

11

STANDING COMMITTEE
ON ENERGY
(1998-99)

TWELFTH LOK SABHA

MINISTRY OF POWER
RENOVATION & MODERNISATION
OF POWER PLANTS

ELEVENTH REPORT



LOK SABHA SECRETARIAT
NEW DELHI

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February, 1999/Magha, 1920 (Saka)

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STANDING COMMITTEE ON ENERGY
(1998-99)
(TWELFTH LOK SABHA)
RENOVATION & MODERNISATION
OF POWER PLANTS
MINISTRY OF POWER

Presented to Lok Sabha on
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LOK SABHA SECRETARIAT
NEW DELHI

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COMPOSITION OF THE STANDING COMMITTEE ON ENERGY
(1998-99)

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13. Shri Vizol
14. Shri Rajendra Prasad Mody

INTRODUCTION

I, the Chairman, Standing Committee on Energy having been authorised by the Committee (1998-99) to present the Report on their behalf, present this Eleventh Report on the subject "Renovation and Modernisation of Power Plants". The task of examining the subject "Renovation and Modernisation of Power Plants" and preparation of this Report was entrusted to Sub-Committee on Power of Standing Committee on Energy 1997-98 and their unfinished work was entrusted to Sub-Committee on Power 1998-99.

2. The Sub-Committee on Power held 8 sittings in all out of which 6 sittings were devoted to recording of personal hearing of organisations and official witnesses and 2 sittings for in-house deliberation.

3. The Sub-Committee on Power (1997-98) held informal discussions with the representatives of Maharashtra State Electricity Board and Gujarat State Electricity Board during their tour to Mumbai and Ahmedabad during 24.9.97 to 28.9.97. The Sub-Committee on Power (1998-99), thereafter, held informal discussions with the representatives of West Bengal State Electricity Board, Damodar Valley Corporation, Assam State Electricity Board during their tour to Calcutta, Guwahati etc., during 12.10.98 to 17.10.98. The Committee wish to express their thanks to the State Governments/State Electricity Boards and the other organisations for furnishing information desired by the Sub-Committee during their visits.

4. The Committee wish to express their thanks to the following experts/organisations for placing before the Sub-Committee requisite material/memorandum in connection with examination of the subject:

- (i) Power Finance Corporation Ltd.
- (ii) Bharat Heavy Electricals Ltd.
- (iii) Neyveli Lignite Corporation Ltd.
- (iv) Damodar Valley Corporation Ltd.
- (v) Confederation of Indian Industry.
- (vi) Associated Chambers of Commerce and Industry.

- (vii) Federation of Indian Chamber of Commerce and Industry.
- (viii) Tata Energy Research Institute.
- (ix) Council of Power Utilities.
- (x) Dr. Homi N. Sethna, Chairman Tata Electric Companies.
- (xi) Shri S.N. Roy, Former Chairman, Central Electricity Authority.
- (xii) All State Governments/SEBs/E.Ds.

5. The Committee also wish to thank in particular the representatives of the Ministry of Power and following organisations who appeared before the Sub-Committee for oral evidence/personal hearing and placed their considered views before it:

- (i) Power Finance Corporation Ltd.
- (ii) Bharat Heavy Electricals Ltd.
- (iii) Confederation of Indian Industry.
- (iv) Federation of Indian Chamber of Commerce and Industry.
- (v) Associated Chambers of Commerce and Industry.

6. The report was considered and approved by the Sub-Committee at their sitting held on 6th January, 1999 and adopted by the full Committee on 1st February, 1999.

7. The Committee place on record their appreciation for the work done by the Sub-Committee on Power 1997-98 and 1998-99 of the Standing Committee on Energy.

NEW DELHI;
19 February, 1999
30 Magha, 1920 (Saka)

K. KARUNAKARAN,
Chairman,
Standing Committee on Energy.

PART A

REPORT

CHAPTER I

INTRODUCTORY

Renovation & Modernisation of Power Plants

The installed power generation capacity at the end of October, 98 is 89,979 MW. But, the demand for electric power continues to grow at a rapid rate outstripping the availability for the same. In the prevailing scenario of shortage of adequate resources to build up new capacity on one hand and stringent environmental requirements on the other, it is most cost effective to optimise the capacity utilisation of the existing generating stations. This necessitates the Renovation and Modernisation of the existing units to remove the deficiencies in their operation as well as to refurbish old units selected on the basis of Remanent Life Assessment (RLA) studies.

2. Plant Load Factor (PLF) which is normally taken as the performance index of a power plant was observed to have a continuous declining trend for generating units in the country during the late 70s. The average plant load factor of the thermal stations in India which was about 52% during the period 1975-79 dipped to about 45-46% in the period 1979-84. Since it is predominantly thermal generation in India (about 71%), these units were major contributing factors for decline in the overall performance of the generating units. The major causes for poor performance of existing thermal power stations were as under:

- (i) Imported units installed during the 50s and 60s had almost outlived their useful life and required major modifications/ restructuring work particularly in the areas of main boiler and its auxiliaries since they were designed as per the existing technology and better quality of coal available at that time;
- (ii) Deterioration of coal quality supplied to thermal power stations compared to the designed quality;

- (iii) Indigenous units installed during early days of indigenisation i.e. during the 70s and early 80s suffered from many generic defects and required renovation/augmentation in the main power plant and other ancillary equipments to bring their performance to the acceptable level.
- (iv) Ash precipitation systems were designed as per the technology available and environmental awareness at the time when these plants were designed and erected. With all round awareness of the need for a cleaner environment, latest techniques available and strict legislative measures adopted by the Central and the State Governments the existing ash precipitation and connected ash handling systems were found to be woefully inadequate requiring complete replacement in most of the cases, a capital intensive activity with long gestation period;
- (v) Deficiencies in Operation and Maintenance (O&M) practices, irregular, inadequate and improperly planned maintenance programmes causing prolonged outages. Due to severe constraints in financial resources of the Central/State Governments, particularly the State Electricity Boards, all replacement work at the power stations had been postponed leading to accumulation of various problems; and
- (vi) Lack of adequately trained operational and maintenance staff, non-introduction of modern management techniques and methods of R&M and other serious deficiencies in overall management.

A table indicating the age of various sizes of units, their average % PLF and their approximate capacity in MW under operation in various thermal power stations in the country is given below:—

Group	Age	PLF	Capacity	Total Stations Thermal units
upto 60 MW	>25	38—45	3300	77 stations
60-110 MW	>20	40—50	5500	337 stations
120-150 MW	>20	42—45	3700	16 utilities
200-120 MW	<20	60—77	28000	
500 MW	<12	68—74	10000	

3. During the 8th Plan period, the economy was liberalised and plan funds for capacity addition were severely curtailed. Thus, the capacity added during 8th Plan period was only 16422.2 MW as against the target of 30,538 MW. BHEL mentioned that based upon past experience, even the Ninth plan targets of 40,245 MW appears to be optimistic.

4. The Renovation & Modernisation of old power plants assume a lot of importance to bridge the wide gap between demand and supply of power. The Renovation and Modernisation of old coal based thermal units and Hydro Units has been well recognised as one of the best options with a view to achieve significant increase in their output through improved efficiency, reliability and availability.

5. On the importance of R&M of Power plants, organisations like FICCI and ASSOCHAM during oral evidence informed the Committee that R&M programmes were much more cost effective and quicker than setting up the new plants. Moreover, no new statutory environmental clearances are required. Coal and water linkage is already there. These projects do not necessitate any acquisition of land etc. and thus, can be completed in a time bound manner.

6. Emphasising the need for R&M of old plants, the Chairman, Central Electricity Authority during evidence stated:—

“R&M activities are generally gauged with a view to achieve higher performance for the power stations. This is actually not the case. The investment in R&M activities at certain power stations besides resulting into increase in the million units, would also lead to other desirable benefits, such as, saving in the fuel consumption, decreased auxiliary power consumption and the increased life of the power stations, which otherwise would retire and would not be available for the power generation. To give an idea on a broad basis, an investment of about 20% of the present day cost for new addition on the R&M on the old power station would revive their full capacity for about next 15 to 20 years. Obviously such an investment would be worthwhile”.

7. Asked about per MW cost of power through R&M, as compared to greenfield power projects, he further added:—

"It varies between Rs. 0.5 crore and Rs. 1.5 crore per MW. It is against the cost of new power plant which is now of the order between Rs. 4 crore to Rs. 5 crore per MW".

8. Giving a cost estimate, Chairman, CEA informed that during Phase-I programme, 10,000 MUs i.e. 2000 MW at a load factor of 56% was added at the cost of about Rs. 1000 crore. The same amount of power from new power project would have cost Rs. 6000 crore.

Plant life extension by R&M

9. Genesis of power plant life extension concept is that the reliability of the thermal generating unit generally remain fairly constant upto about 15-20 years under normal operating conditions and its maintenance. Beyond that period, depending on the actual operating environment, material properties and geometrics of power generating equipments/components degrade as function of service life due to the time dependent material properties such as creep, fatigue etc. resulting in the average heat rate increase, deterioration in efficiency of heat transfer, increase in specific fuel consumption etc. With the realistic estimation of the residual life of these degraded equipments/components, their repairs/replacement with the new technological and metallurgical advancement over the years and with proper operational practices, a new lease of life could be given to the existing plant with its life extension to about 15—20 years. The comprehensive residual life assessment/conditions assessment studies of the plant and system which involves fairly accurate flaw initiation and progression analysis, helps plant authorities to take judicious run/repair/replacement decisions based on techno-economic evaluation of the various options.

10. In order to keep the plant in a healthy condition and to achieve better reliability, availability and plant load factor etc. there is a need to evolve a systematic approach to carry out timely inspection and taking preventive measures by way of proper operation and maintenance, replacement/retrofits and refurbishment action in a phased manner. An important contribution to a maintenance, operation and generation planning of aged plants would be the evaluation of the residual life of the components of the plants which were subjected

to severe condition of operation, including temperature, pressure excursions. Residual Life Assessment (RLA) would help in identification of critical components that require repair/modification/replacement and periodicity of such actions. The components subjected to operating conditions not originally envisaged in design like cycling, excessive temperature, unforeseen system stresses could result in premature failures. Timely action taken would keep the units in healthy conditions and make the sustained operation of the power generating units for extended period also.

11. When asked about the scope of R&M and Residual Life Assessment Studies Power Finance Corporation (PFC) in a written note informed:

"R&M and Life Extension works could be classified into:—

- (i) Environmental upgradation & safety—plants needing to meet environmental regulations;
- (ii) R&M due to technological upgradation—on plants having generic equipment problems or for technology upgradation; and
- (iii) Upgradation or Life Extension—on relatively old plants (20 years) to increase capacity, efficiency, reliability and life.

These objectives are achieved generally by :—

- (i) Restoring mechanical and metallurgical and integrity of components;
- (ii) Selective & phased repairs/replacement/retrofit of components;
- (iii) Introducing technologically and metallurgically superior components developed over the years; and
- (iv) Re-engineering the components/systems for performance improvement and capacity upgrades.

CHAPTER II

PHASE I AND PHASE II R&M PROGRAMME—A REVIEW

In order to improve the performance of existing thermal power stations, a renovation and modernisation (R&M) programme (Phase I) was launched by the Government of India all over the country in September, 1984 for completion during the Seventh Plan period. A Steering Committee was formed under the Chairmanship of Secretary (Power), Ministry of Energy, comprising of senior officers from Central Electricity authority (CEA), Bharat Heavy Electricals Limited (BHEL), Instrumentation Limited, Kota (ILK), Planning Commission to oversee the implementation of the programme. Also roving teams were formed comprising of engineers from CEA, BHEL & Instrumentation Limited, Kota. The task of the Committee was to identify the problems/constraints affecting the performance of thermal units and to suggest feasible technical solution of various problems. Accordingly, the roving teams visited various thermal projects and after prolonged discussions and visits to the site, prepared a statement of major problems which have been affecting the performance of the plants and recommended the feasible engineering solutions. The activities, identified were included under two schemes: (a) Centrally Sponsored Schemes; (b) State plan. The funding of Centrally sponsored schemes (Phase-I) was done by CEA and later on it was done by PFC.

2. The Phase-I programme covered 163 thermal units (13570.50 MW) in 34 selected stations. The total sanctioned cost of various renovation schemes was Rs. 1165 crore, out of which Rs. 423.34 crore was under Central Loan Assistance (CLA) and Rs. 741.66 crore was proposed to be financed by the State sector under State Plan/own resources. The Government of India, had approved an amount of Rs. 500.00 crore in the budget for 1984 providing Central Assistance to various SEBs/organisations to supplement their efforts for R&M of old stations.

3. The R&M programme has since been completed in 3/96 and a total amount of Rs. 1066 crore (CLA Rs. 401.62 crore and State Plans Rs. 664.38 crore) was spent.

4. A benefit of more than 10,000 Million Units/year has been achieved against the targeted benefit of 7000 Million Units/year by way of additional generation equivalent to nearly 1400 Mega Watts.

5. The overall co-ordination & monitoring of Phase-I R&M was carried out by CEA as per the Statutory provision of the Electricity (Supply) Act, 1948.

6. Out of 34 power stations which underwent R&M in Phase-I, PLF of 13 under-mentioned power stations, has gone down after R&M programme:—

Sl. No.	Name of Plant	PLF/before R&M	PLF/after R&M
1.	Panipat	38.00	16.80
2.	Panki	49.00	28.00
3.	Hardua Ganj	32.00	21.30
4.	Amarkantak	56.00	53.30
5.	Ramagundam 'B'	70.00	64.90
6.	Talcher	34.20	30.80
7.	Chanderapur	52.00	29.50
8.	Bokaro	59.00	39.70
9.	Patratu	36.00	25.70
10.	Barauni	34.00	19.40
11.	Bandel	52.00	37.00
12.	Durgapur	32.20	20.40
13.	Namrup	42.00	37.40

7. In reply to a question as to what was the amount spent on R&M programme of above-mentioned 13 projects, the Ministry in their written reply stated:

"An amount of Rs. 404.78 crore was spent on the R&M of the 13 projects covering 61 units and 4103 MW."

8. Commenting on the reasons for fall in PLF after R&M in certain units, Chairman, CEA during oral evidence mentioned:

"As much as 47% of the outlay which was envisaged for incurring expenditure on R&M schemes was utilised on environmental related activities which really do not have any attention for the improvement in terms of the PLF. The environmental related expenditure was on activities such as ESPs, dust extraction and dust suppression system in the coal handling plants and ash handling systems etc. under the R&M phase-I programme and only about 30 per cent was utilised on activities for improvement of PLF. The remaining 23 per cent was spent on other activities relating to safety, replacement of obsolete parts, etc. Hardly any attention could be paid towards the life extension aspects due to fund constraints. The life extension of the power plants is in entirely different activity over and above the routine R&M which is done for the power plants".

9. One representative of Ministry of Power stated:—

"The actual that was achieved was 10.00 million units. On a Macro level, this scheme (phase-I) was a success.". In some plants there were failures in management and in some cases there were other slippages".

10. Specifying the reasons for PLF going down after R&M of the plants. BHEL in their post-evidence reply stated as under:—

"Utilisation of funds for upgradating environmental aspects was necessary, since plants installed 15/20 years prior to phase-I R&M programme, did not have adequate pollution control equipment, to meet changing stringent pollution standards. Hence, such activities were to be taken up, to comply with current standard in pollution levels. Reduction in PLF may be due to various reasons, like grid demand, system capacity, fuel availability. O&M funds, transmission system problem etc., which are not having any impact on equipment performance. Due to these, the plants

will also not be fully loaded. However, operation availability factors (OA) will focus on the equipment performance, independent of reasons given above. Hence, in our opinion, OA could be the guiding factor for measurement of equipment performance".

11. Commenting on the deficiencies of Phase-I R&M Programme, Bombay Suburban Electricity Supply (BSES) stated:

"Efforts had been made to encompass, as far as possible, various areas where repair/renovation work was required and the system could be brought back to near normal working condition. However, due to limited funds, only core activities which has direct bearing on improvement of generation giving immediate results were included under CLA. Other activities which did not directly affect generation were to be funded out of States/ Board's own resources. Thus out of total scheme of Rs. 1200 crore major portion went for improvement in the areas where deterioration has been caused due to poor quality of coal/ash".

12. Commenting further on the problems of R&M, BSES stated that R&M schemes took care of only hardware. The role of men behind the machine, their training, skills, involvement and motivation need be equally taken care of. There have been instances where costly equipment like turbine rotors, generators etc. have been replaced but again damaged within days.

13. Analysing the reasons for failure of Phase-I programme, a representative of ASSOCHAM during evidence stated:—

"I would like to submit two to three reasons for it. One is that these schemes were not fully funded. The Centre provided 50-60 or 70 percent of the funds and the Board were asked to fund the balance 30 per cent. The Boards are not in a position to generate funds even to match the funds which is being released by the Central Government."

Secondly, the schemes were identified by the SEBs themselves and the CEA was asked to oversee them. The type of investigation which needs to be done for every project, I do not think, it was done at that point of time. It was not done in a proper manner. The States proposed that some older plants and some components need replacement. No study by any outside agency was done.

Thirdly, in that component, if you recollect, there was a very large component of environment mitigating measures which the Boards were being asked by the Environment Ministry to put in. So, they found that since the Central Government is releasing the funds, let us also push those funds. They were not entirely the R&M programme. The R&M programmes, as I mentioned earlier, was not done in a detailed manner, for each unit what needs to be done was not gone through. Actually, it is a very investigative study which needs to be done. What we are suggesting is that for each plant and each unit, let there be a proper programme and identification of the cope and then proceed further. These were the major reasons".

14. Asked whether increase in PLF in case of some plants was due to R&M or due to some other factors, one representative of Ministry of Power mentioned:

"There will always be some other factors. One is that there could be a better performance by itself. The second would be that the demand could be more and thus, the machines would be running continuously for a little longer time; thirdly, the quality of coal might be good. This may vary from station to station".

15. The first phase or R&M programme was originally scheduled to be completed by 1991 but was actually completed in March 1996. Commenting on the reasons for delay in completion of phase-I, BSES in a memorandum submitted to the Committee stated as under:—

"There has been delay in completion of the scheme due to various reasons such as delay in completion of formalities by State Governments/Organisations for giving guarantee for repayment of loan to Power Finance Corporation delay in placement of orders and their long delivery schedules and the closure of the works of M/s. ABL for a couple of years. Work on Russian unit could not be carried out because of non-availability of spares from that country due to political disturbances. The unprecedented drought in the country during the year 1987-88 and general shortage of power did not permit the shutting down of thermal units for carrying out R&M works. Apart from all these factors poor financial condition of SEBs was a major contributing factor for slow progress".

16. WBSEB in their Memorandum submitted to the Committee gave the following reasons for delay in completion of the phase-I:—

“The R&M programme undertaken during the 7th plan & 8th plan could not be completed within the stipulated time-frame set up by CEA because of the initial problems faced due to lack of interest of vendors in taking up R&M works and finalising technical details of the old power stations.

The activities for Bandel TPS and Santaldih TPS phase-I and phase-II were delayed due to non-availability of adequate funds, for which loans were taken from the Government of India/PFC Ltd. and IDBI”.

17. When asked to state the reasons for delay in executing works of Phase-I, the Secretary (Power) stated:

“The main reasons for the delay was due to inadequate flow of funds from State Governments, non-availability of shut down of units due to drought conditions liquidation of ABL & additional activities included subsequently for pollution control which took more time.”

18. When asked to furnish details of cost escalation due to delayed implementation of R&M projects in Phase-I, the Ministry of Power in their Post Evidence Reply (PER) stated:

“The R&M Phase-I programme was started in 1985-86 and the core activities were completed by 1991-92 as stipulated. The remaining activities mainly concerning environmental upgradation were completed by March, 1996. There were no escalation on account of delays in Phase-I programme”.

19. The Phase-II programme for R&M of thermal power stations was taken up in the year 1990-91 by the Government of India for implementation during the 8th Plan. Under this programme, 44 thermal power stations consisting of 198 thermal units aggregating to a total capacity of 20869.43 MW were covered. The total sanctioned cost of the scheme was Rs. 2383.03 crore. This included State Plan resources, World Bank loan, OECF and PFC loans. The expected benefits after completion were:

- (i) Additional generation of 7864 MUs/Yr. (1600 Mus.)
- (ii) Increase of 100 MW peaking capacity.
- (iii) Life extension of 24 units by 10 to 15 yrs.
- (iv) Environmental improvement of 93 units.

20. Giving the present status of the scheme, the Ministry of Power, however, have informed as under:

"(a) Physical

The programme which was originally scheduled to be completed by 1995-96 has not yet been completed. By June, 1998 only 53% works have been completed on all India basis. The works on 6 stations have been completed and the works on other power stations are at different stages of completion. However, the progress of R&M in power stations of UP, Bihar and Madhya Pradesh is rather slow.

(b) Financial

By June 1998 a total amount of Rs. 998 crore (41.5%) of total cost has been incurred. The contribution of various agencies is as under:

- (i) PFC—Rs. 185.38 crore.
- (ii) World Bank—Rs. 112.96 crore.
- (iii) OECF—Rs. 95.30 crore.
- (iv) State Plan—Rs. 594.18 crore.

As regards R&M activities in less developed states viz. UP & Bihar. UPSEB have informed that 6 thermal powers stations were covered by the roving team of CEA & BHEL for R&M works during the Financial year 1997-98. UPSEB have further made applications to PFC seeking loan assistance. The only SEB at present left is BSEB, where loan proposals are under formulation and waiting for acceptance of OFAP by Government of Bihar.

(c) Benefits achieved

As against additional generation of 7684 MUs. expected after completion of the programme, an additional generation of about 5000 MUs has already started accruing since last 2-3 years, where R&M works have been completed or are nearing completion".

21. Explaining the reasons for shortfall in realising the targets of Phase-II of the scheme and steps taken to overcome them, a representative of PFC during evidence stated:—

"In some States, the scheme could not be taken up because the States were not able to meet the eligibility criteria set up by

PFC. In 1992-93 PFC got major loan *i.e.* 265 million \$ from World Bank and 250 million & from ADB. Most of these loans were meant towards T&D and in same case towards R&M and environmental related schemes. After the World Bank and ADB loans. We were very much bound by their conditionalities which the States have to fulfil. The States would not be eligible, if they are not having the exposure limit or three per cent rate of return or if they are defaulters or they have not signed the Operational and Financial Action Plan (OFAP). Therefore, a number of States were denied loans only because of that. Other than that any State which came with for R&M loan proposal was not denied loan by the PFC. In 1995-96, we relaxed three per cent rate of return. The only thing we said that they must have the Operational and Financial Action Plan (OFAP) and should not default.

Then we went to the Cabinet for a new programme of four per cent subsidy. We have mentioned this point there also that even the exposure limit can be relaxed on case by case basis if the scheme is financially viable and it would improve the revenues of SEB. So, with this relaxation, today we can cover almost all the State utilities".

22. He further added:—

"The money for R&M is no problem with us. The Power Finance Corporation can raise any amount of money for R&M. We have that much of capability now to raise the money in the market and even the Government subsidy is available at the rate of four per cent on these schemes. But we do not have enough projects. When I say enough projects, I did not mean only the names of the projects as identified in the list. The PFC is a financial institution. For PFC to sanction any loan, the projects have to be properly formulated. They have to identify what benefits will come and what works will be undertaken. Those projects have to be formulated as bankable projects. But to formulate those projects in bankable form, they have to undertake the study first. That means the scheme has to be formulated as to how much money is required for what items of works. Sometimes, they have to do a study of residual life of the plant etc. But that detailing is necessary for making the project. Only properly formulated project has to come to us for funding.

We have been requesting them to come up with projects, to appoint consultants and to conduct studies. We have put up a proposal to the Government of India which was approved. The proposal was to give them grants for R&M studies. Earlier we gave them low interest loans. Now, they are eligible to avail of grants. We have even gone to the extent of giving them seventy per cent loan. Let them come with the projects and we cover almost the entire cost of the equipment by giving them seventy per cent cost of the project as loan. No financial institution gives loans to cover seventy per cent cost of the project".

23. Asked about progress of undertaking R&M activities, a representative of PFC stated:

"Now, those type of activities are not being undertaken for various reasons. One of the reasons was that some of the SEBs have shortage in generating capacity. Sometimes, for studies also, they have first to shut down the units. They would not like to shut it down and would carry on till breakdown. Even for R&M works, they will have to shut it down. They keep on carrying on as far as possible. Moreover, they are not very clear about the type of studies, who could be the best expert or consultant etc.".

24. The main reasons for slow progress in implementing Phase-II R&M Schemes as mentioned by Ministry of Power are as under:

- (i) Whereas CLA was sanctioned for R&M (phase-I programme) no such provision could be made for phase-II.
- (ii) Out of a total of 44 stations, PFC has sanctioned loan for only 25 stations.
- (iii) Many States could not provide timely their balance share of 30% from their own resources.
- (iv) Many SEBs took a lot of time in preparation of the specification, tendering & financing the Orders.

25. Asked to furnish details of cost escalation due to delay in implementation, in Phase-II, MOP, in a post evidence reply stated:

"Phase II programme is till under implementation and any escalation will be known as the programme progress".

26. The Ministry of Power informed the Committee that out of 372 installed units (56,000 MW), as many as 229 units (26,910 MW) will be covered under 'R&M' during Ninth Plan, entailing an investment of Rs. 8,800 crore. Another 70 units (4,404 MW) require life extension, during the same period. This will entail an investment of about Rs. 8800 crore. Asked whether any assessment has been made of number of units requiring R&M during next 10-15 years, the Ministry informed that no such estimates have been made beyond IX plan as it will depend on the observation of the performance of units as and when required.

CHAPTER III

R&M AND UPRATING OF HYDRO ELECTRIC POWER STATIONS

1. The programme for renovation, modernisation and uprating of Hydro Power Stations was formulated as per recommendations of the National Committee set up in 1987 under which 55 schemes 186 generating units were identified with an aggregate installed capacity of 9653 MW. At a total estimated cost of Rs. 1493 crore, the benefits expected to accrue were 2531 MW/7181 MUs. Out of these 55 schemes, work on 21 schemes have already been completed. 26 schemes are under implementation and 8 schemes are yet to be taken up for implementation.

2. Giving the information regarding number of the Hydro Units in the country and the number of Units which have so far been covered under R&M, the Ministry in their post-evidence reply (PER) informed the Committee as follows:

"There are 612 (60 in Central Sector and 552 in the State Sector) Hydro generating units. The national committee set up in 1987 identified 186 Hydro units for R&M/R&U activities".

"A Total of 186 Hydro Generating Units. (157 in the State Sector and 29 in Central Sector) were included for RM&U for implementation during the Eighth Plan".

3. When asked to furnish the details of projects where the capacity has been uprated and by what percentage the Ministry in their reply gave the following figures:

Sl. No.	Name of Hydro units	Original capacity MW	Upgraded capacity MW	Remarks
1	2	3	4	5
1.	Nagjhari (U-2)	135	150 (11.1%)	Life also extended
2.	Ganguwal (U-2)	24.2	27.63 (14.17%) 25 years.	

1	2	3	4	5
3.	Kotla (U-3)	24.2	28.32 (17%)	-do-
4.	Sharavathy (U1-10)	10x89.1	10x103.5 (16.16%)	Life of 4 units extended
5.	Baira Siul	3x60	3x66 (10%)	
6.	Hirakud-I (U1 & 2)	2x37.5	2x49.7 (32.5%)	Life extended by 25 years
7.	Bhakra (RB) (U6, 8&9)	3x120	3x157	Other two units are under renovation

4. During the 9th Plan work on 7 schemes has already been completed and the programme includes completion of balance work on 26 on-going schemes. The 10th Plan programme covers 27 numbers of schemes. These include 8 schemes of phase I, on which work is yet to commence, and the 19 new schemes proposed by SEBs under phase II. The total installed capacity of 19 new schemes proposed is around 1617 MW and the estimated cost as indicated by SEBs/utilities will be Rs. 666 crores.

5. The CMD, BHEL during oral evidence mentioned that the hydro sector has generally remained outside the purview of renovation and modernisation plans.

6. On the comparative advantages of renovation and modernisation of hydel plants over thermal units, CMD, BHEL mentioned that "in case of R&M of thermal plants, the plant, will have to be shut down for RLA studies initially and later on when the R&M is taken up. This becomes difficult in view of the increasing power needs and there is a shortage all the time. But in case of hydro power stations, there is a seasonal shutting down of units in power plants". Moreover, the works can be executed at a much lower cost. The completed hydro R & M projects cost Rs. 37 lakh per MW.

7. One representative of BHEL mentioned that they have been able to upgrade the plants by about eight per cent to ten per cent and bring back to the old capacity by ten per cent. In this context, he informed that they have added 400 MW beyond the rated capacity, where cost per MW is roughly about Rs. 30 lakh. BHEL further added that in addition to carrying out R&M work with the state-of-the-art technology available with them, it is also possible to uprate the capacity of existing hydro machines with marginal investment. Obsolete equipment/technology, problems faced with silt erosion, frequent failures in subsystems present a major opportunity for carrying out R&M works for improving performance and extending life within short cycle times. BHEL has implemented such schemes and is fully geared with engineering, manufacturing and erection/commissioning facilities/ manpower to implement these programmes on turnkey basis with the State-of-the-art technology and lab facilities.

8. Asked about delay in executing 'R&M' of hydel project, one representative of Ministry of Power informed that this was due to lack of financial resources. Even PFC has not been able to provide sufficient funds. The State Governments who are required to arrange the funds have also failed to do so. They too have either to approach PFC or manage their own resources.

9. On the question of delayed implementation of RM&U of hydro-electric projects. Ministry of Power in their PER attributed it to the following reasons:

- (a) Delay in financial tie-up for RM&U schemes.
- (b) No strict adherence to schedule of completion as it is not possible to take shut down due to monsoon period, grid constraints or agricultural requirements. This has invariably resulted in longer execution period/slow progress of RM&U schemes.

10. Explaining the problems in implementation of R&M and uprating of hydro projects, the Ministry of Power stated:

Financial constraints was the major bottleneck encountered in the implementation of R&M schemes and the following schemes

(5 Nos.) of U.P. State are held up as PFC loan was either cancelled or not sanctioned.

1. Chilla	4x36 MW
2. Khatima	3x13.8 MW
3. Pathri	3x6.8 MW
4. Tiloth	3x30 MW
5. Ramganga	3x66 MW

Besides, the following ongoing schemes are going slow as the financial tie-up could not be finalised:

1. Neriamangalam	3x15 MW
2. Sabarigiri	6x50 MW
3. Jaldhaka-I	3x9 MW
4. Loktak NHPC	3x35 MW
5. Hirakud-I (U3&4)	2x24 MW

In addition, the following schemes are yet to be taken up as these are awaiting financial tie-ups:

1. Nizam Sagar	2x5 MW
2. Subernarekha	2x65 MW
3. Obra U.P.	3x33 MW
4. Hirakud-I (U5&6)	2x37.5 MW
5. Poriangalkutha	4x8 MW

RM&U of Machkund (3x17+3x21.25 MW), a joint venture of A.P. & Orissa Governments is held up due to settlement of pending sharing issues between A.P. and Orissa Governments.

CHAPTER IV

SELECTION OF UNITS FOR R&M AND SCOPE OF WORK

Selection of units and clearly defining the scope of works is the first important step towards Renovation and Modernisation of the plant. Normally a plant is designed to have a particular life. One and half lakh operating hours to two lakh hours is considered to be a normal life of the plant. The continuous forced outages is also an indicator to see that something has to be done on the plant.

2. When the Committee enquired as to how a unit is selected for undertaking R&M, the Ministry informed that CEA considers the historical records of operation of the unit details of post-outages, number of operating hours as well as specific tests carried out by the project authorities. RLA studies, as per prevailing practice is carried out after about one lakh operating hours, which comes to 15-20 years.

3. In this regard, a representative of PFC mentioned as under:

"In R&M I, all the units were selected by CEA and that was based on the low plant load factor which basically emerged out of the defects in specific plant and equipment because some of these plants and components were imported from the Eastern block. Russia was our main supplier at that time when these units were set up. BHEL was also in the process of manufacturing these units. So, there were some generic defects and some defects which came out because of inadequate maintenance of these plants. So the basic criterion was the lower availability of the units".

4. Power Finance Corporation in a written memorandum furnished to the Committee stated that inadequate inspection/analysis to define scope of work is one of the important constraints in implementation of R&M works.

5. Tracing the genesis of in adequate determination of defining the scope of work, a representative of PFC during evidence stated:

"The problem was that most of the original equipment manufacturers of these plants have a presence in India and they

wanted to get the orders directly with the Life Extension Study included in this and with the scope to be defined for themselves. So, what was happening was that the scope was not clearly defined in the beginning and therefore, when some of the State Electricity Boards actual proceeded further for the placement of orders on these organisation finally there was a stoppage somewhere either in the CEA, Ministry of Power or in the Ministry of Finance or somewhere else because the cost was too high".

6. Central Electricity Authority in a communication to State Electricity Boards suggested the following criterion for selection of units for R&M:—

"The criteria for relative priority to the implementation of each R&M job will generally be the gestation period and actual for cost benefits. The jobs which have a shorter gestation period but immediate beneficial impact on improvement of generation. PLF and availability etc., will be assigned higher priority for implementation. This approach is necessary as it may not be practicable to carry out all renovation and modernisation jobs at one stretch because this would require too long shut down of thermal units which may not be readily available. Besides, certain long lead items involving detailed engineering procedure of equipment and material etc. may have to be taken up later depending on the time involved in engineering and delivery schedules etc. As such, the entire renovation and modernisation programme have to be implemented in a phased manner."

7. Commenting on the importance of RLA studies, Damodar Valley Corporation (DVC) in their reply stated:

"The need *vis-a-vis* outcome of RLA for old thermal power plants before undertaking R&M particularly during the time of implementation of phase-I R&M scheme could not be truly realised because it was a new concept altogether. However, the need of seriously taking up RLA of ageing power plants became apparent in the later stage under phase-II R&M."

8. In regard to involving CEA in the RLA studies and defining the scope of works, Ministry in their Post Evidence Reply stated that SEBs have competent expertise to undertake RLA studies. However, where SEBs require services of engineers of CEA, such request can be acceded to by CEA.

9. On their approach to R&M, Tata Electric Company in their Memorandum mentioned as under:

“TEC’s Run/Repair/Replace approach to R&M of the generating units is from a utility perspective. This approach focuses on obtaining the maximum technical and economic utilisation of balance useful life in an existing equipment of their component. This can only be achieved by carrying out RLA studies on critical equipment. Following breakthrough in computer technology, State-of-the-art equipments and user friendly software have been developed for effective RLA studies which minimise the downtime for such studies.”

10. Confederation of Indian Industry (CII) suggested that CEA could undertake detailed RLA study and identify all the factors responsible for sub optimal performance of the power plants. CII were of the opinion that some SEBs are capable of undertaking LE/RLA studies but they would be requiring many sophisticated instruments for conducting such studies.

11. When asked whether SEBs are technically and financially self sufficient to select projects for R&M and define the scope of work, the Ministry of Power, in a note submitted to the Committee stated:

“Many SEBs are technically sound. Most of them, however, need financial assistance for scheme implementation. Whereas most SEBs define the scope of work for routine R&M activities in consultation with CEA and BHEL. RLA/LE studies are required to define the scope of work for LE of old units. PFC has registered qualified vendors for R&M and LE studies/works in association with SEBs through global PQ bids. This will help in defining optimal scope of work for R&M and LE of old thermal units.”

12. On the question of entrusting RLA and R&M work to a single agency, CII mentioned that both the works are specialised ones, and should be entrusted to separate agencies. CII again emphasised that CEA, which is a technically proficient body can undertake the study part and the vendors selected by PFC could bid for the R&M jobs.

13. On the question of clubbing the Residue Life Assessment (RLA) and R&M activity, Associated Chamber of Commerce and Industry (ASSOCHAM) in their Post Evidence Reply mentioned:

"The contractor may not have the expertise to conduct an unbiased study. The contractors opinion is often clouded by other factors."

14. ASSOCHAM further added that segregation of two activities would infact help in clearly defining the scope of work in advance and competitive bids can be compared on a genuine basis. Considerable delays take place when various bidders have different idea about the scope of work. In addition evaluation becomes very difficult.

15. On the question of combining RLA and R&M activity CMD, BHEL during oral evidence mentioned that they agree with the suggestion that RLA studies and R&M scheme should be separated. They should not be one, as such. Both the scheme must be separated so that adequate transparency is maintained and decisions are taken after complete examination.

16. When asked whether entrusting RLA study and renovation work to a single agency as a package bring down the cost of R&M? Or it is less costly and more transparent to separate both the activities in the sense that RLA study to be done by one party and R&M work carried out by another party. The Ministry of Power did not agree with the suggestion of CII, ASSOCHAM & BHEL and opined:

"Entrusting RLA study and Renovation work to a single agency as a package would generally work out cheaper and ensuring guarantees for performance would be possible, the transparency in either case is not affected."

17. Asked whether de-linking of financing from bid-evaluation would improve the implementation of R&M, ASSOCHAM opined as under:

"De-linking financing from bid evaluation would result in better technical comparison of competitive bids. Because of the lack of backup guarantees by State or Central Government, bidders accessibility to cheaper funds often influences technical considerations. It was therefore suggested that separate financial bids should be properly evaluated by expert institutions like PFC."

18. On the question of delinking of finance from bidding. Ministry of Power informed that such a delinking would obviously make the bids competitive and transparent. They further added:

"It would be better to discourage the tendency in R&M proposals where the responsibility for arranging finance is being put on the bidders. Thus by delinking financing from implementation would result in better technology and economy."

19. During oral evidence also a representative of CII suggested that CEA could undertake the study for the projects. They can see what is actually to be done. Infact, it will be a very good utilisation of the available talent in the CEA in the changed scenario.

20. In R&M Programme, more emphasis was given on buying/replacing equipments, rather than repairing. There were not enough entrepreneurs in the field. At this, a representatives of PFC stated:

"Actually because of these problems and because we saw that in a number of cases orders could not materialise, we came up with a suggestion which we started from the PFC about six months back we had a detailed interaction with the Confederation of Indian Industry, BHEL, State Electricity Boards, CEA and others and decided that we should actually try to short list the vendors for life extension studies through PQ bid. These vendors for life extension studies obviously will not be only the manufacturers only but they will include three kind of expertise.

The first of these expertise which is required is about the design and engineering in totality so that when they are analysing they are looking at a plant at a particular point of time to renovate it and they are also looking for the possibilities of improving its efficiency and cycle improvements, if possible with minimum cost.

The second requirement is that they should have a manufacturing capability. That manufacturing capability need not be from the same original equipment manufacturers as it is normally believed. The original equipment manufacturer has got definite advantage on a plant which has been supplied by him, but others can also enter into that area. The TVA and NTPC basically are operating organisations not manufacturers.

The third element is that you should be able to test the plant and material in order to achieve that kind of benefit which you mentioned that they should be able to carry out refurbishment operation at places rather than deciding on replacement everywhere."

21. In order to facilitate effective R&M life extension studies the Power Finance Corporation, in association with the SEBs invited global bids and registered vendors to conduct Renovation and Modernisation and Life Extension Studies and also to carry out work on competitive basis.

22. Detailing the process of selection of vendors, the representative of PFC during evidence stated:

"We had floated the global enquiry in January 1998. There were 87 parties who had purchased the bid documents. We opened the bids on 29th April and 45 vendors had participated in the bidding process. We had invited bids in a number of categories. The bidding was only for coal fired thermal power plants. It included over all power plant for studies or overall plant for both the studies and works. So out of 45, we had registered about 36 out of which 16 are for the overall plant for studies as well as for works, about 11 of them are only for studies and the remaining are for different packages."

23. He further added:

"Actually, this activity is not our job. It is a pro-active role because everyone was having problems in finding vendors and short listing vendors for studies. We want world class vendors including Indian to come and do that. Each SEB have to do this exercise. They would have taken lot of time and money. We have done this activity basically on their behalf. We brought them together and we did it all together. It would have taken almost one to two years of time of theirs to invite. Now, all that they have to do is from short list, they have to simply invite the bids straightaway. So, that will save a lot of time."

24. Asked as to how planning and execution, process is done, after a unit is selected for R&M, the Ministry of Power in a note furnished to the Committee mentioned as under:

"After a unit has been selected for R&M, the concerned SEB/utility prepares a feasibility report for submission to CEA for

obtaining techno-economic clearance (for R&M work costing upto Rs. 500 crores, the requirement of obtaining CEA's clearance has now been withdrawn and instead, the approvals of the concerned State Governments are to be obtained). The funding arrangement is required to be tied up by the SEBs. A Task Force comprising senior representative of the SEB, power station concerned, CEA and PFC is set up for ensuring implementation of the schemes as per agreed schedule. CEA monitors the physical progress.”.

25. Shri S.N. Roy, an expert in the field in a written note to the Committee suggested the following guidelines for taking up units for R&M:

“In order to evaluate the benefits of revamping of units, CEA must conduct system studies for time frames prior to major overhaul and subsequent to that. There are apprehensions that the benefits as being visualised may not be available and the heavy expenditure being made on modernisation and renovation may not be justified.”

26. Elaborating his point further, he stated:

“The SEBs should prepare the improvement programmes in the following two stages;

- (i) Instead of undertaking major renovation in the existing units, attempts should be made to resolve all non-technical reasons responsible for poor performance. Thereafter, experts should be involved to cut down “down time” involved in attending to forced outages. By reducing down time, Bhatinda has been able to achieve remarkable performance from 35% to 75% in PLF without any major change in the boilers and the machines. It is can be achieved by attending to non-technical reasons and cutting down time for attending to faults. Experts should be involved to assess the health of the machines and improvements likely without any major change in designs.
- (ii) Some of the machines which have become old and are not giving full output may require modernisation. The boiler is most troublesome equipment which may involve major changes in some power stations. Involvement of experts for proper diagnosis, the work of modernisation and renovation

should not be taken as a matter of policy unless the power stations have been visited by experts to carry out diagnosis of ailments".

27. Confederation of Indian Industry in their post evidence reply as to what issues are to be examined during formulation of R&M scheme, suggested as follows:

"Detailed study to identify the correct potential to be covered under the R&M scheme.

Well defined scope of work before inviting bids for the actual works.

Magnitude of investment required sources of funds to be identified.

Identification of ways to guarantee the investment.

Financing package should not be invited from the R&M and LE vendors.

Monitoring the plant in post R&M scenario".

28. When asked to state whether funds for increasing PLF of plant can be earmarked separately from the funds for environmental aspects. BHEL in a post evidence reply stated:

"In view of stringent environmental requirements. Funds for environmental aspect can be separated from the funds earmarked for increasing PLF/OA of Plant".

29. On the question of earmarking separate funds for environmental activity from R&M. MOP in their PER stated:

"It is feasible to separate out the R&M activities from generation improvement. Environmental upgradation and routine maintenance. However, it will be appropriate to club all the activities and to implement them during the same period when the plant is under shutdown".

30. When asked what Ministry can do to make R&M programme more transparent and effective. MOP in their PER stated that it is difficult to draw a line to separate O&M activities from R&M activities

when undertaking R&M activities on a unit when generation suffered due to inadequate maintenance. Effective technoeconomic appraisal of R&M schemes and identification of activities which are essentially needed to give higher plant availability would make the R&M programme transparent and effective. PFC is making endeavour to do the same.

31. When asked whether any of the thermal unit has been decommissioned or scrapped, the Ministry in Post Evidence Reply stated as under:

"The following thermal units been de-commissioned/scrapped due to their uneconomic operation/aging and there is no possibility of their rehabilitation.

Harduaganj—'A'	3x30 MW	Uneconomical Operation & Old Units
Korba (E)	1x10 MW	-do- 3x30 MW -do-
Paras	1x30 MW	-do-
Barauni	2x15 MW	-do-
Durgapur (DVC)	2x55 MW	Damaged in fire accident in 1983-84".

CHAPTER V

FINANCING R&M PROJECTS

During the phase-I R&M programme, Government of India had approved an amount of Rs. 500 crore in 1984 for providing Central Loan Assistance (CLA) for certain core and essential activities to supplement the efforts of SEBs/utilities for R&M of their thermal power stations. The total sanctioned cost of various schemes was Rs. 1165 crore out of which Rs. 423.34 crore under CLA and Rs. 741.66 crore was proposed to be financed by the States under State plan/own resources.

2. The overall co-ordination and monitoring of phase-I R&M programme was carried out by CEA as per the statutory provision of the ES act, 1948. The responsibility of disbursement and management of Central Loan Assistance (CLA) was taken over from CEA by the Power Finance Corporation w.e.f. 1.4.1988.
3. The total estimated cost of the phase-II programme was Rs. 2383.02 crore which include State plan resources, World Bank Loan, OECF and PFC loans. By June, 1998 a total amount of Rs. 988 crore (41.5%) of total cost had been incurred.
4. Explaining the financing pattern the representative of PFC during evidence stated:

"We would meet upto 70 per cent cost of the projects in R&MIt means 70 per cent of completion cost. The completion cost includes the interest during construction and also establishment and the likely escalations which are there. Unlike the Government planning system where they take the project cost on the base date and constant price on day to day basis, we take it on the completion cost which in other works, means that out of the 30% of the contribution which SEB has to provide, part of it is towards establishment, part of it is towards interest payment and part of it is contingency and escalation. So, roughly bulk of the equipment cost is covered by our loan. There is very little they have to provide from their side of equipment. Once they take our loan, almost the entire equipment cost is taken care of through our loan".

5. When asked the quantum of financing done by PPC, CMD informed :

"In R&M phase-II, where than half of the schemes more taken up by PFC and loan were sanctioned".

6. In reply to a question as to what is the present system of financing R&M projects, the Ministry of Power in a written reply stated:

"SEB are required to arrange funds for undertaking R&M programmes. PFC now gives loans on priority for R&M work. It has recently diluted its lending norms for this activity and relaxed the requirement of 3% rate of return of SEB as well as key OFAP conditions regarding receivables, tariff revision, T&D losses, PLF achieved etc. A consortium approach between PFC and other IFIs can help in making available greater amount of credit for this activity.

World Bank and other multilateral agencies like the ADB have advanced lines of credit to PFC. PFC is thus in a position to make funds available to SEBs for undertaking R&M activities. KFW and OEFC have also been financing R&M activities of SEBs".

7. Commenting on the financial position of SEBs, Federation of Indian Chambers of Commerce of Industry in a written note to the Committee stated:

"The restructuring of the State Electricity Boards (SEB) should be accelerated to facilitate the renovation and modernisation of the power sector, FICCI notes that the CMAP would require all SEBs to begin corporatisation and restructuring including the establishment of independent regulatory commission. Unbundling of services and privatisation of functions. This would begin to correct the fiscally weak condition of the SEBs which are unable to provide adequate funds for maintenance and are unable to act as credit worthy borrowers for financing of R&M activities. Unfortunately, FICCI notes that SEB reform plans appear to be only under serious consideration in a limited number of states and seem to be dependent on international funding agencies for their pace and direction".

8. When asked to state the steps, the Government propose to take to improve the financial health of SEBs, the Ministry of Power in their post evidence reply stated as follows:

"MoP have issued detailed guidelines for privatisation of transmission and distribution network and also to reduce cross subsidisation in power tariff so that the tariff obtained is higher than the cost of generation. These measures once implemented would go a long way to improve the financial health of SEBs. With the passing of Electricity Regulation Commission Act, 1998 GOI is providing the additional subsidy to States under AG&SP who expedite setting up of State Electricity Regulatory Commission during 1998-99 itself. The Reform—OFAP would help to improve the credit rating of the SEBs which would help in attracting private investment".

9. Asked to furnish the details of terms and conditions on which funds were/are received, interest paid thereon by PFC and details of the terms and conditions interest charged from various State utilities PFC in their reply mentioned as under:

"The terms and conditions at which loans from WB, ADB and ODA, were received by PFC and the terms at which the same were lent to SEBs as on 31.03.98 is given below:

(i) Borrowing by PFC from WB, ADB and ODA through GOI:—

These are given as rupee loans by the GOI, carrying interest at the rate of 14% p.a., the maturity of 15 years, grace period of 5 years and repayment of 10 years.

(ii) Re-lending by PFC:—

PFC is re-lending these loans at interest rate of 14.5% plus interest tax for R&M projects, repayment of 10 years and grace period of 2-4 years depending upon the construction period. There is a discount of 0.5% on timely payment. Thus, effectively reducing the interest of 14%.

(iii) Borrowings by PFC in foreign currency lent on back-to-back basis:—

In case of foreign currency loan along with exchange risk, the interest charged for R&M projects is 9.5% plus interest tax.

(iv) Other domestic market borrowing by PFC:—

The weighted average cost of funds to PFC is estimated as 14.42% (as on 31.03.1998). The rate charged by PFC from State utilities for R&M loans is 14.5% plus interest tax."

10. The main terms and conditions which under Power Finance Corporation lends loan for R&M projects, are as follows:—

- (a) The Borrower shall execute a memorandum of agreement in the form prescribed by the PFC.
- (b) The Borrower shall pay interest on the said loan @ 11.5% per annum and service charges at 1.0% per annum in the event of the loan being guaranteed by the State Government or shall pay interest @ 12.5% per annum in the event the loan is guaranteed by any of the Banks mentioned by PFC.
- (c) The loan shall be repaid by the Borrower in 12 equal half yearly installments.
- (d) Commitment charges @1.0% per annum shall be applicable.
- (e) In the event of interest or principal not being paid to PFC on due date, the borrower shall pay panel interest of 2.75% over and above the rate of interest.
- (f) The loan shall be guaranteed fully, unconditionally & irrevocably either by the State Government or by the State Bank of India or its subsidiaries in respect of repayment of principal & payment of interest/service charges. The State Government or any Banks shall execute the guarantee deed/bond in the form prescribed by the Corporation.
- (g) The State Government shall undertake to cause the borrower to earn a return of at least 3% on net fixed assets at the beginning of the year.

11. Under the Central Loan Assistance (CLA) scheme, the funds were directly given to State Government carrying 8% interest. On the question of change over from CLA scheme to funding through PFC, CMD, PFC mentioned as under:

"The Government thought that giving equity to PFC would be a good instrument because with that money we can raise almost

double the money from the market which we raised by way of bonds. We can provide much more money to the SEBs. We have about Rs. 1000 crore equity".

12. During oral evidence Secretary, Ministry of Power further mentioned:

"PFC is one of the major financial institutions which has given thrust to R&M activities. It has recently diluted its lending norms for this activity and relaxed the requirement of 3% rate of return as well as key of OFAP conditions regarding receivables, tariff revision. T&D losses, PLF achieved etc".

13. When the Committee pointed out the exorbitant rate of interest charged on the schemes of SEBs who themselves are financially weak. Power Finance Corporation during oral evidence clarified that "PFC charge 14.5% interest for R&M. 0.5% rebate is paid on timely payment of money. PFC receives money from Government of India on 14% interest. Government of India in turn get the money from ADB or World Bank the interest rate of which vary from 7 to 9 per cent. Government of India absorbs the exchange rate and the exchange rates are estimated at various degrees".

14. On the question of preventing diversions of funds, to other purposes, the witness from PFC mentioned:

"In the PFC we use the system where this is not done or cannot be easily done because our disbursement is not given directly as a money or cheque to the SEB. Money is paid against the bills. We ensure that money is paid only for the specified equipment items of work so that it cannot be diverted. We follow a system whereby we link it to the projects. Not only that, prior to implementation of a project, when we are executing the loan we prepare a complete schedule of disbursements. Everything is specified in our disbursement which would be linked with that schedule. We do not just sanction a project and give the money. Everything depends on the progress of work on the project. After the sanction is issued they have to place the orders; equipments have to come, they have to be installed and only then disbursement will take place."

15. Government of India has approved the proposal of Accelerated Generation and Supply Programme (AGSP) formulated by PFC, under

which subsidy scheme was introduced in the year 1997-98. After this programme the effective rate of interest for R&M programme is 10%. Additional interest rebate is given to States constituting regulatory authorities & States of North-East. PFC has also stated that priority is now given to R&M schemes and even exposure limits of SEBs relaxed on case to case basis provided schemes are offered one financially viable and lead to a positive impact on commercial operations of SEBs/ SGCS/utilities.

16. Asked which of the States have availed interest subsidy one representative of Power Finance Corporation mentioned:

"The States which have benefited from the 4% interest subsidy scheme are Haryana, Himachal Pradesh, Punjab, Rajasthan, Uttar Pradesh, Mizoram, Nagaland, Orissa, West Bengal, Gujarat, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu. Some of them may not have used it for R&M projects. They might have used it for some generation projects."

17. When the Committee as to on which scheme, the interest subsidy is available CMD, Power Finance Corporation clarified that Accelerated Generation and Supply Programme covers R&M programme, completion of on-going projects which are already under construction and which has to be completed expeditiously, and system of providing transmission links so that power generated is made available. Out of 94 projects under the AG and SP, 22 projects are on R&M alone.

18. SEBs have their different perceptions in regard to financing of R&M schemes by PFC.

- (i) UPSEB informed that funding of R&M of power plants is one of the main constraint in implementation. On the conditions of PFC fund UPSEB mentioned—"They are not friendly, to fulfil their condition is difficult."
- (ii) Punjab State Electricity Board in this connection mentioned that the terms and conditions imposed by PFC/Multilateral Agencies/FIs entrepreneurs are not friendly as rates of interest on loans is quite cumbersome/lengthy and expensive. Repayment conditions are stringent because opening of escrow accounts are insisted. Commitment charges should not be imposed when the loans are State Government guaranteed, the interest should be restricted to prime lending rate.

- (iii) Tamil Nadu State Electricity Board was also not satisfied with the conditionalities of PFC and they opined that the terms and conditions imposed by PFC are not exactly friendly. The amount already incurred by TNEB, PFC taking a long time to reimburse after raising many clarifications on each and every claim.

They have desired that PFC must release payment sanctioned amount and ask for utilisation certificate like CEA. This will help SEBs to speed up the R&M works without constraint of funds.

- (iv) RSEB suggested that for financing R&M of power plants, PFC should consider to lower down the rate of interest and should soften/reduce the conditionalities which are time consuming. The conditionalities like rate of return and loan assistance for R&M of power plants by the PFC be simplified.
- (v) Gujarat State Electricity Board (GSEB) in this connection mentioned that PFC is asking for commitment changes at the rate of 1% based on repayment schedule given at the time of sanctioning the loan. Due to several unforeseen reasons, there is a possibility of non-completion of the work as per the forecast. In such cases PFC, should accept the revised claim schedule. The loan disbursement documents asked by PFC are much more than that demanded by CEA earlier. This should be reduced further.

On the method of extending funds by PFC, Gujarat State Electricity Board (GEB) stated that earlier there was a practice by PFC that on getting our invoice, PFC was making direct payment of the bill to the leading party. This has been stopped now. GEB have to make payment to the contractors on receipt of the invoice and then GEB have to forward all necessary documents to PFC for the reimbursement. This procedure is unnecessarily blocking the GEB funds for considerable time."

- (vi) Haryana Electricity Board (HEB) informed that the funding of R&M schemes (phase I and II) have remained serious problems in the implementation of the programme and foreign agencies such as KFW are being involved for R&M phase III to overcome this problem.

- (vii) Maharashtra State Electricity Board (MSEB) suggested that the present exposure limit norms may not be made applicable for R&M scheme i.e. they may be excluded from the exposure limit criteria.
- (viii) West Bengal State Electricity Board (WBSEB) mentioned that PFC Ltd. is the only source of finance in respect of R&M works. Their terms cover opening of ESCROW A/c for this loan purpose. PFC Ltd. insists on conditions like commitment charges on the drawal schedule and for non-drawal (less drawal) and penal interest for delayed repayment should be relaxed considering the financial constraints of Electricity Boards.

WBSEB also pointed out that these conditions were not friendly.

19. When asked as to how the finances can be improved, CMD, BHEL in his deposition before the Committee stated that apart from the PFC, other institutions could also be enthused to join in this modernisation programme. This could become a mandatory system.

20. When the Committee pointed out as to how the scarce funds can be best utilised, he further opined:

"To make the optimum utilisation of the resources to modernisation, one of the objectives that we have set in is that the projects have to be very focused. First, we should take up the projects which have got maximum potential for improvement at the lowest cost. It could be done in a phased manner. It is our view that any plant which has done about 100,000 hours rather than the age alone, would be a good candidate for such a modernisation."

21. A number of industries, have special funds to take care of modernisation, renovation and upgradation and absorption of new technology. Since Power Plants need restorations, refurbishment, renovation, modernisation, when asked whether do Government should create a special Depreciation Fund for these purposes the BHEL during evidence stated:

"But creating a separate fund, i.e. making it mandatory for them to create a separate fund would at least ensure that some funds get earmarked for the purpose as such. To that extent, I think,

it is getting importance and this suggestion is extremely valuable. But overall resources when they are not getting created, creating a fund would only be just in the name and it would not really accumulate any resources."

22. The Ministry of Power, however, opined as under:

"There is no proposal to create any special Depreciation Fund for R&M scheme and there is no need for the same."

23. Clarifying further, the representative of Ministry during evidence stated:

"By creating a Depreciation Fund there is no guarantee that there will be a balance in that because it will get used. When the State Electricity Boards are recovering Rs. 1.60 against an expenditure of Rs. 2 on a very macro basis on generation, transmission and distribution, then all funds will get washed out in the central public sector.

In the Central Power Sector units renovation and modernisation is no problem. PFC do not have a big scheme for funding their stations because they are creating a profit.

Thirdly, there is a component of depreciation in the tariff and that depreciation fund is already there. It is not as if fund is not there."

24. Asked do Government propose to form Risk Development Fund, the Ministry in a not stated:

"Various alternatives are being considered to augment funds available for undertaking R&M activity. Creation of a Risk Development Fund is one such proposal which needs to be examined further."

25. In the absence of clear cut budgetary provisions, either in Central or State Governments Budget's proposal, the attention on R&M does not get focussed. Asked during evidence, CMD, BHEL opined as under:

"All the old power stations belong to the Electricity Boards and they are the properties of the Electricity Boards. Today the generation segment of the power sector has been opened up to private participation. R&M essentially has to be an activity of

the State Electricity Boards unless of course we come to a stage where the SEBs give away these old plants, which require modernisation on whatever basis to some private sector participations who do renovations, etc. I do not know whether any plan is being developed on that as long as they are owned by the Electricity Boards. That is why, given their funds position, there has to be some sort of a budgetary support, even if PFC is asked to fund, 30 per cent of the fund could have to be found from within the system, the State fund etc. I had mentioned earlier that whenever we are talking of new generation capacity it should be mandatorily asked as to whether the new generation capacity is a must in its entirety or whether a part of the problem can be taken care of by renovating redundant power station because that could be a cost-effective solution. But we do believe that primacy must be given to R&M to the same extent as new generation capacity is being given as such. And for this purpose, as long as these stations.....I do not see any other possibility immediately-continue to be owned by the SEBs, the budgetary support in some form or the other would be necessary for this activity."

26. The Ministry of Power did not agree to the suggestions of BHEL and instead in a note stated:

"PFC has not denied financial assistance to any technoeconomically sound R&M and LE proposal of SEBs. As such, there is no need for a separate allocation for R&M in Government budget. However, budget provision for interest subsidy to promote R&M activities would need to be continued during 9th Plan."

27. Measures are needed to maximize the financing available for R&M activities from all sources. In addition to the promised redirection of Power Finance Corporation lending to R&M activities which could double domestic lending for R&M to \$200 A million per year the Government of India should develop other mechanisms to expand the borrowing capacity of State Electricity Boards. One such measure might be an industry wide insurance fund to back the growing debt repayment claims on SEB escrow funds.

28. The private sector should be allowed to play a leading role in R&M efforts through the extensive creation of joint venture, lease, and sale options for existing power plants. SEBs should move rapidly to

make a wide variety of plants available for private sector ownership or management. Consideration should also be given to be occasional use of negotiated agreements in lieu of tenders to allow the development of highly customized proposals for the circumstances of a particular plant. A positive approach to privatization could tap the powerful resources of private sector energy companies to take on high impact modernization and fuel supply innovations. Complete privatization or sharing of ownership will reduce the burden of SEB debt service, open worldwide financing sources, and provide some front end equity payments for improvement elsewhere.

29. Tariffs and taxes should be set to facilitate investment. The Government should consider further changes to encourage the flow of foreign capital to the power industry. Among the deterrents are the tariff on imported power equipment which significantly raise project costs and discriminates against use of high quality foreign equipment.

30. One or more major State level demonstration R&M programmes might speed the process of R&M both in that State and nationwide. According to FICCI States vary widely in their ~~preparation~~ for and receptivity to R&M activities. States with the most advanced approaches such as Gujarat and West Bengal should be encouraged to adopt and accelerated plan to implement R&M activities throughout their jurisdiction. It might provide for such approaches as systematic needs assessment, and establishing "one stop" facilities for information, permitting and tender activities. Where possible these activities should be considered for central or international finance agency support to demonstrate the true potential of R&M activities.

CHAPTER VI

PRIVATE SECTOR PARTICIPATION IN R&M

1. With the announcement of private power policy in October, 1991, private investment became possible in all areas of power sector. It consequently opened up a new avenue of financing of R&M of power plants. In October, 1995 Government of India framed draft guidelines for private sector participation in R&M and circulated it to the States inviting their comments. The policy guidelines were then finalised. The policy envisaged following:

"Where R&M of a generation station is considered to be beneficial, efforts should be directed at securing those benefits at the earliest by tapping feasible sources of investment, whether public or private.

The choice and initiative rests quite clearly with the State Electricity Boards (SEBs) and the State Governments. In some instances, raising needed funds through traditional means like loans from financing institutions, external aid agencies, suppliers credit or a combination of these could still be an option and ownership of renovated plant could remain with the SEB. However, an attractive alternative option would be some form of privatisation and transfer of ownership for implementing the R&M programme without delay".

2. The policy guidelines laid down the following three alternative options for private investment in R&M:

"Option 1. Lease, rehabilitate, operate and transfer (LROT)

Under this option, the private promoter (PP) would take over the power station of the SEB on a long-term lease, PP would invest and carry out the R&M of the power station and would take over its operation and maintenance. Normally, the station would revert to the SEB on completion of contracted years of lease; the arrangement could also be renewable on terms to be specified".

"Option 2. Sale of plant

SEBs could offer power stations, which are uneconomical to them run and difficult to maintain due to overage, for outright sale to private parties. The present worth of the plant would have to be assessed which would be the reserve price for the sale.

"Option 3. Joint Venture

In this option, a new company will be formed as a joint venture (JV) of the SEB/State Government and selected private collaborator. The JV company would undertake R&M and operate and maintain the power station in question. The private collaborator would normally be a PP who would assume responsibility for the management for the JV. The participation by SEB (and/or the State Government) in the JV would be by transferring the existing plant at an agreed value to the fixed assets of the JV PP will finance the full required investment for R&M partly through equity and balance by arranging required loan finance".

3. The guidelines suggested that a balanced selection of R&M route should among others take note of the following:

- (i) Relative economics: Bilateral fund sources and suppliers credit arrangements generally limit the degree of competition in choice of supply, cost implications of which should not be overlooked.
- (ii) Risks: If R&M is taken up purely as an SEB project, risks associated with time and cost overruns, plans and designs, operational risks (e.g. short-provisioning of O&M because of resource constraints) and shortfall in releasing target improvement would be substantially, if not wholly to SEB's account. In privatised R&M, much of these risks would be transferred to the private agency.
- (iii) Financing other priority areas : For any SEB, there are strict limits to the funds that can be borrowed. Allocation of loan funds for the R&M programme would, therefore, involve corresponding reduction in availability of finance elsewhere, which would have heavy cost implication in a situation of resource constraints. Certain types of privatisation (Sale of plant) could. On the other hand, generate resources for investment in other priority areas like system upgradation, improvement in metering etc.

(iv) Resulting price of energy : The higher cost of private finance loan as well as equity will find reflection in the resulting energy prices. However, as noted, lower cost of financing is generally accompanied by extra risks and future uncertainties. Projected price comparison could also be unreal, because of adoption of historical costs for SEB assets. By providing a closer reflection of real current costs, competitively derived prices of privatised R&M, would help eliminate hidden subsidies that are detrimental of efficient functioning.

4. Commenting on the lack of interest shown by private investors in R&M programme, a representative of ASSOCHAM mentioned that some SEBs are asking for finance alongwith project proposals and in that case the private parties require securitization of debt. Bankers guarantee is also not available. Secondly, scope of work is not defined for which there is large variation in bids. Thirdly, SEBs take long time to finalise the bidding of project.

5. Associated Chamber of Commerce and Industry (ASSOCHAM) in a note submitted the following for failure of the LROT scheme:

- (a) Uncertainty about returns.
- (b) Absorption of existing manpower.
- (c) Uncertainty for the payment for supply of power.
- (d) Lack of certainty about fuel supply.
- (e) Lack of transparency.

6. Commenting on the present private sector participation in R&M CII in their written reply mentioned:

"The Government of India policy has been in place but due to the poor financial health of our SEBs the private sector has not been able to make their R&M contracts bankable which is a major drawback of the existing policy".

7. When the Committee asked as to why private parties are not showing much interest for R&M, a representative of CII during evidence stated:

"More the 39 private sector parties have been shortlisted by the PFC to execute R&M work. It is not that the private sector is not interested. In fact, they are very keen to participate because

in Indian Industry, there is a serious lack of real activity because there are no new projects and the Indian Industry is crying for more business. So, the Indian Industry is very keen on R&M activity also".

8. The Confederation of Indian Industry (CII) commenting on the LROT (lease, rehabilitate, operate and transfer) scheme in their Memorandum furnished to the Committee stated:

"While LROT has been a powerful scheme, it failed to stimulate R&M movement mainly in view of apathy of both vendors and SEB engineers on privatisation of the operation of their plants. UPSEB initiatives evoked poor response for both Harduaganj plant earlier and now Obra. Thus it seems that LROT arrived before its time".

9. The apathy of vendors and SEB engineers is due to excessive manpower at the SEB owned plants. No private organisation will be willing to operate a business unit with gross over-manning even when compensated for the excess manpower. Also, the SEBs employees would resist to work in the privatised environment with the fear of loosing job security.

10. CII in a written note to the Committee suggested a modified scheme for private participation in R&M the new scheme while retaining the strengths of LROT, attempts to modify its weakness. Thus, FIRM while providing continuity for LROT, relates itself significantly to the operational independence of SEBs and pride of their engineers.

FIRM stands for:

F Financing by Financial institutes against a Bankable Guarantees (By Fls like PFC, IDBI etc.)

I Integrated Engineering (with Life Extension studies)

The entrepreneur must provide power plant engineering as a whole and not just turbine or boiler engineering in isolation. Also, it must be conceived and implemented together with SEB engineers with their inputs on engineering and operational issues.

R Refurbishing (By Pre-qualified vendors on a competitive basis)

M Monitoring : Management to ensure return on investment.

11. The FIRM approach, being conceived with the participation of Ministry of Power, CEA, PFC and SEBs is aimed to achieve higher investment levels in the State sector through effective Residual life assessment studies, defined scope of refurbishment works, sharing of risks between vendors and the SEBs and wider investment participation.

12. CII, explaining their 'FIRM' scheme in a written note suggested the following two issues:

(i) Situation of certainty : A structure needs to be built for the entrepreneur to work in a situation of certainty without impairing the transparency and advantages of a competitive bidding process. It is therefore suggested that all entrepreneurs who have been pre-qualified be given the RLA report and can quote for all the power stations identified for R&M, through a competitive bidding process.

13. It is also suggested that the vendors who have trained manpower and built up capacities should be allowed to take any number of projects at a time.

(ii) Bankability of contract: If the contract is not bankable, R&M initiatives may never take off. A number of financial models are now working, like guarantees from SEB backed by State Government, guarantees from development banks like PFC, IDBI etc. or from commercial banks like SBI; Escrow account; above these financial models, a market oriented approach like the entrepreneur be given distribution rights etc. could also be followed.

14. There was difference of opinion among SEBs in regard to private participation in R&M programmes. SEBs like WBSEB, ASEB have not found LROT scheme encouraging. PSEVB mentioned that they are not in favour of private sector participation in R&M. TNEB mentioned that private sector participation in R&M is not necessary since abundant technical knowledge is available with it. Rajasthan State Electricity Board mentioned that private sector participation is feasible and desirable in old power plants which require substantial investment in refurbishment and not retrofitting. Joint ventures on equity sharing basis could be formed for such purpose. Haryana SEB was of the view that the power plants should be retained with State Electricity Boards and should be renovated by arranging finances. Government of Orissa (Department of Energy) in their reply stated that promoting of private sector participation should be encouraged provided that

these are selected through ICB posing stringent conditions on the bidders technical capability and financial capability. Delhi Vidyut Board stated that participation of private sector in R&M activities is not foreseen as more remunerative and opined that it would be better to discourage the tendency in R&M proposals where the responsibility for arranging finance is being put on the bidders. Thus by de-linking financing from implementation would result in better technology and economy.

15. To boost, private sector involvement in R&M, the following few suggestions have been made by CII.

- (i) Increased and a separate allocation in the Ninth Plan for R&M projects, which could be used either in terms of cash flow or on guarantees for investment by the private sector.
- (ii) Multilateral Funding Organisations could be persuaded to provide funds and/or guarantees over and above the amount which is being currently channelised.
- (iii) Relaxation of lending norms by the power Finance Corporation (PFC) for such projects both in terms of loans and guarantees.
- (iv) Creation of a consortium approach between the PFC and other Indian Development Banks like IDBI, IFCI, IFFI etc.

16. Asked about the reasons for lack of private sector participations in R&M, Ministry of Power in a note mentioned:

- (i) Problems in finalising the modalities for transfer of human resource to the private developers.
- (ii) Absence of proper modalities for transfer of assets of State Electricity Boards to the private developers.
- (iii) Problems in finalising agreement for private R&M.

17. Ministry of Power in their preliminary material also mentioned that CII has replaced it's LROT approach with FIRM approach as under LROT scheme SEBs were reluctant to part with their power stations to private parties even on lease basis, as also because of the need to adopt a financial engineering approach to R&M activities.

18. Asked whether FIRM approach is better than earlier LROT approach, the Ministry stated that it has been left to the State Electricity

Boards to formulate schemes that are mutually acceptable and implementable.

19. Asked about the present status of private sector participation, Ministry of Power in their post-evidence reply stated:

"The investment Promotion Cell is not monitoring power projects being offered to private developers for Renovation and Modernisation, as the envisaged capital outlay limit for such projects coming under the purview of the Central Electricity authority is over Rs. 500 crore".

20. On the mobilisation of funds Ministry of Power mentioned that various alternatives are being considered to augment funds available for undertaking R&M activity. In regard to formation of a consortium. Ministry of Power mentioned that PFC could meet fund requirement of R&M/LE activities whenever the R&M and LE activities pick up in certain periods requiring funds in excess of the capacity of PFC, they could approach other FIs to co-finance the activities.

21. Asked whether Ministry of Power desire to change the present policy to boost private sector investment in R&M, they informed:

"No, we do not intend to make any changes in the guidelines for attracting private investment. Sufficient material in the form of guidelines, draft agreements, etc. has already been provided for this purpose to the States. State have to take requisite action in identifying projects for R&M, and have to create atmosphere for motivating private developers to take interest in R&M schemes".

CHAPTER VII

PERSPECTIVE PLANNING

The proposals for R&M and Life Extension studies are formulated by the State Electricity Boards. The units are identified by a roving team, consisting of engineers from concerned SEBs, BHEL and CEA. The States have been delegated powers to clear the projects from technical and economic angles, costing less than Rs. 500 crore. However, CEA's technoeconomic clearances are required for the projects involving investment of more than 500 crore.

2. At present, there is no national policy/programme, on R&M, and a representative of ASSOCHAM, during evidence deposed as under:

"In the earlier years, the Government had identified phase I and II. But all these programmes were partly done because the emphasis was mostly on the environmental aspects, a sort of cover up, and the renovation and modernisation aspect really did not get much importance. we feel that let there be a sort of national policy on R&M of the older plants. There is no such policy now, and the Government has only formulated some sort of a programme. Unlike other policies the R&M programme has not been put into focus".

3. Supplementing further, ASSOCHAM in a written note stated:

"A National R&M programme should be evolved in consultation with major players including SEBs, PFC, vendors, developers and consultants and more important Central Government agencies. Budgetary support, proper control and monitoring systems are vital for the success of the programme. R&M is the shortest and most economical route to generating additional power. The past experience suggests that a piecemeal efforts of the States/SEBs have not succeeded. A national plan with Central participation is imperative. As the R&M programme will need to be implemented in a phased manner, a perspective plan is imperative. The plan should ideally lay down the time frame for implementing the various phases."

4. Underlining the need for long-term planning in the matter, Confederation of Indian Industry stated as under:

"Much of the R&M funding has gone into emergency repairs which should have been covered under normal maintenance. That plus the low level of expenditure from Rs. 100 crore a year. We have not seen the results of R&M programme translated into increased PLF. You have been funding it from 55 per cent to 60 per cent, a fairly static level. It is not showing dramatic improvement because the level of expenditure has been low and the plants are neglecting the operation and maintenance and are trying to cover it under a capital project. It in turn adds to the burden on the consumer because it is going under a capital programme.

So, there is really a need for long term Five Year Plan on what should be done under R&M and what should be the funds required for that which can be done by a proper technical study of all the plants. The process which I have started is that the Power Finance Corporation has not identified the methodology for going about R&M activity in which detailed studies have to be done first and for which PFC will be laying out specifications and all the SEBs are required to follow that procedure and do comprehensive technical studies of each plant.

Then, they have to determine what exactly needs to be done under the project. Then, these activities will be tendered out to the industry to carry out R&M programme and that will be financed by the Power Finance Corporation. This process has just started and it will take another one year for all the State Electricity Boards to do the study. After that, you will see the results of the R&M programme".

5. Justifying the formulation of national plan on R&M, a representative of BHEL during evidence informed:

"We believe that this R&M is a cost effective way of bringing the redundant capacity back to the generation system capacity. Like the Chairman mentioned, this can be done at 30 per cent of the cost. It can also be done at a fraction of the time. When it is taken up at a new power station, it could be at the 25, 30 or 35 per cent time. This combination of lower cost and lower time taken for renovating the power station can be cost effective

and a powerful tool in the hands of the country to bring back redundant power stations to add generating capacity to the system. This is a very important area and I think there should be a national plan going for next five or ten years. It should be a well-laid out plan. But we do believe that the thrust of the policy must be very well defined. According to us, there are the components of the thrust that should be there in this plan. One is that, the R&M programme should be undertaken only after RLA study which is the total study of the power plant. It could be a systematic and detailed planning that should follow and the activities must be prioritised as to how to do it commensurate with the benefits that will be available from the R&M.

The second part that is important is funding. Today the Government have taken some initiative and provided a subsidy to the Power Finance Corporation to provide an interest subsidy to the power plants for modernisation. This has helped them to utilise it at the rate of ten and a half per cent. We would suggest that apart from the PFC, other institutions could also be enthused to join in this modernisation programme".

6. Asked to detail the thrust of a national programme, CII in a post evidence note stated:

"Technology upgradation of the old equipment, capacity expansion, repairs and refurbishment and improvement in plant management should be the main ingredients of National R&M Programme".

7. To formulate a national programme on R&M, the following steps, were recommended by CII:

"Identify all the thermal power stations under different age categories which need to undergo renovation and modernisation.

CEA could undertake detailed RLA study and identify all the factors responsible for sub-optimal performance of the power plants. The PFC could fund the study and the cost incurred in conducting LE/RLA study can be subsumed in the project cost.

The SEBs could invite bids for the actual work from the vendors which have already been re-qualified by PFC. The model bid document to be followed by SEBs for inviting bids for the actual works could be prepared by the Power Finance Corporation.

However, for the success of such national programme immediate stress should be laid upon improving the credit worthiness of SEBs".

8. When the Committee wanted to know whether the implementation of a national programme, as a perspective plan a necessity, BHEL in a note clarified:

"A perspective plan for R&M is a necessity. There is an immediate need to develop infrastructure for carrying renovation and modernisation by adopting the philosophy of repair and refurbishment as this approach should be highly cost effective.

The SEBs should recognise that, regular repair and maintenance is very necessary even in efficient units. The repair and maintenance of the power plants in India, specially the ones owned by SEBs has primarily been corrective in nature. They hardly undertake any preventive maintenance of the operating units because of the paucity of funds with them.

Thus to maintain the efficient operation of the plant, the following must be kept in view:

- Regular maintenance of the plant.
- Efficient functioning of subsystems and other functions of the plant.
- Improved management practices—both financial and human resources.
- Monitoring the health of key elements of the power plant.
- Operation of inefficient units should be halted and corrective actions to be taken accordingly".

9. In the 7th Plan, when R&M started total Central Loan Assistance (CLA) was Rs. 500 crore. From 1988, CLA was transferred to PFC. In the second phase, it was visualised to spent Rs. 2300 crore. However, only Rs. 988 crore was spent. In the Ninth Plan, an ambitious target of Rs. 8,800 crore has been set out. Asked to comment, whether PFC would be able to fund R&M programmes, a representative deposed—

"Fund is not the problem for R&M. You are talking about the requirement of Rs. 8,800 crore. After PFC has introduced the

scheme and also relaxations given by the Government, fund is not the problem. Even Rs. 8,800 crore. Which has been mentioned by the Chairman, CEA, practically will not be spent and you will notice this if you look at the first two years of the Ninth Plan.

In 1997-98, actual disbursement was only Rs. 59 crore. In 1998-99, the loan sanctioned was Rs. 730 crore but so far the amount disbursed was Rs. 5 crore upto November. The problem basically is this. Having the bankable schemes which can be implemented, formulating those projects and bringing to the sanction stage and implementing them—all these take time. It is not just that one can start spending tomorrow morning for R&M. That is where a lot of problems arises".

10. Taking into consideration availability of funds with PFC to finance R&M, the Committee enquired whether Government have chalked out any perspective plan in this regard, and the Secretary (Power), stated:

"We have a perspective plan for a five year period. It is a perspective plan for the Ninth Five Year Plan. It is not a perspective for 10-15 years. We have not done a perspective plan for the next 10-15 years. But there is a Five Year Plan which can be taken as perspective plan. This is a continuous activity".

11. Chairman, CEA supplemented:

"Perhaps a long-term perspective plan for carrying out R&M activities. etc. is not required. As already mentioned, the requirement of investment is very low compared to new machines just less than Rs. 1 crore for a MW. That is one aspect.

Secondly, it has to be a continuous exercise. For instance, for the Ninth Plan what we have done is that it is a spillover from the Eighth Plan. Then, certain new schemes have also been identified by the CEA, the BHEL, the PFC, etc. The roving team went around the country invarious States and discussed the subject with the States. Based on that, in the Ninth Plan, we have firmed up the machines that we want to take up for life extension and for renovation and modernisation. For the Ninth

Plan period. The R&M activities will be required in 50 stations consisting of 229 machines. Then, out of these, 70 machines have already passed their age of 25 years. So, a life extension is due on them.

Then, we expect that the estimate of expenditure, including spillover, on new machines and life extension is over Rs. 8,800 crore for the Ninth Five Year Plan".

12. In a Post-evidence note, however, the Ministry of Power stated as under:

"The R&M activities are now driven by commercial prudence and PFC provides loan for all R&M schemes under relaxed conditions within overall operational policy based on the requirements of SEBs. As such perspective plan for R&M and LE activities would not emerge from MOP but would emerge from SEBs.

Such perspective Plans should appropriately be prepared by SEBs in respect of their plants."

CHAPTER VIII

MONITORING

CEA monitors R&M activities as a part of its statutory functions. However Ministry of Power in their Preliminary Material informed that continuous monitoring is not normally envisaged unless otherwise stated for specific components in RLA study. The RLA as per prevailing practice, is carried out after about one operating hours.

2. During oral evidence CMD, Power Finance Corporation stated that the Central Electricity Authority have the responsibility for monitoring. They are monitoring generation of all plants including those which go in for R&M. Their generation is constantly monitored and whatever is the PLF is brought out in the CEA reports.

3. Asked whether a separate organisation should be set up for the purpose of monitoring R&M or the CEA is quite capable to undertake such assignments, one representative of ASSOCHAM mentioned:

"A separate organisation is not required".

4. Advocating CEA involvement in monitoring CII representatives during oral evidence deposed as under:

"CEA has system of monitoring plants' performance on a monthly basis and every fault which arises is reported to them. They know what is wrong with each station. Now it is a question of involving them in the process jointly with Electricity Boards".

5. Similar views were expressed by FICCI who stated that CEA's technical wing can be given the total responsibility to monitor.

6. During oral evidence one representative of the Ministry of Power mentioned as under:

"Now a major part of monitoring is done by the PFC at the time of disbursement of instalments and then completion of projects because they are financing the R&M scheme".

7. In regard to involving CEA in the RLA studies and defining the scope of work, the Ministry in their post evidence reply stated that SEBs have competent expertise to undertake RLA studies. Should SEBs require services of engineers of CEA, they can make formal request to CEA for the same.

8. Views of State Electricity Boards in this regard are as under:

"WBSEB mentioned that they are competent to conduct residual life assessment study after every 5 years to assess the condition of the plant and equipment of the stations and if need arises, the R&M of the areas may also be undertaken".

9. However, ASEB did not conduct RLA studies for their 4x110 MW units. PSEB plans to carry out similar studies of power plants. PSEB finds its study extremely useful. TNEB informed that they have no facilities for monitoring hence they have not taken up monitoring so far. MPSEB monitors various units from time-to-time. GSEB stated that continuous monitoring is done for each equipment of the plant. Haryana SEB mentioned that adequate funds are required to keep the monitoring going.

10. On the question of monitoring Chairman, Central Electricity Authority during oral evidence stated as under:

"In the Phase-I programme, the CEA was nearly fully involved with the R&M exercise all over the country starting from identification of the R&M scheme, scope of work and then also rendering assistance to SEBs in framing a proper scheme, project report, cost benefit analysis etc. Thus in the Seventh Plan, the entire scheme was being prepared, financed, executed, supervised and Monitored by CEA".

11. Elaborating further he stated:

"One of our functions is monitoring the performance of the power plants in terms of actual generation, maintenance etc. We keep on analysing and the analysis finally concludes in terms of identifying the plant which needs very special attention in terms of R&M work".

12. In the context of monitoring Phase-II R&M programme, Chairman, CEA clarified as under:

"When we went to Phase-II, certain changes were made in the overall scheme and the CEA was not involved in the control of finances. The Government changed the policy and asked PFC to Finance the schemes. Then the subsequent monitoring action became less effective".

13. Commenting on the expertise of CEA, Chairman CEA during oral evidence mentioned as under:

"Anybody who monitors, who apprises, who determines the scope of work has to be involved from step one till the last step. Only then he can make contribution in terms of his expertise. Monitoring of the power plants was done on a continuous basis in the CEA, which includes the plants which get connected to the grid after R&M activities".

14. Further clarifying the point on monitoring, a representative of the Ministry of Power stated as under:

"Earlier, whenever we had centrally scheme, there was an integrated supervision of the CEA on the implementation of that scheme. But then, for good reasons, the Government of India decided that Centrally schemes will be transferred to the States, and this was one of the schemes which was given up".

15. Chairman, CEA in this regard mentioned that the entire R&M funding, the physical progress, the completion, achievement of benefit, etc. definitely need a very close interaction between the experts and the agency which is executing it. Though the PFC is making a lot of efforts, this is not possible because of the mechanism of flow of fund that is there and the people who are available in that organisation. The CEA has another advantage that it was monitoring the performance of the machine right from its birth. So, the entire history and everything is available. That is also a missing link.

PART B

CONCLUSIONS AND RECOMMENDATIONS OF THE COMMITTEE

1. The Committee have observed that out of about 56,000 MW installed thermal capacity 30% need renovation and modernisation. These plants are more than 20 years old and are operating at very low Plant Load Factor (PLF) and availability levels. The Committee also find that most of the imported units installed during the 50s and 60s and indigenous units installed during 70s and early 80s are facing problems due to high ash content coal than their designed capacity and they require major modification/restructuring/renovation and augmentation. The Committee acknowledge that addition to generation of power through renovation and modernisation of Power Plants is one of the most cost-effective options available as the cost of generation through R&M of power project is estimated at only 20% cost of new power plant. Moreover, R&M projects do not require environment clearance, new coal and water linkage and land acquisition. These projects thus, can be completed in a time bound manner and in almost 30% of time taken for new projects.

2. The Committee find that Phase-I R&M programme was launched by the Government of India in 1984 for completion during the 7th plan period but was completed in March, 1996. The reasons for delay as mentioned by Ministry of Power are inadequate flow of funds from State Governments, non-availability of units for shut down due to drought conditions, liquidation of original equipment supplier firm ABL and additional activities included in R&M works subsequently for pollution control. This clearly shows Government planning going haywire. The programme which was to be completed in 6 years took more than 12 years. Even the plant load factor in 13 stations, out of 34 stations covered under phase-I, came down after R&M activities on which more than 1/3rd of the total expenditure was incurred. The Ministry of Power's statement that there was no escalation in the total cost of phase-I does not seem convincing as during the twelve year period there was a lot of rise in price index and the Government have spent only Rs. 1066 crore out of the estimated expenditure of Rs. 1165 crore on Phase-I

programme. This aspect needs to be gone into in greater details along with the causes which led to decline in plant load factor of thirteen stations. It is understood that about 47% of the total expenditure was incurred on environmental related activities and as such it appears that R&M activity was not paid due attention under the first phase. The Committee therefore, recommend that funds for environmental purposes should be allocated separately. If with lesser expenditure, the generation targets have been achieved, then it seems the targets fixed were unrealistic. This should also be examined. The Committee feel that achievement of generation targets may be due to some other factors also than R&M like better quality coal, increased use of machines etc. The Committee desire that before undertaking R&M of a plant, all non-technical reasons responsible for poor performance should be identified and attended to so that down time could be reduced as also the cost of R&M. The Committee also desire that the short comings noticed during the operation of phase-I should be taken note of and ensured that these do not affect the working of phase-II of R&M.

3. Phase-II of R&M programme which was taken up in the year 1992-93 was to be completed during 8th Five Year Plan (1995-96). But only 53% work had been completed upto June, 98. A total amount of Rs. 988 crore (41.5%) of total cost has been incurred during the same period. Out of 44 stations, work has been completed only in six schemes and on other schemes work is at different stages of completion. The Committee find that 'finance' remains the most important cause of poor performance of the scheme as SEBs are not in a position to provide their share of expenditure in the scheme. The Committee therefore, desire that the Government should take immediate concrete steps to meet this problem so that the balance work of the phase-II can be completed in the minimum possible time as it has been already delayed by three years. Every possible efforts should be made to encourage the States to set up State Electricity Regulatory Commissions if necessary in order to ensure the financial health of the State Electricity Boards. The Boards or the State Governments should provide funds for the completion of these R&M, projects in time.

4. The Committee observe that a programme for R&M and uprating of Hydro Power Stations was taken up only in 1987, in which 55 schemes were selected. The Committee are distressed to note that after 11 long years, out of these 55 schemes, works in only 21 schemes have been completed, 26 schemes are still under

implementation and no action has been taken by the Ministry in case of 8 schemes. As the R&M and uprating of Hydro units require lesser time, and is economically much cheaper, the Committee do not find any reason as to why these projects were not completed in time. The Committee are unhappy with the inaction of the Government and desire the completion of all the on going and other newly selected projects in time. The Government should therefore, adhere to strict time schedules to avoid any cost and time overruns. The Committee desire that reasons for delay in execution of the pending schemes be gone into and placed before the Committee within 3 months time from presentation of this report to Parliament along with the new time frame within which these would be completed within 3 months time from presentation of this report to Parliament.

5. The Committee have observed that deficiencies in Operation and Maintenance practices and irregular, inadequate and improperly planned maintenance programmes have caused prolonged outages of power plants. The cash strapped SEBs have even postponed major replacement works. Besides, lack of adequately trained Operation and Maintenance staff, non-introduction of modern management techniques and methods, are the other causes of poor performance of thermal power stations. The Committee are of the view that in order to keep the plants in healthy conditions and to achieve better reliability, availability and plant load factor etc. there is a need to evolve a systematic approach to carry out timely inspection and take preventive measures in a phased manner. It is in this context, the engineering studies of Residual Life Assessment (RLA) and Life Extension assume paramount importance. The Committee have been informed that at present there are 77 stations generating power upto 60 MW having age profile of more than 25 years, operating at PLF in the range of 38-45. Another 337 stations generating power in the range of 60-110 MW are more than 20 years old and operate at PLF of 40-50. As against this only 15 Thermal Stations and 22 units have been identified by PFC to conduct R&M & LE studies during 1998-99. another 100 units are undergoing R&M.

But the Committee have observed that there is no fixed criteria or time period for selecting units for RLA studies. The Committee also note that there is a common view among the players that units running beyond 100,000 hours or 12-15 years should undergo RLA studies so that Life Extension/R&M can be carried out. In phase I of renovation & modernisation programme, selection of plants was made

by Central Electricity Authority on the basis of low plant load factor. Another consideration was forced outages. The plants are also designed to have a particular life on completion of which life extension measures are required to be taken. Now-a-days the plant availability factor is also considered. The Committee feel that based on the plant availability factor, a unit should be taken up for Remanant Life Assessment Studies before completion of its designed life so that by the time it complete its life, SEB is clear about the corrective to be taken up to keep the unit in a healthy condition. Such a study should clearly define the scope of renovation & modernisation works to be taken up.

6. The Committee are of the view that renovation & modernisation and environmental activities should be clearly and separately defined so that investment on renovation & modernisation works can be ensured to bring in the desired increase in generation capacity and plant availability. The basic idea for selecting a unit for renovation & modernisation should be to obtain maximum technical and economic utilisation of balance useful life in an existing equipment. The Committee note that RLA and R&M work have been taken up as a package. As a result transparency has not been achieved. The Committee emphasize the need for utilising the available expertise and information with the CEA and recommend that both RLA and R&M work should be separated from each other. The Committee also favour that RLA studies should be completed by SEBs/CEA etc. by using finance made available by PFC, for the purpose so that the scope of work can be properly identified and then the project can be offered to vendors for R&M work to ensure transparency and avoid disputes in regard to scope of R&M works.

7. The Committee find that under phase-I of R&M programme, the Central Government had financed the programme under Central Loan Assistance Scheme. SEBs were given loans carrying 8% interest. However in phase-II, this scheme was dropped and funding was done by PFC with an interest rate of 14.5%. The Committee observe that due to stiff terms and conditions for funds and other conditionalities insisted upon by PFC, State Electricity Boards failed to receive required amount for R&M programme. Almost all SEBs which sent memoranda to the Committee are of the view that the terms and conditions laid down by PFC were not user friendly. The Committee desire that the conditions regarding penal interest on delayed payments, commitment charges and reimbursement procedure should be gone into and suitably modified in consultation with and according to the suggestions made by the SEBs.

Arranging of Finance has been the biggest problem in implementation of R&M scheme. As of now PFC is the only source of finance for this activity. For this other financial institutions should be encouraged to extend loans on soft terms to SEBs.

8. The Committee note that in spite of the 4% subsidy scheme State Electricity Boards are not interested to opt for the funds as they are not sure of the duration of such subsidy scheme. The Committee therefore, recommend that this scheme should continue beyond the Ninth Five Year Plan so that R&M can get adequate funds and apprehensions in the minds of Utilities can be removed. The Committee are of the view that the Union Government should provide adequate financial allocation in the budget to ensure proper and timely implementation of R&M schemes. The Committee find that in Phase-II, funding has been done by PFC with a much higher interest rate than in Phase-I. The Committee desire that funds for R&M works should be provided to SEBs at a much lower rate and without avoidable formalities to ensure that R&M projects do not suffer for lack of funds.

9. The Committee observe that the Government had announced the private power policy in 1991. By opening up the power sector for private investment, the Government hoped that sufficient investment will come for Renovation and Modernisation of power plants. The Committee note that four years after announcement of private power policy, in 1995, Ministry forwarded the draft guidelines framed by the Confederation of Indian Industry (CII) to the State Government/SEBs. The Committee are unhappy to know that the proposals made by the Ministry did not find favour with the State Electricity Boards as they were not willing to sell or lease out their plants; the private parties on their part were unwilling to accommodate the manpower of SEBs. The Committee observed that some of the SEBs are technically self-sufficient to look after their own R&M programmes but even other SEBs are not interested to opt for private participation. The Committee feel that LROT (Lease, Rehabilitate, Operate and Transfer) scheme failed as this was framed without considering the ground realities in SEBs. The Committee are also apprehensive of the effectiveness of FIRM approach suggested by CII as this has also been mooted without proper involvement of the Union Government, SEBs, PFC, CEA, etc. The Committee desire that available technology and financial support of private entrepreneurs should be utilised for the benefit of SEBs. A

transparent procedure and minimum return should be ensured to encourage private investors. The Committee, keeping all these factors in mind, emphasize that detailed policy guidelines in regard to private sector participation in the field of R&M should be re-framed with active participation of CEA, PFC, SEBs and concerned agencies/experts in private sector.

These guidelines should also take care of excessive man-power in SEBs. The question of bankability of contract may also be considered where development banks like P.F.C., I.D.B.I. etc. can be asked to extend guarantees on behalf of SEBs to boost investment. The Committee note that the scope of work is usually not properly defined resulting in huge variations in bids and that SEBs are taking too much time to finalise the bids. It is, therefore, desired that immediate steps should be taken to clear such problems.

10. The Committee note that one of the statutory functions of CEA is monitoring of all the projects including R&M projects. The Committee find that CEA has a system of monitoring plants performance on a monthly basis and every fault which arises is reported to them. They know the details of each station. The Committee, however, note that the system of monitoring by CEA has been given up due to certain changes in the power sector. The Committee note that a Task Force comprising of senior representatives of the SEBs, power station concerned, CEA and PFC has been set up for ensuring implementation of the schemes as per agreed schedule. But this has not been able to ensure timely completion of R&M projects.

11. The Committee are sad to note that while CEA was fully involved in R&M Phase-I exercise all over the country starting from identification of the R&M schemes scope of work and also rendering assistance to SEBs in framing proper schemes, project report cost benefit analysis etc., the monitoring by CEA has been given up in Phase II of R&M programme. The Committee deprecate the withdrawal policy of CEA from its statutory function of monitoring power plants and emphasize that the monitoring by CEA, the best available agency, should be continued even though the PFC is monitoring the progress of implementation to ascertain the utilization of its funds. CEA should ensure that all factors responsible for delaying any R&M project are sorted out and work is completed without time and cost over-runs.

12. The Committee have observed that there is no proper perspective planning regarding selection and implementation of the R&M power projects. The successive R&M programmes initiated by the Government have failed to achieve the desired results due to lack of motivation of SEBs, lack of proper planning in implementation, failure in ensuring adequate funds and absence of post R&M monitoring. While the Committee are sad to note that cheap source of power through R&M could not be utilised due to lack of sufficient transmission and distribution facilities for free flow of power, they also deprecate the policy of pursuing R&M projects as a commercial venture, and the tendency of the Ministry of Power in trying to withdraw itself from planning for power sector. The Committee are of the view that as R&M helps in generation of cheap power in short duration, commercial considerations alone should not govern the Ministry's participation in the scheme.

13. The Committee note that in the absence of any National Policy on R&M, the programme is not getting that much attention, which it ought to have been. The piecemeal efforts of States/SEBs have not yielded the desired results. While Organisations like ASSOCHAM, CII and BHEL have advocated the imperative need to draw a long term perspective plan on R&M, Secretary (Power), during his deposition before the Committee opined that "We have not done a perspective plan for the next 10-15 years. But there is a five year plan which can be taken as perspective plan". Chairman CEA, was also of the opinion that "a long term perspective plan is not required as the investment is very low". The Committee do not concur with the views of Secretary (Power) & Chairman CEA and desire that a well defined national perspective plan for 12-15 years for R&M and L.E. of power plants should be framed in consultation with major players like CEA, PFC, SEBs, Vendors, developers and consultants. All the thermal and hydel projects which now require R&M and the projects which are expected to be in need of life extension/renovation and modernisation and uprating should be identified and put up for R&M and Life Assessment study at the appropriate time. These identified projects should be prioritised in each Five Year Plan and implemented, so that these could be completed within the Five Year Plan. The Committee are of view that R&M schemes can be taken up in phases within the broader scheme of perspective plan so as to complete the projects within the stipulated time.

14. The Committee note that 4 thermal units, having capacity of 250 MW (Harduaganj 'A' 3 x 30 MW, Korba (E) 1 x 10 MW + 3 x 30 MW. Paras 1 x 30 MW and Barauni 2 x 15 MW) have been decommissioned on account of uneconomical operation. Similarly, Durgapur unit of DVC (2 x 55 MW) damaged in fire accident has also been scrapped. As a result, 360 MW generation capacity is being lost. The Committee are of the view that in the present technologically advanced era, no generating unit should be decommissioned or scrapped especially when there is acute shortage of power in the country. The Committee therefore recommend that possibilities should be explored to rehabilitate these units by undertaking R&M measures in them. The Central Government may therefore, impress upon the State Governments/SEBs, the need to rehabilitate these units by 'R&M'. A special technoeconomic package may also be considered by Union Government in this regard.

The Committee feel that while clearing a new power project all the possibilities of getting optimum power from existing plants in the region through R&M should be explored. These projects should be funded on priority basis and monitored closely to prevent fall in generation due to lack of evacuation system lack of inadequate fuel supply, etc.

NEW DELHI;
19 February, 1999
30 Magha 1920 (Saka)

K. KARUNAKARAN,
Chairman,
Standing Committee on Energy.

APPENDIX I

MINUTES OF FIRST SITTING OF SUB-COMMITTEE ON POWER OF STANDING COMMITTEE ON ENERGY (1998-99) HELD ON SEPTEMBER 8, 1998

The Sub-Committee sat from 11.00 hours to 12.00 hours.

PRESENT

MEMBERS

Shri Basudeb Acharia — *Convenor*

2. Shri E. Balanandan
3. Shri Jalaludin Ansari
4. Smt. Sukhda Mishra
5. Shri Shailendra Kumar
6. Shri Francisco Sardinha
7. Shri Amar Roy Pradhan
8. Shri Brahmakumar Bhatt
9. Shri Ghulam Nabi Azad
10. Shri Vilas Muttemwar

SECRETARIAT

1. Shri P.K. Bhandari — *Deputy Secretary*
2. Shri R.S. Kambo — *Under Secretary*

At the outset, the Convenor welcomed the "Members of the Sub-Committee on Power to the first sitting of the Sub-Committee.

2. Thereafter, the Sub-Committee considered the material circulated, in connection with examination of the subjects "Renovation and Modernisation of Power Plants" and "Hydro Power—A Critique". After some discussion, the Sub-Committee decided to examine both the

subjects concurrently. It was also decided to (a) take evidence of the representative of SEBs. (subject to the approval of HS) on a future date; (b) briefing by the representatives of Power Finance Corporation on 16 September, 1998 regarding 'R&M of Power Plants'; (c) briefing by the representative of Ministry of Power on 25 September, 1998 in connection, with examination of subject "R&M of Power Plants". The Sub-Committee also decided to have briefing by the representatives of Ministry of Power on the subject "Hydro Power—A Critique" on 26 September, 1998.

3. The Sub-Committee then decided to undertake on the-spot-study visits to (a) West Bengal and North-Eastern States and (b) Jammu & Kashmir, for about a week with effect for 12 and 23 October, 1998 respectively, in connection with the subjects under examination.

*The Sub-Committee then adjourned to meet again on
16th September, 1998.*

APPENDIX II

MINUTES OF THE SECOND SITTING OF SUB-COMMITTEE ON POWER OF STANDING COMMITTEE ON ENERGY (1998-99) HELD ON SEPTEMBER 16TH, 1998

The Committee met from 14.30 hrs. to 16.30 hrs.

PRESENT

Shri Basudeb Acharia — *Convenor*

MEMBERS

2. Shri E. Balanandan
3. Smt. Sukhda Mishra
4. Shri Shailendra Kumar
5. Shri Amar Roy Pradhan
6. Shri Brahmakumar Bhatt
7. Dr. Jayanta Rangpi
8. Shri Ghulam Nabi Azad

SECRETARIAT

1. Shri R.S. Kambo — *Under Secretary*

WITNESSES

1. Dr. Uddesh Kohli, CMD, PFC
2. Dr. K.K. Govil, Director Projects, PFC
3. Shri Naveen Kumar, Senior Manager (Projects), PFC

2. At the outset, the convenor welcomed the officials of Power Finance Corporation to the sitting of the Sub-Committee and apprised them the provisions of Direction 58 of the Direction by the Speaker.

3. The points discussed with the representatives of Power Finance Corporation are briefly as under:

- (i) Role of PFC in Renovation & Modernisation (R&M) of Power Projects.
- (ii) Procedure of selecting Power Plants for R&M.
- (iii) PFC to ensure that proper procedure is followed by SEBs while floating bids inviting tenders and making selection.
- (iv) Financing of R&M of Power Plants.
- (v) Benefits of "Accelerated Generation and Supply Programme" in Power Sector.
- (vi) Criteria for determining "eligible" and "non-eligible" SEBs for extending loans by PFC.
- (vii) Disparity in the amount sanctioned and disbursed for carrying out 'R&M'.
- (viii) Invitation of Global PQ bids and registration of Vendors for R&M and Life Extension (L.E.) studies.

4. A verbatim record of the proceedings has been kept.

*The Sub-Committee then adjourned to meet again on
25th September, 1998.*

APPENDIX III

MINUTES OF THE THIRD SITTING OF SUB-COMMITTEE ON POWER OF STANDING COMMITTEE ON ENERGY (1998-99) HELD ON SEPTEMBER, 25TH 1998

The Committee met from 14.30 hrs. to 16.30 hrs.

PRESENT

Shri K. Karunakaran — *Chairman*

MEMBERS

2. Shri Basudeb Acharia — *Convenor*
3. Shri E. Balanandan
4. Shri Jalaludin Ansari
5. Smt. Sukhda Mishra
6. Shri Franciso Sardinha
7. Shri Amar Roy Pradhan
8. Shri Brahmakumar Bhatt
9. Dr. Jayanta Rangpi
10. Shri Ghulam Nabi Azad
11. Shri Ravindra Kumar Pandey
12. Shri Vilas Muttemwar

SECRETARIAT

Shri R.S. Kambo — *Under Secretary*

WITNESSES

1. Shri V.K. Pandit — *Secretary*
2. Shri Pradip Baijal — *Spl. Secretary*

3. Shri R.N. Srivastva	— Chairman, CEA
4. Shri V.K. Sood	— Member (Th.), CEA
5. Shri D.V. Khera	— Member (Hydel), CEA
6. Shri K.N. Sinha	— Member (Plg.), CEA
7. Dr. Uddesh Kohli	— CMD, PFC
8. Ms. Gayathri Ramachandran	— JS (Th.)
9. Shri J. Vasudevan	— JS (Hydel)
10. Shri Rakesh Kacher	— JS (PFC)
11. Shri S.R. Shirain	— JS & FA
12. Dr. K.K. Govil	— Director, PFC
13. Shri T.N. Thakur	— Director, PFC
14. Shri V.S. Verma	— Chief Engineer
15. Shri R. Dahiva	— Director

2. At the outset, the Sub-Committee considered the dates for undertaking tour to Jammu & Kashmir. After some discussion, the Sub-Committee decided to undertake tour w.e.f. 27th October, 1998. Thereafter, the witnesses from Ministry of Power were called in. The Convenor welcomed the representatives of Ministry of Power to the sitting of the Sub-Committee and apprised them the provisions of Direction 58 of the Directions by the Speaker. Secretary, Ministry of Power and Chairman, CEA gave a briefing on the subject "Renovation and Modernisation of Power Plants".

3. The points discussed with the representatives of Ministry of Power are briefly as under:

- (i) Government of India had sanctioned Rs. 500 crores for R&M phase I under Central Loan Assistance. During 1986, when PFC came into existence, the Central Loan Assistance scheme was withdrawn and PFC mandated *inter-alia* to conduct R&M programme.
- (ii) No hydro projects were taken up for R&M and R&U during phase-I of R&M programme.

- (iii) Units are being selected for R&M during Ninth Five Year Plan also.
- (iv) Under Accelerated Generation and supply programme interest subsidy of 4% is passed on to SEBs through PFC.
- (v) Detailed guidelines for Private Sector participation in R&M have been issued by Government of India.
- (vi) 47% of the fund earmarked for R&M was utilised on environmental activities.
- (vii) Monitoring of R&M schemes have been shifted from CEA to PFC.
- (viii) Success of R&M programme depends on the financial health of SEBs.

4. A verbatim record of the proceedings have been kept.

*The Sub-Committee then adjourned to meet again on
26th September, 1998.*

APPENDIX IV

MINUTES OF THE FIFTH SITTING OF SUB-COMMITTEE ON POWER OF STANDING COMMITTEE ON ENERGY (1998-99) HELD ON NOVEMBER 17TH, 1998

The Committee met from 15.00 hrs. to 17.00 hrs.

PRESENT

MEMBERS

Shri Basudeb Acharia — *Convenor*

2. Smt. Sukhda Mishra
3. Shri Vilas Muttemwar
4. Shri Amar Roy Pradhan
5. Shri Braj Mohan Ram
6. Dr. Jayanta Rongpi
7. Shri Francisco Sardinha
8. Shri Brahmakumar Bhatt
9. Shri S. Agniraj

SECRETARIAT

1. Shri P.K. Bhandari — *Deputy Secretary*
2. Shri R.S. Kambo — *Under Secretary*

WITNESSES FROM ASSOCHAM

1. Shri Ashok Dasgupta — Co-Chairman, Sub-Committee on Power
2. Shri P.S. Bami — Former Chairman, NTPC Ltd.
3. Dr. Kapil Thakural — KPMG
4. Shri Anjan Roy — Deputy Secretary General, ASSOCHAM
5. Shri Amarjit Singh — Advisor

2. At the outset the Convenor welcomed the representatives of Associated Chambers of Commerce and Industry (ASSOCHAM) to the sitting of the Sub-Committee and apprised them of the provisions of Direction 58 of the Directions by the Speaker.

3. The points discussed with the representatives of Associated Chambers of Commerce and Industry are as under:—

- (i) A national policy on the R&M of the older plants should be framed.
- (ii) As SEBs are not in a position to organise the funds for R&M Project, PFC should provide funds as the nodal agency of financial institutions.
- (iii) The SEBs do not have the type of expertise which is required to carry out a proper investigation of the R&M projects. The scope of work for R&M should be well defined.
- (iv) Phase I and II R&M programme failed due to lack of proper investigation, utilisation of funds for improving PLF and more emphasis on environmental aspect.
- (v) Central monitoring of R&M projects preferably by CEA is a necessity.
- (vi) An equipment supplier normally gives a performance guarantee of one year or one and a half years. The operation of renovated and modernised plants are in the hands of the SEBs.
- (vii) Source of funds should be finalised before taking up a R&M project.
- (viii) Finance should be delinked from the bidding of the project.

4. The representatives of ASSOCHAM then withdrew and representatives of FICCI were called in.

WITNESSES FROM FICCI

1. Shri N.K. Balasubramaniam	— President, RPG Power and Member, Energy Committee (FICCI)
2. Dr. Aditya Trivedi	— Joint Secretary (FICCI)
3. Shri Pramod Dhawan	— Member, Energy Committee (FICCI)
4. Shri R.K. Ghose	— Manager & Consultant, Energy (FICCI)

The Convenor welcomed the representatives of Federation of Indian Chambers of Commerce and Industry (FICCI) to the sitting of the Sub-Committee and apprised them of the provisions of Directions 58 of the Direction by the Speaker.

5. The points discussed with the representatives of FICCI are as under:—

- (i) The advantages of R&M are that it do not require any new sanction. Coal linkage, water connection and land acquisition problems are not there.
- (ii) Phase I R&M programme was more of identification of certain pieces of equipment rather than renovation and modernisation in true sense of the term. Emphasis was on environmental side. It failed particularly because of fuel supply agreements and other related systems were not in place.
- (iii) Private Sector is not enthusiastic to take up R&M. For the success of any R&M programme, adequate return to private investors are to be ensured.
- (iv) All the Power utilities and most of SEBs are not fully equipped to undertake RLA studies.
- (v) The technical wing of CEA should be given the responsibility for residual life assessment.

6. A verbatim record of the proceedings has been kept.

The Sub-Committee then adjourned to meet again on 2nd December, 1998.

APPENDIX V

MINUTES OF THE SIXTH SITTING OF SUB-COMMITTEE ON POWER OF STANDING COMMITTEE ON ENERGY (1998-99) HELD ON DECEMBER 2, 1998

The Committee met from 15.00 hrs. to 17.15 hrs.

PRESENT

MEMBERS

Shri Basudeb Acharia — *Convenor*

2. Shri Vilas Muttemwar
3. Shri Ravindra Kumar Pandey
4. Shri Amar Roy Pradhan
5. Shri Francisco Sardinha
6. Shri Shailendra Kumar
7. Shri Jalaludin Ansari
8. Shri Ghulam Nabi Azad
9. Shri E. Balanandan
10. Shri Brahmakumar Bhatt
11. Shri S. Agniraj

SECRETARIAT

1. Shri P.K. Bhandari — *Deputy Secretary*
2. Shri R.S. Kambo — *Under Secretary*

LIST OF WITNESSES FROM CONFEDERATION OF INDIAN INDUSTRY

S.No.	Name	Designation
1.	Shri R. Chandramouli, Convenor	CII Core group on Renovation and Modernisation and Chief Executive Power, Larsen and Toubro Ltd.
2.	Shri Y.K. Gupta	Member, CII National Committee on Energy and General Manager, L&T Ltd.

2. At the outset Convenor Sub-Committee on Power welcomed the representatives of Confederation of Indian Industry (CII) to the sitting of the Sub-Committee and apprised them of the provisions of Direction 58 of the Directions by the Speaker.

3. The points discussed with them are briefly as under:

- (i) R&M programme has received inadequate funds so far.
- (ii) Poor utilisation of funds by SEBs. Major parts of allocated funds have been utilised for normal O & M of plants.
- (iii) There is a need for perspective planning & long term policy on R&M.
- (iv) R&M Phase II suffered due to lack of resources with the SEBs.
- (v) There ought to be separate budget for R&M Programme.
- (vi) Private Sector participation in R&M projects.
- (vii) Quantum of interest subsidy, presently 4% be enhanced.
- (viii) CEA should be associated with SEBs to undertake RLA studies and also monitor continuously the performance of stations.
- (ix) Units of 50-200 MW capacity need immediate R&M.
- (x) Improvement of environment and generation should be done as a package not in piecemeal.
- (xi) To recoup the investment made in R&M projects, private investors be allowed to take up distribution in areas around power stations.

4. The representative of CII then withdrew and representatives of BHEL were called in.

LIST OF WITNESSES FROM BHARAT HEAVY ELECTRICALS LTD.

S.No.	Name	Designation
1.	Shri K.G. Ramchanderan	CMD
2.	Shri K.C. Lahiri	Director (Power)
3.	Shri Kishan Kumar	Executive Director (Commercial)
4.	Shri V.P. Singh	Executive Director (Planning)
5.	Shri S.R. Basu	General Manager
6.	Shri D. Indran	General Manager
7.	Shri A.K. Goswami	DGM

5. The Convenor welcomed the representatives of Bharat Heavy Electricals Limited (BHEL) to the sitting of Sub-Committee and apprised them the provisions of the Direction 58 of the Direction by the Speaker.

6. The points discussed with the representatives of BHEL are as under:

- (i) The best way to address R&M is to first make RLA studies.
- (ii) First R&M programme addressed only to specific equipment problems.
- (iii) The plants were designed for better quality of coal than available today.
- (iv) Paucity of funds has affected generation even after R&M.
- (v) BHEL has developed boiler for optimal use of Indian coal.
- (vi) There should be a perspective plan for R&M.
- (vii) R&M of hydro plants should also be taken up urgently.
- (viii) Separate funds should be allocated to take care of environmental problems of the power stations.

- (ix) Keeping in view the resource constraints R&M projects should be prioritised before implementation.
- (x) RLA study and R&M programme should be separated to maintain adequate transparency.

7. A verbatim record of the proceedings has been kept.

*The Sub-Committee then adjourned to meet again
on 9th December, 1998.*

APPENDIX VI

MINUTES OF THE SEVENTH SITTING OF SUB-COMMITTEE ON POWER OF STANDING COMMITTEE ON ENERGY (1998-99) HELD ON DECEMBER 9, 1998

The Committee met from 09.30 hrs. to 11.00 hrs.

PRESENT

MEMBERS

Shri Basudeb Acharia — *Convenor*

2. Smt. Sukhda Mishra
3. Shri Amar Roy Pradhan
4. Shri Shailendra Kumar

SECRETARIAT

1. Shri P.K. Bhandari — *Deputy Secretary*
2. Shri R.S. Kambo — *Under Secretary*

LIST OF WITNESSES MINISTRY OF POWER

1.	Shri V.K. Pandit	Secretary (P), MoP
2.	Shri Pradip Baijal	Spl. Secy. (P), MoP
3.	Shri R.N. Srivastva	Chairman, CEA
4.	Shri V.K. Sood	Member (Th.), CEA
5.	Shri D.V. Khera	Member (Hydel.), CEA
6.	Shri K.N. Sinha	Member (Ping.), CEA
7.	Dr. Uddesh Kohli	CMD, PFC

8.	Ms. C.R. Gayathri	JS (Th.), MoP
9.	Shri J. Vasudevan	JS (Hydel.), MoP
10.	Shri Rakesh Kacker	JS (PFC), MoP
11.	Shri S.R. Shivrain	JS & FA, MoP
12.	Dr. K.K. Govil	Director, PFC
13.	Shri T.N. Thakur	Director, PFC
14.	Shri Shashi Shekhar	Director (Th.), MoP
15.	Shri V.S. Verma	Chief Engineer, CEA
16.	Shri Gurdyal Singh	Chief Engineer, CEA
17.	Shri V.K. Dhaiya	Director, CEA

2. At the outset, Convenor, Sub-Committee on Power welcomed the representatives of Ministry of Power to the sitting of the Sub-Committee and apprised them the provisions of Direction 58 of the Direction by the Speaker.

3. The points discussed with them are briefly as under:—

- (i) In the Phase-I R&M Programme, emphasis was more on environment and O&M activities. About 2000 MW capacity was added at the cost of Rs. 1000 crore (approximately) during Phase-I. The cost benefit ratio to 0.5 crore per Mega Watt.
- (ii) In the Phase-I programme, the CEA was fully involved with the R&M exercise all over the country, starting from identification of the R&M scheme, determining scope of work and thereafter rendering assistance to SEBs in framing a proper scheme, project report, cost benefit analysis etc. In Phase-II due to certain changes made in the overall scheme, the role of CEA in regard to monitoring was less. In Phase-I, R&M was under a Centrally sponsored scheme. Now, this has been transferred to State sector.
- (iii) In Phase-I, the core activities work was completed in 1991-92, as per the given schedule but work on other activities was completed in March, 1995. There was thus time overrun during this Phase.

- (iv) Phase-II R&M Programme was intended to be done on commercial basis. Only 545 of work has been completed. The programme suffered due to mobilisation of resources.
- (v) Both environmental activity and R&M activity require shutting down of Thermal Power Plant. It is imperative to take up both the activities simultaneously.
- (vi) Ministry have not framed any long-term perspective plan for carrying out R&M activities, as it is an ongoing and continuous process. However, plan has been prepared for next 5 years.
- (vii) In Ninth plan (Phase-III), 50 stations, consisting of 229 units require R&M activities. An estimated Rs. 8800 crore is required for purpose. Funding will be from PFC, World Bank's loan and State's own plan.
- (viii) States have to get themselves involved intricately with R&M programme. They should take advantage of interest subsidy which is 4-6%. All R&M projects which are technoeconomically sound and life extension projects of SEBs have been sanctioned funds.
- (ix) Ministry agreed that more effort is needed for speedy implementation of R&M scheme during Ninth Five Year Plan.
- (x) There is no need to create any depreciation fund in order to fund R&M programme.
- (xi) So far as completed R&M scheme in hydro power is concerned, the cost per MW has come to Rs. 37 lakh.
- (xii) As per stipulation of Ministry of Environment, coal having more than 34% ash content should not be used beyond 1000 km. from the pit head.

4. A verbatim record of the proceeding has been kept.

The Sub-Committee then adjourned.

APPENDIX VII

MINUTES OF THE EIGHTH SITTING OF SUB-COMMITTEE ON POWER OF STANDING COMMITTEE ON ENERGY (1998-99) HELD ON JANUARY 6, 1999

The Committee met from 11.00 hrs. to 11.45 hrs.

PRESENT

MEMBERS

Shri Basudeb Acharia — *Convenor*

2. Shri Vilas Muttemwar
3. Shri Ravindra Kumar Pandey
4. Shri Amar Roy Pradhan
5. Shri Brij Mohan Ram
6. Dr. Jayanta Rongpi
7. Shri Francisco Sardinha
8. Shri Shailendra Kumar
9. Shri Ghulam Nabi Azad
10. Shri E. Balanandan

SECRETARIAT

1. Shri P.K. Bhandari — *Deputy Secretary*
2. Shri R.S. Kambo — *Under Secretary*

The Sub-Committee on Power considered the draft report on the subject, "Renovation and Modernisation of Power Plants" relating to Ministry of Power and adopted the same.

2. The Sub-Committee authorised the Convenor to finalise the report and submit it to the Chairman for consideration by the Standing Committee on Energy.

The Sub-Committee then adjourned.

APPENDIX VIII

MINUTES OF THE TWELFTH SITTING OF STANDING COMMITTEE ON ENERGY (1998-99) HELD ON FEBRUARY 1, 1999 IN COMMITTEE ROOM NO. 'D' TO CONSIDER/ADOPT DRAFT REPORT ON THE SUBJECT "RENOVATION AND MODERNISATION OF POWER PLANTS"

The Committee met from 1530 hrs. to 1615 hrs.

PRESENT

Shri K. Karunakaran — *Chairman*

MEMBERS

2. Shri Basudeb Acharia
3. Shri Bikash Chowdhury
4. Shri Rajbanshi Mahto
5. Shri Som Marandi
6. Shri Ravindra Kumar Pandey
7. Shri Amar Roy Pradhan
8. Shri Naresh Kumar Chunnalal Puglia
9. Shri Braj Mohan Ram
10. Shri Nuthana Kalva Ramakrishna Reddy
11. Dr. Jayanta Rongpi
12. Shri Francisco Sardinha
13. Shri N.T. Shanmugam
14. Shri Th. Chaoba Singh
15. Shri Chandramani Tripathi
16. Prof. (Smt.) Rita Verma

17. Shri Sushil Chandra Verma
18. Shri Jalaludin Ansari
19. Shri Gandhi Azad
20. Shri E. Balanandan
21. Shri Sushil Barongpa
22. Shri Brahmakumar Bhatt
23. Shri Bangaru Laxaman
24. Shri Parmeshwar Kumar Agarwalla
25. Shri Tariq Anwar
26. Shri Parasram Bhardwaj

SECRETARIAT

1. Dr. A.K. Pandey	— <i>Additional Secretary</i>
2. Shri John Joseph	— <i>Joint Secretary</i>
3. Shri P.K. Bhandari	— <i>Deputy Secretary</i>
4. Shri R.S. Kambo	— <i>Under Secretary</i>

2. The Committee considered the draft report on the subject "Renovation and Modernisation of Power Plants" and adopted the same with some modifications/additions as shown in Annexure.

3. The Committee authorised the Chairman to finalise the above-mentioned Report after making consequential changes arising out of factual verification by the Ministry and to present the same to the Parliament.

4. The Committee also considered the tentative programme for consideration of Demands for Grants (1999-2000) concerning the Ministries/Department under their ambit. After some discussion, the Committee decided to have sittings on 16th March, 1999 to finalise the questionnaires, on 18th, 19th and 20th March, 1999 to take oral evidence of the representatives of Ministries/Department on Demands for Grants (1999-2000) and on 5th and 6th April, 1999 for consideration and adoption of the draft Reports.

The Committee then adjourned.

ANNEXURE

(vide para 2 of the Minutes dated 1.2.99)

**MODIFICATIONS/ADDITIONS MADE BY STANDING
COMMITTEE ON ENERGY IN THE DRAFT REPORT
(PART-B) ON THE SUBJECT "RENOVATION AND
MODERNISATION OF POWER PLANTS"
RELATING TO MINISTRY OF POWER**

S.No.	Para/ Page	Line	Modifications/Additions
1.	2	25	<p>After the sentence ending with first phase. Insert the following sentence:</p> <p>"The Committee therefore, recommend that funds for environmental purposes should be allocated separately".</p>
2.	4	last sentence	<p>Add in the last "Within 3 months time from presentation of this report to Parliament".</p> <hr/>