocks amongst RE projects and other requirements of the open line Railway on the other. The Railway Board must ensure to achieve the desired progress of Railway Electrification projects to complete the programme envisaged for the Seventh Plan.

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2.19

The Committee are of the firm view that the Central Organisation for Railway Electrification should be disbanded and made an integral part of the Railway Board to ensure effective and ex-

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peditious management of all Railway Electrification projects.

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At present Adviser, Electrical, has dual functions. He looks after not only railway electrification projects, but also all other aspects of electrical services on the Railways. With the increasing tempo of railway electrification and disbanding of CORE, as suggested by them, the Committee feel that a full-fledged Member-in-charge of Electrical Engineering be created in the Railway Board by upgrading the post of Adviser, Electrical, and the Electrical Engineering Branch in the Board should be suitably strengthened.

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2.21

The electrification programme envisaged for the Seventh Plan period is very important and crucial in view of the national considerations. The Committee have observed that it is equally important to ensure that the basic inputs are provided immediately for the successful implementation of this programme. The present infrastructure available for Railway Electrification by way of organisation, overall long-term planning, development of adequate and matching production capacities and need for effective coordination with P & T and SEBs does not give the confidence that the envisaged programme can be achieved at the present rate of performance. The Committee think that unless immediate steps as highlighted above are taken early the electrification programme will suffer slippages.

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3.25

The Committee strongly feel that electrification of the two trunk routes viz. Calcutta-Madras and Madras-Bombay should also be commenced before the end of the Seventh Plan in view of growing traffic on these routes. The Government should allocate and make available additional funds during the Seventh Plan to enable the Railways to take up electrification on these routes and complete it during the Eighth Plan period.

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3.29

During the evidence, Member, Engineering, tried to justify that when projects are completed, the construction organisation has to be wound up. The staff are put on other projects or absorbed for maintenance, and thus there was no problem. The Committee, however, do not feel convinced of applying this explanation to railway electrification projects. The Committee have observed during their inspection of railway electrification projects that it took about 2 to 3 years to build up a project unit with adequate strength of the junior officers and technical staff, particularly in the disciplines of Signal and Telecommunication and Electrical Engineering. There is acute shortage of these categories. The open line Railways, who themselves are short of them, do not like to spare these personnel for railway electrification projects. The Committee, therefore, strongly feel that those units which are about to complete,

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		in the near future, the projects in hand, should be allotted other already approved and contiguous projects.
9	3.30	<p>The Committee feel that disbanding a field unit at one place and starting subsequently a new unit in another area will only slow down the overall progress and pace of electrification which is so important from national considerations. The Committee have in mind particularly the following situations where it will be unwise to disband the existing units :</p> <p>(a) <i>Railway Electrification Madras :</i></p> <p>On completion of Arrakonam—Jolarpettai project by 1986, this unit could be allowed to take up already approved project of Jolarpettai—Bangalore or Jolarpettai—Erode project.</p> <p>(b) <i>Railway Electrification Vijayawada :</i></p> <p>On completion of Balharshah-Vijayawada project (i.e., GT Route) by 1987-88, this unit, instead of being wound up, could be allowed to take up the already approved project of Kazipet-Sanatnagar.</p>
10	3.31	The Committee strongly recommend as suggested by them the Government should allocate and make available additional funds to enable the

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Railways take up electrification of Jolarpettai-Bangalore. and Kazipet-Sanatnagar projects during the Seventh Five Year Plan period itself.

11 3.33

The Committee noted that this work of electrifying Krishna-Canal-Tenali-Guntur has since been included in the 1986-87 works programme but the funds allocated are not substantial. Another link which the Committee has in mind is the Tundla-Agra-Bayana where the work was due to start in the beginning of the Seventh Plan. Had electrification of this section been planned properly to synchronise with electrification of the Delhi-Jhansi, Mathura-Gangapur city and the Delhi-Kanpur sections, many operational constraints could have been avoided. The Committee recommend that more funds should be allocated for these works, which are vital, so that these sections are covered by electric traction soon.

12 3.38

The Committee note that the cost of hauling traffic per 1,000 GKM is Rs. 126.54 in respect of steam traffic, whereas it is Rs. 13.84 in respect of electrified traffic movements. Keeping this high cost factor in view, the Committee feel that the process of phasing out steam locomotives should be accelerated. As an immediate measure, co-existence of electric and steam tractions side by side, particularly in the marshal-

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ling yards, should be totally stopped. Secondly, they would suggest that in such of marshalling yards, as fall in predominantly electrified areas, steam traction in yards should be done away with on priority basis. This might remove problems connected with setting of OHE also.

13 3.39

The general question of total replacement of steam traction by other modes needs to be considered in greater depth in view of the fact that steam traction costs much more than the other modes of traction and, therefore, any accelerated investment needed to phase out the steam traction would be well paid off by the lower cost of operation. However, the Committee cautions that this process of phasing out steam traction should not result in retrenchment of the concerned personnel.

14 3.40

In the Sixth Five Year Plan, the Railways planned for electrification, by including in their yearly works programme, 563 rkm in 1980-81, 2,526 rkm in 1981-82, 1,136 rkm in 1982-83, nil in 1983-84 and 1,012 rkm in 1984-85—totalling to 5,240 rkm as against a target of 2,800 rkm in the Plan. The provisions in the works programme should have relevance to the attainable plan targets. Against the Sixth Five Year Plan target of 2,800 rkm, the achievement has been 1,522 rkm i.e. 54.39 %, which, however, include works taken up from 1970-71

onwards. The Committee are informed that the spill over of the Sixth Plan to the Seventh Plan is to the extent of 1,356 rkm Spill over to such a large extent is not healthy. As a railway electrification project takes four to five years for completion, the spill over should be confined only to the last one or two years of a Plan-period and not spread over a longer period. The Committee have not gone into the time over-run and cost overrun of the railway electrification projects already completed. If these two aspects are taken care of the Committee are sure, the spill-over can be drastically reduced.

15 3.41

The Committee note that, except in the Fifth Five Year Plan, there was no shortfall in allocation of fund as asked for by the Railways. In the Sixth Five Year Plan Rs. 450 crores were asked for and were allotted. The Chairman, Railway Board, clarified that "this Rs. 450 crores of the Sixth Plan was at the 1979-80 prices.....and as the annual plan allocations were not in keeping with the Five Year Plan allocations, there was shortage of resources."

This phenomenon of the allocations being fixed at the cost prevailing in the base year is not peculiar to the Railways. This principle is adopted for all the projects. The complaint of the Railways that there was inadequate flow of funds during each year of the Plan has been remedied in the Seventh Five Year

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Plan. The Railways asked for Rs. 830 crores for railway electrification in the Seventh Five Year Plan and have been allotted Rs. 210 crores in the first year of the Plan. The problem of flow of funds having been met, the Committee expect that the Railways would achieve the target of electrifying 3,400 kms. in the Seventh Five Year Plan.

16 3.42

The Committee note that the trunk routes-Bombay to Delhi (both Western & Central Railways), Bombay to Calcutta and Delhi to Madras are proposed to be energised on first priority and are expected to be completed progressively before the Seventh Five Year Plan is over. On those routes, while keeping in view the rate of return on capital invested to be more than 10%, the electrified stretches have spread over different sections. It is of utmost importance that stretches which have been left out, should be attended to first route-wise, irrespective of rate of return, with a view to introducing electric traction over the maximum possible distances within a short time to avoid multiplicity of traction. This would also result in better utilisation of electric locos.

17 3.43

As admitted by the Member, Mechanical, there have been delays on account of lack of coordination between signalling and telecommunication works on one hand and the electrification on the other. The Railways have taken

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steps to improve coordination—One of them being bringing the Chief Project Manager under the control of the open-line General Manager, and expect that these steps would show better results. It has also been admitted that all electrified sections have not been cleared for 120 kms, p.h, speed. except the Rajdhani routes. In a situation like this, the advantages of electrification do not manifest themselves easily. In the opinion of the Committee, application of modern methods of management and close monitoring at all levels should bring the desired effects. The Committee would await a report from the Railways about achievement of better coordination among different disciplines.

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4.7

Among the important components which are needed in railway electrification, the indigenous capacity for solid core insulators and telecom cable is short of the actual requirement needing bridging imports. For the other three items viz., 132/25 kv power transformers, 132/25 kv circuit breakers and 25 kv interruptors, though the indigenous capacity is adequate, it is proposed to procure these items under the World Bank loan with a view to updating the technology. While appreciating the efforts being made not only to indigenise the components require, but also to update their technology, the Committee would only like to emphasise that process of indigenisation should be expedited.

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19	4.8	The Committee hope that standardisation of components must have been taken care of by the Railways.
20	4.15	The fabrication and galvanising work for railway electrification is carried out mostly through the Trade, as the Railways have fabrication facilities at Sini, Lucknow, Jullundar and Manmad and galvanising facilities only at Raipur, whereas fabricators and galvanisers in public and private sectors are spread over in about eight cities. The Committee note that the ratio of departmental and outside work is 1 : 3 and that the departmental cost is more than that of the Trade. The Committee would like the Railways to examine the cost of the work done departmentally with a view to bringing it down to the Trade cost level, if not lower.
21	4.16	In the opinion of the Committee, long distance transport of fabricated steel structures for galvanisation should be avoided. It would be highly desirable and economical if the fabrication and galvanisation facilities are provided under one roof.
22	5.19	The Committee observed that there has been consistent short-fall in the production of electric locomotives at Chittaranjan Locomotive Works (CLW) in the earlier years. During the Sixth Plan (1980-85), CLW produced only 260 electric locomotives against the production capacity of 300. However,

the Committee note with satisfaction that during the current year, 1985-86, CLW would be exceeding the target of 60 electric locomotives. They also note that sanction has been accorded for expanding the existing capacity to 80 electric locos per annum and that further augmentation to 100 electric locos per annum may also be considered during the Seventh Five Year Plan. In the working Group Report on the Seventh Plan, the requirement of electric locomotives has been assessed at about 700 for a freight level of 350 million tonnes in the terminal year of the plan. The requirement is proposed to be met by gradually stepping up the production at CLW.

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5.20

The Committee observed that while the Department of Railways have planned to electrify about 3400 rkm of trunk lines during the Seventh plan, the equally important planning for production of matching requirements of electric locomotives has lagged behind badly. The Committee suggest that Department of Railways should take steps to ensure that the capacity of CLW is increased to 100 electric locomotives per annum, as planned, so as to reduce the gap between requirements and production of electric locomotives to the maximum extent. Besides CLW, the Bharat Heavy Electricals Ltd. would also be manufacturing 120 electric locos. As pointed out later in

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this Chapter, there is ample scope to improve the capacity utilisation of the loco fleet. The Committee hope that with the augmentation of production at CLW, commencement of production of electric locomotives at BHEL and with better utilisation of the loco fleet there would be no shortfall of electric locos. when the different trunk routes get electrified by the end of the Seventh Five Year Plan.

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5.21

The Committee note that the current design of electric locomotives WAG-5 is for 3900 HP, with technology based on 1960 vintage. This technology is being uprated by CLW to 5000 HP at its works within the existing equipment and marginal inputs and to 6000 HP by importing 18 prototypes 6000 HP engines of three types from Japan and Sweden. These prototypes are expected to be delivered in 1987-88, whereafter they would be subjected to field/service trials for one year and out of that one type will be selected for series manufacture at CLW by the end of the Seventh Plan or early in the Eighth Plan. Meanwhile, efforts to improve the equipment, which go into the CLW locos (WAG 5) like traction motor, transformers, convertors and invertors are being carried out indigenously as well as by importing the latest technology of various sub-assemblies and balancing equipment. It has been stated by Member, Mechanical, that CLW cannot do it alone and that

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it will be done with the help of the Research, Designs and Standards Organisation (Lucknow). The Committee are of the view that indigenisation efforts by CLW/RDSO to uprate the horse power of CLW locomotives deserve encouragement and should be pursued with vigour. The Committee would even suggest that for better results and convenience, the research work connected with uprating of horse-power of electric locomotives may be done close to shop floor level at CLW.

25 5.22

As for import of 18 prototypes from abroad, the Committee would like to sound a note of caution to keep in view the experience regarding import of traction motors from France sometime back, by way of precaution to avoid pitfalls.

26 5.23

The Committee feel that CLW should be asked to go ahead with uprating of indigenous electric loco to 5000 or 6000 HP and the Railways should not attempt to go for manufacture of imported 6000 HP locos which would lead to a set back to the railways' indigenisation programme. The imports, already ordered, may be reviewed and cancelled, if possible.

27 5.31

The Committee observe that the kilometerage logged by the locomotive is improving year by year but is still far below the average norm of 450

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kms which itself is on a low side. The Committee find that this low performance is due to multiplicity of traction in the electrified areas. The Committee recommend that the kilometerage earned per locomotive per day should be analysed and remedial measures taken to improve the performance. Any improvement in the performance will reduce the requirement of locos and incidental investment in procurement, provisioning and repair cost of locos.

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5.42

It was conceded by the Member, Mechanical, during evidence that POH facilities for electric locomotives have not gone hand in hand with the progress of railway electrification/acquisition of electric locos and that 146 electric locos were running overdue for POH as on the 1st October, 1985. The Committee need hardly point out the importance of this facet of railway electrification. The concerned authorities are already seized of the problem and should overcome this handicap early in the interest of safety of passengers. The Committee still feel that marginal facilities may be created in selective electric loco-sheds at junction points so that POH may be undertaken on a temporary basis till the expansion of POH shops is completed and additional capacity created.

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The Committee note that the average speed of goods trains is a little over

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23 kms per hour during the last four years although the trailing load has increased. The Committee feel that with better utilisation of track and rolling stock, in electrified zones, there is scope to increase the speed of goods trains, which would result in quicker turn round of rolling stock and would reduce need for additions. This, however, should be subject to ensuring safety.

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6.6

The Committee note that under Section 25 of the Customs Act, 1962, the Central Government, if satisfied, may exempt, generally either absolutely or subject to some conditions, goods of any specified description from the whole or any part of custom duty leviable thereon. The question of declaring railway electrification project as of national importance, with a view to seeking the above exemption/concession, was taken up by the Railways with the Ministry of Finance twice since 1982, but with no results, mainly because of some procedural lacuna. In December, 1985, the Department of Railways had again taken up this issue, apparently after this Committee had broached the subject. The railway traction is going to be the main stay of surface transport infrastructure. Increase in the capital cost of such basic infrastructure facility of national importance would manifest itself in the form of additional operational cost of railways and ulti-

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mately into higher freight charges. Such avoidable increase in freight component of transport of raw materials, as well as finished products, would exert unnecessary inflationary pressure on the general economy on the one hand and tend to inflate Government receipts on the other with no attendant benefits. In view of its national importance the Committee recommend that exemption from custom duty, as admissible under the existing rules, should be granted to the Railways for railway electrification. A decision in this regard should be intimated to the Committee within a period of four months.

31 6.7

Similar provision also exists in the Central Excise Act, 1944 for purposes of excise duty. The Railways should also move for seeking exemption/concession for railway electrification, in case they are using items which attract the said Act or the Rules made thereunder.

32 7.16

The Committee are of the opinion that here is no control over the electricity tariffs for railway traction and that the State Electricity Boards fix their tariffs without any consideration for the Indian Railways. The tariffs varied from 55.49 to 89.79 paise per unit in 1984-85. The Indian Railways are a public utility of national importance and are a bulk consumer of electricity. Instead of enjoying any benefits on these two counts, they are made to pay

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a rate which is in some cases, even higher than industrial tariffs. Though a number of committees have examined different aspects of this issue, a solution to the satisfaction of the Railways has not been found—it may be on account of the fact that tempo of electrification was not at such a height and that share of electricity generation by the Central organisations was poor. The Committee understand that share of National Thermal Power Corporation (NTPC)—a Central Government undertaking—is about 5.2% at the end of the Sixth Five Year Plan and with the coming up of the other super-thermal power projects under the NTPC, its share is expected to go to 23% by the end of Seventh Five Year Plan. In addition to NTPC, Centre has got some hydro and nuclear power plants under its control, which means further rise in its share of power generation. No doubt, under the Electricity (Supply) Act, 1948, Government of India have no powers to issue any policy direction to any State Government/State Electricity Board for fixation of power tariffs, but in the present day context, the situation has changed. The Committee feel that the entire issue should be re-examined by the Ministry of Energy (Department of Power) in a national perspective keeping in view the increasing share of Centre in electric generation and the need of Railways for electric traction. If need be, the Electricity (Supply) Act, 1948

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may be suitably amended to empower central authority or the Government of India to regulate the tariffs for railway traction at least on a uniform pattern throughout the country, if not at a concessional rate. The State Governments should be persuaded to agree to such amendment in the interest of speedier electrification of railway routes in the larger national interest, as well as in the interest of development of the States themselves.