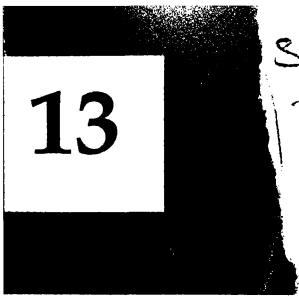

ENERGY FOR 90's AND BEYOND : PROSPECTS, REALITY AND CHALLENGES

(PLANNING COMMISSION, MINISTRIES OF POWER, COAL, PETROLEUM & NATURAL GAS, NON-CONVENTIONAL ENERGY SOURCES AND DEPARTMENT OF ATOMIC ENERGY)

[Action Taken by the Government on the Recommendations Contained in the 3rd Report of The Standing Committee on Energy (Tenth Lok Sabha)]

THIRTEENTH REPORT

AUTHENTICATED COPY

सत्यमेव जयते

CHAIRMAN COMMITTEE ON ENER

LOK SABHA SECRETARIAT
NEW DELHI

April, 1995/Chaitra, 1917 (Saka)

THIRTEENTH REPORT

STANDING COMMITTEE ON ENERGY

(1995-96)

(TENTH LOK SABHA)

ENERGY FOR 90's AND BEYOND : PROSPECTS, REALITY AND CHALLENGES

(Planning Commission, Ministries of Power, Coal, Petroleum & Natural Gas, Non-Conventional Energy Sources and Department of Atomic Energy)

[Action Taken by the Governmeznt on the recommendations contained in the 3rd Report of the Standing Committee on Energy (Tenth Lok Sabha)]

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Presented to Lok Sabha on .....

Laid in Rajya Sabha on .....

LOK SABHA SECRETARIAT
NEW DELHI

April, 1995/Chaitra, 1917 (Saka)

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(1995-96)

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INTRODUCTION

I, the Chairman of the Standing Committee on Energy (1995-96) having been authorised by the Committee to present the Report on their behalf, present the Thirteenth Report on Action Taken by the Government on the recommendations contained in the 3rd Report of the Standing Committee on Energy (Tenth Lok Sabha) on "Energy for 90's and beyond: Prospects, Reality and Challenges".

2. The 3rd Report of the Standing Committee on Energy was presented to Lok Sabha on 17th March, 1994. Replies of the Government were received in batches and the last batch of replies was received on 6th January, 1994. The Standing Committee on Energy of 1994-95 had considered and adopted this Report at their sitting held on 24th March, 1995.

3. The Committee of 1995-96 at their first sitting, held on 17th April, 1995 authorised the Chairman to finalise the report adopted by the previous Committee and present them to Parliament.

4. An analysis of the action taken by the Government on the recommendations contained in the 3rd Report of the Committee is given in Appendix VII.

JASWANT SINGH,
Chairman,
Standing Committee on Energy.

NEW DELHI :
April 18, 1995
Chaitra 28, 1917 (Saka)

CHAPTER I

REPORT

This Report of the Standing Committee on Energy (1994-95) deals with the action taken by the Government on the observations/recommendations contained in the Third Report of the Standing Committee on Energy (1993-94) on "Energy for 90's and beyond: Prospects, Reality and Challenges" which was presented to Lok Sabha on 1st March, 1994. A statement indicating the Ministries/Department concerned with each of the recommendation/conclusion contained in the third report is given in Appendix-I.

2. The Action Taken Notes have been received from the Planning Commission, Ministries of Power, Coal, Petroleum & Natural Gas, Non-Conventional Energy Sources and the Department of Atomic Energy in respect of all 143 recommendations/conclusions contained in the Report. These have been categorised as follows:—

(i) Recommendations/observations, which have been accepted by the Government:

Sl. Nos. 1 to 7, 9 to 14, 16 to 23, 25 to 37, 39 to 53, 56 to 58, 60, 61, 63 to 67, 70 to 89, 91, 92, 95 to 100, 102 to 107, 109 to 111, 114 to 120, 122 to 125, 127 to 130, 132 to 135, 138, 140 and 141.

(ii) Recommendations/observations, which the Committee do not desire to pursue in view of the Government's replies:

Sl. Nos. 38, 55, 59, 62, 69, 101 and 108.

(iii) Recommendations/observations in respect of which replies of the Government have not been accepted by the Committee:

Sl. Nos. 8, 15, 24, 94, 112, 113 and 137.

(iv) Recommendations/observations in respect of which final replies of the Government are still awaited: Sl. Nos. 54, 68, 90, 93, 121, 126, 131, 136, 139, 142 and 143.

3. The Committee require that final replies in respect of the recommendations for which only interim replies have been given by the Government ought to be furnished to the Committee at the earliest.

The Committee will now deal with the action taken by the Government on some of their recommendations:—

A. Establishment of an Energy Commission

Recommendation Serial Nos. 8, 15 and 136

4. The Committee had observed that the Government does not have a coherent, rational energy policy for the country which would also emphasise sustainability. The Committee were also of the view that the Government does not have a well defined, coordinated and time bound plan adequately backed by financial resources for implementation in the energy sector. The Committee had, therefore, recommended establishment of an Energy Commission headed by the Prime Minister for evolving an integrated energy policy and to ensure balanced development in an environmentally and socially sustainable fashion.

5. The Ministry of Power and the Ministry of Petroleum and Natural Gas in their separate replies have given details regarding the planning exercise conducted with respect to their respective Ministries, but have not explained how coordination is ensured between them and with the Ministries dealing with the other sources of energy such as Coal, Non-Conventional Energy Sources and Atomic Energy. This is not satisfactory, itself amply substantiating an absence of proper coordination even in furnishing a reply to the Committee on an issue like energy policy. It is in the context of lack of coordination, that the Committee had recommended establishment of an Energy Commission. The Government has not given any response to this suggestion. The Committee, therefore, reiterate that an Energy Commission should be set up and the response of the Government communicated to the Committee.

B. Reclamation and Restoration of exploited Mines

Recommendation Serial No. 24

6. The Committee had stressed that it should be mandatory for undertaking proper rehabilitation consequent on exploitation of a mine.

7. The Ministry of Coal in its reply has stated, *inter-alia*, that with increasing environmental awareness, reclamation & restoration of land after coal extraction has now become an important activity which is taken care of during mine planning. Although we have still a long way to go a beginning has been made and in all opencast projects reclamation of land and plantation of trees thereon is provided for. In dragline mining backfilling is a part of the excavation operation. Voids

left, if any, are suitably graded and left as water pools for irrigation purpose. Strict vigilance is being exercised by Ministry of Environment and Forests while approving the Environmental Management Plans as well as during monitoring implementation of Environmental protection measures including back filling & reclamation.

8. The Committee appreciate the steps initiated for reclamation and restoration of land after coal extraction. The reply is, however, silent on the question of making the task of reclamation and restoration mandatory. The Committee hope that Government has taken note of their recommendation for implementation.

C. Re-examination of Retention Prices

Recommendation Serial No. 54

9. With regard to Hydrocarbons, the Committee held that the Government should clearly bring out the approach that was sought to be followed, in the medium term, to effect a possible transition from the present system of administered prices. If, on the other hand, the current pricing system with assured returns was to continue, its implications needed to be studied carefully in the face of a possible surplus refining capacity. Irrespective of whether the proposed refining capacities materialise or not, the present policy of retention prices for refineries needs to be re-examined.

10. The Ministry of Petroleum & Natural Gas has *inter-alia*, stated in its reply that the goal of the Government is to move away in a gradual phased manner from the controlled machanism of pricing. As an initial measure, the entire trade in lubricating oils, RPC and CPC has been taken out from the purview of administered pricing so as to provide PSU oil companies a flexibility and ability to compete with private sector in the liberalised economic environment.

11. The Committee note that the goal of the Government is to move away from the controlled mechanism of pricing.

D. Reduction of T & D Losses

Recommendation Serial Nos. 70 & 129

12. The Committee had observed that by adopting a suitable mix of various suggested measures, a reduction in the T & D losses from 23 to 18 per cent can be easily achieved during the Eighth Plan period. The Committee further emphasised that the losses need to be eventually brought down to a level of 15% by diverting resources to T & D from those presently directed towards generation.

13. The Ministry of Power has, *inter-alia*, stated in its reply that various steps taken by the Government have helped reduction of T&D losses of All India level from 22.83% in 1991-92 to 21.80% in 1992-93 showing a reduction of 1%.

14. The Ministry has not given any response to the suggestion of bringing down T&D losses to the level of 15%. The Committee hope that Government will initiate action in this regard in pursuance of their earlier recommendation.

E. Establishment of Regional Tariff Boards

Recommendation Serial No. 71

15. It was felt necessary that tariffs are regulated by an independent authority based on normative performance of plant and equipment and personnel. For this purpose regional tariff commissions had been suggested and agreed upon by all the Chief Ministers. The Committee desired that these should be established at the earliest.

16. The Ministry of Power has, *inter-alia*, stated in its reply that the Ministry had obtained the approval of the central cabinet for establishment of National and Regional Tariff Boards and a resolution was issued for the purpose on 20.7.1992. Subsequently, following recommendations of a Working Group, the Ministry has sought the concurrence of State Governments/SEBs etc. for carrying out necessary amendment to the Electricity (Supply) Act, 1948 for establishment of these boards. The Ministry has stated that action will be taken for setting up National and Regional Tariff Boards as soon as the concurrence is received.

17. The Committee note adversely this delay in the establishment of National and Regional Tariff Boards. It is regrettable that a proposal approved by the Cabinet in June, 1992 is yet to be given effect to. The Committee, therefore, expect the Government to obtain the views of the State Governments in the matter expeditiously and to take appropriate action.

F. Metro System

Recommendation Serial No. 90

18. The Committee pointed out that constructing a metro system along high density routes in major metropolitan cities provides a promising strategy and felt that what could be considered is the Build-Operate-Transfer (BOT) option, which would not only ensure a quick and efficient implementation of the project but

also bring into existence management and operational expertise that is essential for maintaining the system. The Committee recommended that this concept needs to be explored and seriously considered by the Government.

19. The reply furnished by the Ministry of Power is silent on the question of constructing a Metro System with the Build-Operate-Transfer option. The Committee desire that the view of the Ministry in this regard should be furnished early.

G. Coal Prices

Recommendation Serial No. 94

20. On the issue of coal prices the Committee pointed out that there was no systematic principle adopted for inter-grade price differential and recommended that a rational pricing structure shoauld have an in-built allowance to adequately compensate the consumers for using lower quality coals. The Committee also pointed aout that the pithead prices have on in-built inefficiency in that the cost of production is calculated with total disregard for the low output per manshift. Further, the Committee observed that tthe pithead prices are determined on the basis of the industry-wise average cost of production with the result that some of the coal mining companies such as BCCL and ECL, which have old and high cost mine under their control, are not able to recover their costs.

21. The Ministry of Coal has stated in its reply that the prices of coal are fixed on the basis of the recomamendations made by the Bureau of Industrial Costs and Prices (BICP) after detailed cost studies of the coal industry. The Ministry has further stated that the BICP has taken into account the questions of inter-grade price differential during the course of their study of the coal industry. As the currdsent prices for the grades are A, B & C are already on the higher side relative to the lower grades, the BICP reportedly proposed a minimum price increase for these grades. It has been further stated that as the prices recommended by BICP are based on the principle of normative cost and not on actual cost, the question of any inefficiency creepaing into it does not arise.

22. The reply is silent as to whether anya review was undertaken to rationalise inter-grade price differential on scientific basis. The Committee feel that the BICP's recomamendation for minimum price increase for superior grades of coal appears to discriminate against a large section of users of inferior grades of coal. The Committee therefore, reiterate that present coal prices ought to be reviewed taking into account the inter-grade price differentials.

H. Environment Cost-benefit Analysis

Recommendation Serial No. 112

23. The Committee had recommended the Government to incorporate costs of environmental damage/mitigation measures into project appraisals. It was emphasised that adequate and comprehensive incorporation of environmental costs and benefits of using a particular technology or resource should form part of project analysis. This, the Committee believed would lead to more rational choices in the energy sector.

24. The Ministry of Petroleum & Natural Gas has stated in its reply that instructions are being issued to the PSUs to incorporate environmental cost benefit analysis in their project proposals. The Ministry of Power however has, *inter-alia*, stated in its reply that environment cost benefit analysis of using particular technology requires long term exhaustive and authentic data based on various environmental parameters like air and water quality, epidemiology, vegetal cover etc. Since such data base do not exist in our country, cost benefit analysis has not been attempted in our country so far. Whenever adequate data base is available, cost benefit analysis of using particular technology could be undertaken.

25. The Committee take exception to the manner in which the Ministry of Power has responded to the Committee's recommendation. Instead of approaching the concerned authorities to initiate steps for development of required data base, the Ministry of Power has taken an indifferent stand that whenever adequate data base is available, cost-benefit analysis of using particular technology could be undertaken. This is disappointing, the Committee expect the Ministry of Power to take up the matter immediately and to inform the Committee of the steps taken.

I. Rehabilitation of Project Affected People

Recommendation Serial No. 113

26. The Committee had recommended the Government to devise a comprehensive and humane policy for the rehabilitation of families affected by developmental projects. The Committee emphasised that such rehabilitation ought to precede, not follow the launching of projects involving displacement of people.

27. The Ministry of Power has among other things stated in its reply that submission of Rehabilitation & Resettlement Plan by the project prohonents to the Ministry of Environment & Forests is one of the pre-requisite for getting

28. What the Committee desired was not just a rehabilitation plan but an actual implementation of that plan itself, as a condition precedent to the launching of projects. The Government has not responded to this. The Committee require of the Government to furnish its reply in this regard at the earliest.

J. Professional Training on Environment

Recommendation Serial No. 121

29. The Committee has stressed the need for providing professional training in operation and maintenance of pollution control treatment devices and laboratories; in setting standards; in management of hazardous waste; and in modelling data processing legal aspects to the staff concerned.

30. In its reply the Ministry of Power has, *inter-alia*, referred to CEA's advice that a National Institute of Power and Environment may be established independently or a separate wing under the National Power Training Institute be set up to cater to the requirements of training facilities of power personnel on environmental issues.

31. The reply is not clear as to what exactly the Government proposes to do whether it intends to establish a National Institute of Power and Environment, or to set up a separate wing under the National Power Training Institute to cater to the requirements of training facilities of power personnel on environmental issues. The Committee expect the Ministry to clarify.

K. Pricing of Petroleum Products

Recommendation Serial No. 126

32. The Committee had emphasised that prices of petroleum products should reflect the economic cost of supply and that this is particularly important if private sector marketing of products is to be promoted.

33. The Ministry of Petroleum & Natural Gas has stated in its reply that Government policy on pricing of petroleum products is directed towards meeting the petroleum product demand required for the growth of economy and also to make the essential petroleum products available at an affordable price. The pricing mechanism is so structured as to discourage non-essential use, promote inter-fuel

substitution and subsidise essential fuels for socio-economic reasons to vulnerable sections of the society.

34. The reply of the Ministry is silent on the implications of the present pricing policy on marketing of petroleum products by private sector and how this issue is proposed to be tackled. The Committee will await this information from the Ministry of Petroleum and Natural Gas.

L. Restructuring of Energy Management Centre

Recommendation Serial No. 139

35. The Committee had recommended that an autonomous non-governmental body with representatives from industry, consumers and other interest groups should be constituted to draw up a National Energy Conservation Plan.

36. The Ministry of Power has stated in its reply that it has submitted a note for Coordination Committee of Secretaries on the proposal of Planning Commission, *inter-alia,* setting up a National Energy Conservation Authority under the Cabinet Secretariat. The Ministry has further stated that once the proposal of Planning Commission and the Ministry's comments thereon are considered by the Coordination Committee of Secretaries, a note on the suggestion made by the Standing Committee would be submitted, particularly in view of the fact that issue relating to granting autonomy to Energy Management Centre (EMC) is under active consideration.

37. With regard to constitution of an autonomous non-governmental body to draw up a national energy conservation plan, the Ministry of Power has mentioned that presently the National Energy Conservation Plan was being formulated by the Planning Commission on the basis of the inputs received from various Ministries in the energy sector and various semi-governmental/non-governmental bodies, like, EMC, National Productivity Council and Tata Energy Research Institute. It has been stated further that the issue of strengthening/restructuring of EMC as an autonomous body is under active consideration of the Government and that the proposed restructuring would reflect the concern shown by the Standing Committee and the needs of the country.

38. With regard to the formulation of a National Energy Conservation Plan, what the Committee recommended was constitution of an autonomous, non-governmental body, with representatives from industry, consumers and interest groups. The Committee hope that the proposed restructuring will

make the Energy Management Centre autonomous and will also suitably give effect to the recommendation of the Committee. The Committee desire that very early action be initiated by the Government in this regard.

M. Establishment of an Autonomous Regulatory Body

Recommendation Serial No. 137

39. The Committee had suggested that an autonomous regulatory body may be established which could draw participation from the producers, consumers, Government, industry and other experts to discharge the following functions :

(i) assist in drawing up medium term plans of energy supply by boards/ companies;

(ii) set prices based on the normative efficient costs so that the cost of inefficiencies in the supply system is not passed on to the consumers;

(iii) ensure an integrated approach to energy pricing to achieve an optimal energy consumption and desired inter-fuel substitution.

40. The Committee suggested that this autonomous body could be in the form of an Energy Pricing Commission, with statutory powers to set and regulate energy prices for the producers and consumers, while ensuring transparency in its operations.

41. In response to this recommendation, the Ministry of Power has indicated the present position with regard to establishment of National and Regional Power Tariff Boards. The role of the Tariff Boards would be to evolve the tariff policy and fix the power tariff for the sale of electricity both for bulk supply at the distribution point as also for inter-State/inter-regional sale. It is not clear whether the Tariff Boards will also have the power to determine the tariff for purchase of power from the Independent Power Producers. This needs to be clarified by the Government.

42. While the establishment of Tariff Boards is a desirable step, what the Committee recommended was an autonomous regulatory body to set and regulate the prices of all sources of energy for the producers and consumers to ensure an integrated approach to energy pricing to achieve an optimal energy consumption and desired inter-fuel substitution. It appears that the proposed Power Tariff Boards may not fulfil this task. The Committee request a further clarification.

N. Comprehensive Report on Energy

Recommendation Serial No. 143

43. Emphasising the need for a comprehensive document bringing out information and statistics on various aspects of energy, the Committee had recommended that the Government ought to bring out every year a comprehensive report on energy and lay it in Parliament for the benefit of members and the public.

44. In its reply, the Planning Commission has stated that as per the Business Rules, the subject of energy policy comes under the purview of the Ministry of Power and that the document should, therefore, be prepared by the Ministry of Power. The Ministry of Power, however, has stated that the Planning Commission had brought out a comprehensive document on energy which formed a part of the Eighth Five Year Plan and that the portion relating to energy deals with various sectors of energy and the linkages between them.

45. The Committee regret that the Ministry of Power has not positively responded to their specific suggestion for compilation of annual statistics and related information on various aspects of energy. The Committee are aware that the 8th plan document contains portion relating to energy which deals with various sectors of energy. The Five Year Plan document cannot substitute the requirement of an annual compilation of updated information. The need for such an annual document is self evident. The Committee, therefore, urge that a comprehensive document as suggested by the Committee should be brought out every year and laid in Parliament for information of members and the public.

CHAPTER II

REPLIES OF THE MINISTRY OF POWER

Recommendation Serial No. 6

The Major concerns regarding the power supply system in the country are :

— the demand for power continues to outstrip its supply resulting in continued shortages of energy (10%) and peak electricity (19%) ;

— relatively low availability of thermal power plants due to unforeseen outages;

— low plant load factors of thermal power plants;

— low efficiencies of conversion of coal to electricity;

— high transmission and distribution losses (over 20% of total electricity generated);

— absence of power saving culture or incentives.

Reply of Ministry of Power

These major concerns regarding power supply system in the country have been discussed in various chapters of the report and accordingly recommendations of the Committee and replies of Ministry of Power thereto are given separately for each of the above points at appropriate place.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial Nos. 8 and 9

It is the view of the Committee that :

— the Government does not have a coherent, rational energy policy for the country which would also emphasize sustainability. The principal concern of the Government has been with a reduction in the gap between supply and demand with the balance of payment being a major constraint. The hefty injection of

investible resources have been largely aimed at augmenting energy supply rather than attaining higher levels of efficiency and optimal resource utilization;

— despite the Government's pre-occupation with increasing energy supplies, extensive shortages of good quality coal, electricity and oil remain.

Reply of Ministry of Power

It is not correct to say that resources have not been utilised to attain higher level of efficiency and optimal resource utilisation is lacking. Utilisation of resources for R & M Programme is an example.

The renovation and modernisation of thermal power stations is being carried out to *inter-alia*, improve their efficiency and plant load factor (PLF). The R&M Programme (Phase-I) of thermal power stations, which was launched in the Seventh Plan at the latest sanctioned cost of Rs. 1290 crore, is in advance stage of completion and is yielding encouraging results. The R&M Programme (Phase-II) of thermal power station has also been launched at the latest sanctioned cost of Rs. 1963 crore for implementation during the Eighth Plan. This programme is anticipated to improve the overall PLF of the units covered by 5% and give an additional generation of 8750 MUs per annum.

An amount of Rs. 210 crore and Rs. 357 crore would be spent in R & M-I and R & M-II Schemes respectively on the efficiency improvement activities.

Energy consumption for commercial purposes has increased over the period 1972-73 through 1991-92, 4.32 times which works out to 332.5%. Similarly, the per capita consumption on All India basis for the year 1972-73 which has 96.35 Kwh has gone up to 269.98 Kwh in the year 1991-92 which is about 2.8 times and which works out to a percentage increase of 180.21.

The consumption of coal, furnace oil and diesel oil used in various generating stations in the power sector for the years 1972-73 and 1991-92 is given below :

Year	Coal (MT)	Furnace Oil (KL)	Diesel Oil (KL)
1972-73	13678069	1718476	3223
1991-92	133682600	811669	301326

It can, thus be seen from the above that there is an increase of 615.7% in coal consumption over the period which is mainly due to the rapid industrialization in the country. It is also mentioned that the industrial power is of the order of 48% of the total energy consumption in the country.

The shortages, however, remain there as the demand is outstripping growth and the growth is restricted due to resource crunch. This has necessitated promotion to private sector investment in the energy sector.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Comments of the Committee

(Please see paragraph 5 of Chapter I of the Report)

Recommendation Serial No. 11

Hydro power in total utility capacity declined sharply from 43 to 28%.

Reply of Ministry of Power

At the time of independence, the share of hydro power in the total installed capacity in the country was 37.3% which increased to 50.62% in 1963. There after, the hydro share has continuously declined to present level of 26.68%. The measures to correct this declining trend in hydro share include creation of Corporations in the Central Sector/Joint Sector exclusively for hydro potential development, encouraging Private Sector to invest and participate in the hydro development and providing funding through external assistance.

The Government is actively considering a proposal to revise tariff for hydel electric power so as to encourage fresh investments in hydel sector.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 13

The targets for energy conservation are not achieved because of the absence of a well defined plan of action, a suitable package of financial incentives and needed institutional infrastructure to facilitate the implementation of such schemes.

Reply of Ministry of Power

The 8th Plan has given a major thrust to energy conservation and a National Energy Efficiency Programme (NEEP) has been formulated and included in the 8th Plan document. Under NEEP, a saving of 5,000 MW of additional installed capacity in the electricity sector has been envisaged by the terminal year of the 8th Plan. Out of which expected saving through demand side and supply side management will be 2750 MW and 2250 MW in the installed capacity respectively.

As a follow up to achieve the NEEP target, Planning Commission at its meeting held on 1st September, 1992 decided that each Ministry/Department would prepare its action plan giving target savings and the programme which are to be taken up by them as well as the financial resource requirement for implementing these programmes in the 8th Plan.

Recognising the importance of energy conservation several fiscal incentives and concessions have been provided to energy conservation projects by the Government such as relief in income tax by way of allowing 100% depreciation in the first year. Besides certain concessions are also available from State Governments and Union Territories in respect of Sales Tax exemptions for various new and renewable sources of energy and energy conservation equipments. Further Standing Committee has been set up to study and revise list of energy saving devices and recommending the same to the Ministry of Finance for various fiscal incentives.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : December, 1994]

Recommendation Serial No. 14

Private sector participation in power generation, hydro carbon exploration and supply though welcome will pay only a subsidiary role.

Reply of Ministry of Power

Indian power sector is dominated by public sector, the existing private sector companies account for only 4% of the generating capacity. Given the size of requirement of additional generating capacity, public sector has to continue to play a significant role in Indian power sector. The policy to attract greater private sector participation was introduced with a view to bring in additionality of resources in the context of acute power shortage and severe resource crunch with the public

sector. The policy is intended to supplement and not supplant the efforts of the public sector.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 15

The Committee is of the view that the Government does not have a well defined, coordinated and time-bound plan adequately backed by financial resources for implementation in the energy sector.

Reply of Ministry of Power

As far as power sector developmental plans are concerned, the long term power planning exercises are carried out by considering all sources of generation *viz.* hydro, gas, coal & nuclear and optimising them on the basis of pattern on demand on the systems & the system costs. The reason for not meeting the power demands is the shortfalls in achieving the planned targets in the almost all Five Year Plans. The lack of financial support is in turn mainly responsible for not meeting the objectives. It may be further appreciated that the fund constraints in the immediate future may be much more severe. In this regard, efforts are being made to tap private investment for funding power projects in supplement to the available financial resources of the State and Centre. The response from the private entrepreneurs is encouraging so far.

The share of coal based thermal generating capacity in the overall available capacity is no doubt on higher side, mainly on account of limitations on adding more hydro, gas and nuclear capacities. The coal based projects obviously have some adverse environmental impact. Studies for Environmental Impact Assessment are invariably made from time to time to assess the likely level of pollution & to devise measures to contain it within the prescribed statutory limits, some of which are even more stringent than those recommended by World Bank. With these measures, it is expected that the adverse environmental effort will be minimum and acceptable.

Though, hydro power is relatively pollution free, there are several major hurdles coming in the way off increasing the pace of hydro development *viz.* lack of sufficient fund allocations and timely cash flow, delays in acquisition of land, resolution of inter-State disputes, problems of rehabilitation and environmental & forest clearances etc. Long gestation period in commissioning of hydro projects

which vary from 8 to 12 or more years, also contributes to falling back on coal based power projects to meet the growing power requirements in short/medium terms because of their lower gestation periods. Efforts are also being made to encourage private investment in hydro projects by making the investment equally attractive to the one for other sources of generation.

The other possible measure to reduce the percentage of coal based generation is enhancing of the gas based generation although there are limitations in availability and linkages of gas for power generation. The efforts are, however, being made to tap the indigenous sources of the gas as well as to explore the possibilities of importing gas from other countries.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Comments of the Committee

(Please *See* Paragraph 5 of Chapter I of the Report)

Recommendation Serial No. 16

It is clear that by suitable utilisation of energy conservation methods and renewable energy technologies, it should be possible to achieve the goals of sustainable development, reduction in energy consumption and in controlling environmental damage.

Reply of Ministry of Power

Energy as a national resource is closely interwined with the environment. There are a number of areas where the effects of energy on the environment are strong and visible. Environmental impacts range from localized air pollution to transboundary or global air pollution, water and land pollution and degradation, waste disposal and hazardous and radioactive pollutants. Option to reduce environmental impacts related to energy could be categorised into three main groups : (a) supply options, including fuel switching; (b) energy conservation and efficiency options; and (c) technology options to make energy development sustainable all options as appropriate are to be included in the energy-environment policy and planning process.

Regarding supply side, SEBs have been asked by Ministry of Power to fix up target for each year and to formulate the action plan for reduction of T&D losses @ 1% per annum each year during the current plan period so that a total

of 5% reduction can be achieved at the end of the 8th Five Year Plan. Moreover, EMC acting as Ministry of Power's executive agency, is entrusted with various programmes relating with energy conservation in power sector. These programmes include both demand and supply side management. Besides, environmentally sound technology plays a big role in abating the effects of many environmental pollutants. As the energy sector is highly capital intensive, it stands to benefit most from technological cooperation. Transfer of sophisticated technology primarily for economic advantages (higher efficiency) would environmental advantages as an additional benefit. After new industrial policy, Ministry of Power has permitted private sector participation in the power sector which is a positive step in technology transfer. The Joint venture proposals in the power sector would bring not only investment but also technology which in turn would abate the effects of many environmental pollutants by virtue of sophisticated technology.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 36

Coal Gasification

The share of coal produced from opencast mining (using both the shovel and dumper and dragline technique) has increased steadily, reaching a level of about 64% in 1989-90, it being anticipated that its share will stabilize at around 73% by the year 2004-05. With declining quality of coal coupled with mixing of large amounts of extraneous matter, it is anticipated that coal supplied to power plants will contain more than 40% ash in the coming years. The Committee holds that the need to develop technologies for effective utilisation of indigenous coal reserve in India for the production of a fuel which can be used in the industrial and domestic sector as well as for pollution-free electricity generation cannot be overstated. It is extremely important to continuously upgrade coal utilisation technologies in order to minimise energy costs and environmental damage. IGCC is one such technique, the commercialisation of which would depend on the rate of transfer of development of technology in India and its diffusion. Demonstration units can be set up in one of the existing pulverised coal power plants where upstream facilities for coal, downstream facilities for hot gas and disposal system for slag, slag-gas and effluents already exist. The Committee recommends a consideration of this by the Government.

Reply of Ministry of Power

A study was carried out by a Steering Committee constituted by Ministry of Power with representatives from CSIR, CEA, Department of Coal and Ministry of Non-conventional Energy Sources with CSIR as a nodal agency to compare the various coal gasification and select a technology suitable for Indian coal, which contain high ash content in the range of 40-45%. The Steering Committee came up with useful studies on the economics at various gasification processes in their report in 1991, in which it was concluded that IGCC would be techno-economically viable compared to conventional pulverised coal fired systems. The Steering Committee indicated that the Integrated Gasification combined Cycle (IGCC) system of power generation through Coal Gasification is a proven technology abroad for low ash coals and also Coal Gasification technology on a pilot scale is proven in India for indigenous high ash coals and the same is still required to be demonstrated at commercial scale. In this regard the Committee recommended that a phased programme be envisaged by first having an IGCC demonstration plant of 45 MW capacity for generating data and acquiring experience. The data generated, and experience thus gained could be utilised for designing higher capacity plants.

As per the recommendation of the Steering Committee, Ministry of Power (MOP) constituted an Expert Group with Member (Thermal), CEA as Chairman in February, 1993 to explore the possibility of identifying an appropriate existing thermal power plant for setting up of an IGCC demonstration plant for power generation and to suggest modalities for funding the project. The Expert Group had since concluded its studies and submitted its report to MOP. This report is under consideration by the Government.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 44

Coal Quality and Environmental Issues

A phased approach for establishment of coal beneficiation facilities should be followed and specific time targets established and notified after which non-beneficiated coal would not be moved beyond a certain distance. Establishment of coal washeries at pit-heads would require large investments and for this purpose, the private sector could be brought into operate these washeries in a viable and efficient manner.

Reply of Ministry of Power

The proposal of beneficiation suggested in the report only shifts the factors to the coal washeries and does not, in any way, solve the problem of ash disposal. Further, the beneficiation process itself can only reduce the free dirt in coal which marginally reduces the ash content. The intrinsic ash content of coal cannot be reduced by the process of beneficiation.

Beneficiated coal can at the best be utilised for distant power plants from techno-commercial point of view as use of beneficiated coal for pit-head power plants has not been found viable. The Ranghe Committee set up by the Planning Commission in July 1988, had recommended that coal beneficiation for Kayamkulam TPS and Yamuna Nagar TPS which are located more than 1000 Km. from identified coal mines is economical on the basis of techno economic appraisal. Accordingly, coal-mining-cum-beneficiation plants at Kalinga in Talcher coal field (8.00 mtpa) for Kayamkulam TPS and Piparwar in North-Karanpura coal field (6.5 mtpa) for Yamuna Nagar TPS were taken up for implementation by the Ministry of Coal. The beneficiated coal is likely to be supplied by the end of 8th Plan or early 9th Plan. Based on the actual experience and the techno-economic viability of use of such beneficiated coal phased approach of establishing coal beneficiation facilities for supplying coal to other distant rain-fed power plants can follow.

Since the coal beneficiation plant would require large investment, private sector could be brought in for installation and operation of all these washeries after the above approach is found viable.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 45

The introduction of clean coal technologies in general, requires major information dissemination and education effort. The economic benefits of improved technologies would not only have to be quantified but the methodologies for such assessment made transparent and convincing the concerned.

Reply of Ministry of Power

R&D efforts are underway to evaluate clean coal technologies for their application to suit Indian conditions. Once the techno-economic viability of clean-coal technology is established, the approach recommended by the Committee could be followed. Towards this more extensive exposure and training could be

given to the concerned specialists so as to ensure that no technology gap occurs and the implementation process is accelerated.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 58

Power Shortages

On an average there exists 7-10% deficit in energy and 12-20% in peak demand. These being average figures, the power cuts in some regions are as high as 45%. The shortages emanate from a gap of about one percentage point in the growth of supply and demand. While there are heavy shortfalls in capacity creation, there is rapid growth of agricultural land domestic loads leading to shortages.

Reply of Ministry of Power

The energy requirement, availability and shortage for the country as a whole is given as below :

	1991-92	1992-93	1993-94
Requirement	288974	305266	323252
Availability	266432	279824	299494
Shortage	22542	25442	23758
(%)	(7.8)	(8.3)	(7.3)

State-wise percentage shortfall during past six years is enclosed as Annexure I.

Bihar, DVC and Orissa in the Eastern Region and Assam and Tripura in North-Eastern Region faced peaking shortage above 30%. Regarding power cuts it may be mentioned that during August, 1994, only Maharashtra is having notified 10-15% demand cut on H.T. Industries.

It may be seen from the above that gap between availability and requirement has remained more or less of same degree in the previous years. However, the main reason for shortages lies in demand outstripping the generating capacity

addition as has been pointed out by the Committee. Various measures taken to improve the generation of the country include Renovation and Modernisation of old units, assistance to Electricity Boards in undertaking Plant Betterment Programme, supply of requisite quantity and quality of coal, training of operation and Maintenance personnel and strengthening of Transmission and Distribution system.

The major problem coming in the way of increasing generating capacity and improving transmission system is the resource crunch. It is due to this reason that private sector participation in the field is being promoted. (Appendix II)

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 59

Low Thermal Efficiency of Conversion of Coal to Electricity.

The efficiency of conversion of coal to electricity in the Indian thermal plants is very low (In the range of 28-30%) with a view to decrease coal burning, which would also entail lower CO_2 emissions, it is necessary that the efficiency of thermal plants is enhanced to 35%, 40% and 47% in stages by adoption of advanced technologies. An improvement in the thermal plant efficiency from 30% to 35% brought about by increasing the existing level of boiler efficiency from 80% to 86% and reducing the turbine heat rate from about 3,000 Kcal/Kwh to 2,400 Kcal/Kwh, and reduce coal consumption by about 0.04 Kg/Kwh and of oil by 3 ml/Kwh. For a 100 MW Thermal capacity the savings would be Rs. 1.5 crore per year.

Reply of Ministry of Power

The present day power plant technology has improved considerably with boiler efficiencies being achieved in the order of 85-87% with conventional drum type boilers and gross turbine cycle heat rate of about 1950 Kcal/Kwh for our prevalent unit sizes of 200/250 MW and 500 MW units. In case of NTPC plants, the boiler efficiency is in the range of 86% and the turbine cycle heat rate is in the range of 2400-2500 Kcal/Kwh. While the coal consumption would depend on the quality of coal, the oil consumption would depend on the quality of coal, the oil consumption is already substantially below the 3 ml/Kwh value.

The improvement in thermal conversion efficiency for coal based plants can be achieved by adopting new & advanced technologies such as use of super critical

steam parameters, integrated coal gasification combined cycle etc. which have their own relative merits and demerits. These have already been given careful consideration from the point of view of reliability, cost economics and adaptability to suit Indian conditions. The new technology—use of once through units with super critical steam parameters are applicable to new plants only and would improve the efficiency by maximum amount of 1.5 - 2.5%. However, a decision has been taken not to use once through steam generators for the new units for the present. With conventional drum type steam generator, marginal improvement in efficiency is possible. Efforts are also under way to evaluate the technologies relating to combined cycle through coal gasification mode. Use of such technology in gasification of Indian coals in a demonstration plant is being investigated by NTPC and BHEL. These technologies have yet to be established on commercial basis for adoption to suit for conditions.

In case of proposals for new plants, it is seen that widely varying level of plant efficiencies & unit sizes/parameters are being propogated. It is of utmost importance that standards/norms be carefully worked out so as to have uniformity in unit sizes and parameters and consequently improved overall plant efficiency.

For existing plants, only marginal improvements are possible using technologies to reduce auxiliary power consumption. Better house-keeping in terms of reduced leakages in steam, water and gas systems, improved process control with special reference to optimised operational regime and operating the unit at or near the rated parameters etc. results in improved overall plant efficiency and is being encouraged.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 60

While over the last 8-10 years, the technical performances of the thermal stations of SEBs have improved, there is still considerable scope for improvement. It is possible to improve considerably the plant load factor, peaking capacity and the system load factor.

Reply of Ministry of Power

Poor Technical Performance

It has been rightly mentioned that over the last 8-10 years the technical performance of the thermal stations of SEBs has improved. The plant load factor

achieved during the year 1993-94 is 61% against the target of 57.8% fixed for the same period at all India level. The Central Sector achieved a PLF of 69.8%, the private sector 57.1% and the State Sector 56.6% for the year 1993-94 for the year 1994-95 a target PLF of 62% has been fixed keeping in view the stipulations of the Action Plan adopted in the Power Ministers' Conference held in January, 1993. While all efforts are being made to improve the plant load factor and peaking capability, there is a limit beyond which the performance cannot be improved further. This limit is due to various operational constraints/requirements as follows :

(a) *Planned Maintenance :*

Around 10% provision is required to be kept for doing planned maintenance (P.M.) for ensuring the annual/capital overhaul for every thermal unit in the country. Presently, the planned maintenance rate is 8-9% because the planned maintenance of many units is by passed due to various reasons like fund constraints, unduly long time taken by some other units for planned maintenance/forced outage in the same station due to long delivery schedule of certain critical spares etc.

(b) *Forced Outage :*

Another 12-13% provision has to be made for break down of the equipment leading to shutdown of the unit for repairs. This rate has been brought down from around 19% to 13% during the last few years.

(c) *Partial Unavailability of Units :*

Another 10-12% generation is lost because of running of the various units at part load due to (i) deficient functioning of some vital auxiliaries leading to reduction of the load on the unit. (ii) because of reduction of load during off-peak period since there is low demand of power at that time.

(d) *Hydro Thermal Mix :*

The percentage of hydro generation to thermal (including nuclear) generation during the year 1993-94 has been as low as 28%. Therefore, thermal stations have to participate in load regulation in an extensive manner during the off-peak period.

(e) *High Ash Content in Coal :*

It is a well known fact that the coal supply for thermal power stations contains very high percentage of ash. This is upto 45% or so. Abrasive action of ash results in higher forced outage rate as well as higher planned maintenance requirement.

(f) *Financial Constraints :*

For reducing forced outage rate as well as planned maintenance rate, the down time for each outage is required to be reduced. This is possible only if advance planning for spare parts management, Renovation & Modernisation requirements and fund requirements for doing annual/capital overhaul, payment of advances etc. for execution of work can be done well in time. All this needs huge amount of funds. Due to financial constraints the required optimum planning is not possible which results in increased duration for every outage and has effect on the plant load factor.

Therefore, the maximum possible limit of PLF that can be achieved under the prevailing Indian conditions is around 65-67%.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 61

Renovation and Modernisation (R&M) Programme

The impact of an R&M Programme aimed at improving the PLF by 7 percentage point (from 45% to 52%) for about 201 units with a total installed capacity of 19,980 MW were worked out. It is estimated that this measure would generate an additional 12,264 GWH of energy, bringing in an additional revenue of Rs. 1,226 crores in the year 1996-97.

Due to improved capacity utilisation, the savings in additional capacity from the measure would be of the order of 2,650 MW (Rs. 8,000 crores) against an investment expenditure of Rs. 1,462 crores on the R&M Schemes. Apart from undertaking R&M, life extension and uprating of plants should be done on a priority basis by allocating adequate funds for this activity, because the life extension schemes for power plants have to be undertaken in totality and not in partial or piecemeal manner. The impact of the on-going R&M Programmes need to be monitored and reviewed on a regular basis.

Reply of Ministry of Power

The above recommendation of the Standing Committee on Energy is fully agreed with. On achieving encouraging results from R&M Programme (Phase-I), R&M Programme (Phase-II) was started in the year 1991-92. This programme covers 209 units of 46 old thermal power stations, with aggregated capacity of

20871.435 and a total latest sanctioned cost of Rs. 1854.19 crores/MW. The programme is anticipated to give an additional generation of 8750 MUs by improving the overall PLF by 5% from 51.5% to 56.5%. The programme is also anticipated to extend the life of certain units of Neyveli, Amarkantak, Korba-II, Satpura-I and Kothagudem TPS' aggregating to a total capacity of 1402.5 MW, by 15-20 years. The programme, on completion, is also anticipated to increase the peaking capacity of certain units by total of 100 MW.

This Programme is, however, adversely affected because of the paucity of funds with the concerned SEBs/Organisations. The PFC/World Bank are partly funding the 21 R&M schemes of only those SEBs/Organisations which are eligible as per criteria laid down by them. The combined funding by PFC/World Bank of these schemes is of the order ot Rs. 531.46 crores (28.7% of total sanctioned cost of the R&M programme Phase-II). The 5 R&M schemes pertaining to Badarpur (NTPC), I.P. (DESU), Neyveli (NLC), Ropar (PSEB), and Bhatinda (PSEB) costing Rs. 420.72 crores are being funded through their own/Central Resources. The position in respect of the remaining 20 R&M schemes costing Rs. 548.65 crores, pertaining to HSEB, UPSEB, WBSEB, DVC, DPL, BSEB, ASEB, which are not eligible for PFC loan is very critical. These 20 Power stations affected by the paucity of the funds contribute to 4310.6 MUs (49.26%) out of a total 8750 MUs of additional generation envisaged on completion of this R&M Programme, even though they cost only about 30% of the total cost. Thus, noncompletion of these 20 schemes because of paucity of the funds, inspite of their being techno-economically more attractive, would result in curtailment of the anticipated benefit of additional generation of half, and will, therefore, negate the entire R&M Phase-II Programme.

To remove the hurdles in funding of these 20 non-PFC funded schemes, the Central Electricity Authority has suggested that the Central Assistance, instead of routing through PFC, should be made directly to the project authorities through CEA as was done during the 7th Five Year Plan under R&M Programme (Phase-I). The total fund requirement in respect of identified stations (32 thermal power stations and 23 hydel stations) belonging to those who do not become eligible for PFC funding would be of the order of Rs. 998.92 crores upto 1996-97. A proposal in this regard has also been placed before the Committee of Secretaries. The Planning Commission had also felt the need for rethinking on providing funds for the R&M Programme. Because of resource constraints, it has been able to provide only Rs. 40 crores for special R&M efforts in 1994-95. In view of this background, the Ministry of Power is now considering to open up the R&M Programme for private sector participation in a big way. All aspects in this regard have already been discussed in a meeting taken by Secretary (Power) on 26th May, 1994 and the modalities for private sector participation in the R&M Programme are being worked out in consultation with the CEA and NTPC.

Recommendation Serial No. 62

Reduction in Partial Outages in Thermal Plants

Optimizing the plant operations and maintenance can result in reduced levels of partial outages and the peak load capability of power plants can be raised from 57% to 63%. The cost of such a measure would be about Rs. 100/- crore and the benefits would accrue in the form of an increase in installed capacity by about 5,543 MW involving investment savings of about Rs. 16,500 crores. This activity will have to be undertaken by the SEBs. The Committee recommends serious consideration of this measure.

Reply of Ministry of Power

Central Electricity Authority have taken the following steps for optimising the plant operations and maintenance for reducing the level of partial outages and raising the peak load capability of power plants :-

1. SEBs/utilities are being contacted regularly for –
   (i) undertaking annual/capital maintenance of each unit as per schedule; and
   (ii) to complete the annual/capital maintenance within the time schedule as recommended by the T.K. Srinivasan Committee.
2. CEA Officers visit the various thermal power stations periodically and advise the station authorities for improving their operational and maintenance practice.
3. Monthly review meetings are held in CEA with M/s BHEL and other SEBs/ utilities for early revival of units under long-duration forced/planned shut down.
4. The performance of thermal stations is monitored regularly in CEA and on the basis of generation during peak hours. Meritorious Productivity Awards are given to various thermal power stations as per the scheme approved for this purpose.
5. There has been steady decline in partial outages including tube failures, mill plant non-availability, CHP and ash handling plant problems etc. in the NTPC plants, details of which are given below :

Year	Partial Loading (%)	PLF (%)
1990-91	220.53	61.67
1991-92	15.45	70.59
1992-93	16.13*	70.00
1993-94	09.72	78.07

Deterioration in coal quality, over a period of time, has been noticed which could lead to partial loading of the units and outages of the mill. Supply of proper quality of coal to the power stations needs immediate attention of the coal companies.

As regards investment savings of about Rs. 16,500 crores by way of Rs. 100 crores investment on optimising plant operation and maintenance, it is difficult to furnish the comments unless activity-wise details for such investment are made available.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 63

Performance of Plant and Equipment Supplied by BHEL

Although the performance of 210 MW units which form the backbone of the system has improved considerably, the earlier 110 and 120 MW unit which are 60 in number operate at plant load factor of 40-45 percent. This pulls down the PLF of the States in which these units predominate. The Committee recommends that BHEL should pay urgent attention for rectification of the generic defects in these units predominate. The Committee recommends that BHEL should pay urgent attention for rectification of the generic defects in these units.

Reply of Ministry of Power

CEA agrees to the above recommendations of the Standing Committee on Energy. Further it is stated that 210 MW units whose PLF performance has been in the range of 62-63% have been giving a satisfactory performance as compared to 110/120 MW units whose performance has been in the range of 42-46%. These units of 110/120 MW now form 18% of the total strength in terms of number and 14% in terms of total Thermal capacity. The units are also now old, operating for the last 17-18 years in different utilities. This capacity group units installed are both from indigenous manufacturers namely BHEL as well as imported. Problems in the imported units are primarily faced for the procurement of spare parts.

Performance-wise the units of BHEL are comparable to that of imported units though lower in performance with respect to 210 MW units. As mentioned earlier, improvement in their performance of this capacity group is now recommended by undertaking residual life assessment studies and taking them for renovation and modernisation wherever necessary. Financial constraints, however, have been the major problem with the State Electricity Boards in this

endeavour. BHEL however should certainly associate with the utilities in order to enhance the performance of this capacity group of units.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : November, 1994]

Recommendation Serial No. 64

High Auxiliary Power Consumption

By retrofitting large size electric motors with variable frequency coupling as well as improved housekeeping measures, it is possible to bring down the level of auxiliary power consumption from 10% to 8.5%. The benefits of an improvement of this magnitude would make available an additional 5,743 Gwh of electricity every year with an additional revenue of Rs. 574 crores. Against this, the investment cost for this measure is estimated as Rs. 1000 crores. This too needs to be considered by Government.

Reply of Ministry of Power

All new plants and also not very old plants are already provided with variable speed drives for large size motors of I.D. fans and boiler feed pumps which result in considerable saving in auxiliary consumption for plant's part load operation. The use of variable frequency drives even for these applications have yet to be established techno-economically as the cost of such an equipment is prohibitively high.

A variable frequency drive has been adopted by NTPC for ID fans at Dadri to evaluate their efficiency. BHEL is putting up a pilot variable frequency drive for boiler feed pump at Muddanur Power Station of APSEB. Based on the operational feed back, implementation of such measures in other projects are retrofit would be followed after their feasibility is established.

For 500 MW units, NTPC has adopted turbine driven boiler feed pumps as this has the benefit of avoiding multistage conversion from steam to electricity and use of electric power for major drives like Boiler Feed Pumps.

CEA is executing a scheme approved by MOP for carrying out energy audit studies on certain selected thermal power stations in the country. Apart from other areas, the studies include the trend of auxiliary power consumption on thermal power station for producing electricity. The areas of higher auxiliary power

consumption at the station would be identified and corrective actions would be taken for reducing this consumption.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated: October, 1994]

Recommendation Serial No. 65

Optimising the Operations of Hydro Power Stations

To achieve an optimal performance of hydro plants, the Committee are of the view that the following two measures could be considered for implementation during the Eighth Plan : –

— a coordinated operation of the hydro-thermal plants, where the hydro plants in hydro-dominated States are shut down during the off-peak hours and used for peaking purposes only.

— uprating of 49 hydro power stations involving a total installed capacity of 8,839 MW.

The cost of the above measures is estimated to be Rs. 854 crores. The benefits would be in the form of an additional availability of 761 MW of installed capacity and 1,590 million units/annum. The incremental revenue generated from the sale of these units would be about Rs. 159 crore per year and savings in capital expenditure would be Rs. 2,280 crore. The Committee recommends that the Government examine these proposals for implementation.

Reply of Ministry of Power

The hydro electric plants designed to afford peaking benefits are normally operated during the peak demand hours as per load despatch schedule indicated by the regional load despatch stations. However, the run-of-river schemes without pondage like canal fall stations and other run-of-river schemes during high inflow season operate as base load stations, in which case preference is given for absorption of zero incremental cost hydro energy during off peak hours to enable saving of fuel at thermal stations.

The hydro development commenced in 1897 and about 30% of the generating units have reached the anticipated and planned period of useful life though even now their performance continues to be good. With a view to extend the useful life of these units further with minimum investment the CEA conceived a scheme

to identify plants that would need to be renovated economically. The plan for renovation/modernisation and uprating (RM&U) was prepared and 55 RM&U Schemes have been identified having a total installed capacity of 9648 MW at an estimated cost of Rs. 1351 crores. The benefits likely to accrue from this RM&U plan are assessed as 2254 MW and 6954 MU. This plan would also increase plant life from increase in availability and reliability of the plant.

The CEA identified in this process the possibility of uprating of some of the generating units with benefits of additional capacity and energy at practically no extra cost utilising available margins in the machine design, replacement of old machinery components of inferior design with ones of improved design and better efficiency. The additional capacity thus identified amount to 553 MW and additional energy benefits 1154 MU annually. There is likely to be an indirect benefits in terms of prevention of capacity loss of about 1361 MW as old generating units those have already completed their useful life of 30-35 years are likely to stop generation. Restoration of derated capacity amounts to about 340 MW.

The progress of the RM&U plan is rather slow mainly due to shortage of finance. Not having funds of their own, the States/utilities look forward to PFC for necessary financing. PFC have their own operational criteria and many of the SEB's/utilities are not in a position to meet the criteria of OFAP (Operational and Financial Action Plan) and minimum rate of return. Thus they remain ineligible for PFC loan.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 66

Physical Resources for Power Generation

The country is endowed with vast hydel resources, large quantities of low grade coal and natural uranium. Natural gas is not available in sufficient quantities and, therefore, would be utilized judiciously. It is suggested that gas should not be used for power generation except at landfall points and places located for away from the coal bearing areas. Instead, gas is required as a priority for fertilizers, petrochemicals, domestic cooking, industrial heat and for replacement of oil in the transport sector.

Reply of Ministry of Power

Natural gas based power plants have been very useful in meeting the peak requirements and also as load based stations where required. These plants have low gestation period and due to this a quick increase in thermal generating capacity has been possible in the previous years. It is mainly being used for power generation in areas which are away from coal fields. Progress of Nuclear Power Stations which utilised natural uranium reserves has been slow and hydel projects have larger gestation period. All this has made gas based power stations a necessity. Future growth of such stations is, however, restricted due to lesser availability of gas.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 67

Accelerated Hydro Development

The Committee find that for a coordinated deployment of hydro-thermal resources a combination of 40% hydro and 60% thermal is considered desirable. Presently, the share of hydro capacity is low at 28%. Accelerated hydro development is therefore, necessary by initiating urgent advance action on a number of fully investigated hydro projects in various regions of the country. The capacity requirements up to 2006-07 will be about 15,000 MW lower if an optimum hydro-thermal mix is achieved. Run-of-river plants should be preferred to storage type plants and pump storage plants should be utilised for peak load. Rationalise the supply mix so as to restore an optimal thermal-hydro mix.

Reply of Ministry of Power

The Government is concerned about the declining share of hydro power in the installed capacity. Government has a list of sanctioned schemes which, if taken early could achieve the objective of raising the share of hydro to 40% by the end of the 9th Plan. The major constraint in this regard is availability of funds . To invite increased investment, Government is considering a proposal to revise tariff for hydro power so as to make investments in hydel generation sufficiently attractive.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 69

Long Term Planning

The Committee are of the view that the 15 years perspective power generation expansion plan should take into consideration, energy conservation, inter-regional power transfers and a suitable hydro-thermal combination. By doing so it would be possible to reduct the additions to installed capacity by about 50,000 MW out of a projected demand of 1,47,000 MW.

Reply of Ministry of Power

The para on Long Term Planning at page 35 enclosed with the above referred note has been perused. In this connection, it is stated the 15 years Perspective Power Generation Expansion Plan prepared by CEA had already taken into consideration the aspects of energy conservation, inter-regional power transfers and a suitable hydro thermal combination. The benefits to be obtained from these measures are contained in the Report titled "Report on Perspective of National Power Development upto 2006-07" brought out in September, 1991. The same are reproduced below :–

Benefits from Demand Management & Energy Conservation	30,000 MW
Benefits from inter-regional transfers	10,000 MW
Benefits from suitable hydro thermal combination (Accelerated Hydro Development)	15,000 MW
Total Benefits	55,000 MW

It may further be added that the said suggestions of the Committee shall also be kept in view while formulating the next National Plan.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : December, 1994]

Recommendation Serial No. 70

The Committee holds that the reduction in technical losses can be achieved by :–

— installation of additional capacitors;

— installation of proper size of transformers; and

— augmentation and strengthening of sub-transmission and distribution lines

Similarly the non-technical losses can be minimized by :–

— installation of reliable and high quality meters;

— improvement in billing and collection procedures;

— switching over from "flat rate" tariffs to metered electricity supply to agriculture; and

— strengthening of administrative and legal measures for curbing thefts.

By adopting a suitable mix of the above measures, a reduction in the T&D losses from 23 to 18 per cent can be easily achieved during the Eighth Plan period. While the incremental investment costs of these measures is estimated in the range of Rs. 7,000 – 10,000 crore, the benefits would be in the form of an additional 18,870 Gwh of energy and 4,420 MW of installed capacity (otherwise costing about Rs. 13,260 crore). The losses need to be eventually brought down to a level of 15% by diverting resources to T&D from those presently directed towards generation.

Reply of Ministry of Power

The Government is aware of the need for reduction in T&D losses and have already initiated actions in order to reduce these losses. The gist of action taken by Government is given below :–

(i) All State Electricity Boards had been asked to assess the requirement of capacitors in consultation with CEA. PFC has been requested to accord priority to extend loan to the SEBs for their capacitor installation programme.

(ii) Guidelines have been issued to SEBs indicating the various steps required to reduce T&D losses and to augment and strengthen the sub-stations and distribution lines.

(iii) SEBs have been advised to carry out energy audit and installing tamper-proof meter boxes, computerise their billings and strengthen the administration by setting up vigilance squads to detect the cases of theft of energy.

(iv) Incentive schemes in the form of cash award and trophies have been announced for the SEBs for their Division in their efforts to reduce the T&D losses.

(v) Indian Electricity (Supply) Act, 1910 has been amended in 1986 making theft of energy a cognizable offence with deterrent punishment upto 3 years imprisonment, or fine of not less than Rs. 1,000 or both.

2. These steps have helped reduction in T&D losses of all India level from 22.83% in 1991-92 to 21.80% in 1992-93 showing a reduction of 1%.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Comments of the Committee

(Please *See* paragraph 14 of Chapter I of the Report)

Recommendation Serial No. 71

Normative Tariffs for Consumers' Satisfaction.

It is necessary that tariffs are regulated by an independent authority based on normative performance of plant and equipment and personnel. For this purpose regional tariff commissions were suggested and agreed upon by all the Chief Ministers. These should be established at the earliest.

Reply of Ministry of Power

The recommendation is fully endorsed.

As far as normative tariff is concerned, the tariff notification issued by the Ministry of Power under Section 43 (A) of the Electricity (Supply) Act, 1948 provides for working out the tariff on the basis of certain normative parameters.

The Ministry had accepted the need for setting up national and Regional Tariff Boards who would, not only, evolve the tariff policy for sale of electricity both for the bulk supply as well as for the retail sale, but will also work out the cost of supply to various consumers at LT point and recommend the appropriate tariff for adoption by the Public Utilities concerned. The Ministry had also obtained the approval of the central Cabinet for establishement of these Boards and a Resolution was issued for the purpose on 20.7.1992. Subsequently, however, it was felt that the Tariff Boards should have more powers for effective working

and accordingly, a working Group consisting of 5 Chairmen of the SEBs was appointed to work out the details in this regard. The Working Group had identified the amendments required to be carried out to the Electricity (Supply) Act, 1948 and had recommended that the Tariff Boards, though recommendatory in nature, may be given statutory authority. The recommendations of the Working Group have been circulated to all the State Governments/SEBs etc. and the Ministry of Power has sought their concurrence for carrying out necessary amendment to the Electricity (Supply) Act, 1948, the matter is being persued effectively and action will be taken for setting up the National and Regional Tariff Boards as soon as the concurrence of the State Governments for amending the Act is received.

[Ministry of POWER : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Comments of the Committee

(Please *See* Paragraph 17 of Chapter I of the Report)

Recommendation Serial Nos. 72 and 97

Interim tariff for Agriculture.

Till such time that proper agricultural tariffs are levied, a uniform tariff of Rs. 0.50 was recommended and agreed to by all the Chief Ministers. This also should be implemented uniformally.

Electricity tariffs are generally the lowest for the agricultural sector. Over the years the gap between the cost of generation/supply and average realization from the agriculture sector has been widening. A utility-wise analysis shows that during the period 1985-90, out of 22 utilities in the country, electricity tariffs for agriculture consumers declined in 5 utilities and remained unchanged in 13 utilities. Consequently, the losses at the All India level incurred on account of supply of electricity to this sector have increased at an annual rate of 25% during 1985-86 to 1990-91. One of the reasons for the decline in the average agriculture tariff since the mid 1970s is that all the SEBs have gradually changed over from metered supply to "flat-rate" tariff based on the connected load (HP of pumpset), largely to do away with the problems of administration, billing and collection.

The Committee addressed itself to this important question. Two factors standout. Electricity continues to be supplied to the agriculture sector at high rates

of subsidy and mostly on the basis of flat rate tariffs. This in turn encourages a misuse of electricity for non-agricultural purposes, thus further adversely contributing to the financial health of the SEBs. Simultaneously, there is gross inefficiency in the supply of electricity to the agricultural sector. It is seldom made available for the required number of hours, with the required continuity or at such hours as are convenient for its gainful use. It is a common complaint of the agriculture sector that they are treated as the poor relatives, electricity is supplied to them on lower priority to industry, and almost always during inconvenient hours of the night. The SEBs are thus caught in the pincers of high subsidy, gross misuse and low consumer satisfaction.

Reply of Ministry of Power

It is true that electricity tariffs charged from agricultural sector are extremely low. As per the data provided by the Planning Commission, the estimated commercial loss to the State Electricity Boards (SEBs) on account of supply to the agricultural sector at subsidised rates during 1993-94 has been placed at Rs. 8349 crores, which have been off-set by a small subsidy of Rs. 983 crores only given by the State Governments.

The Ministry entirely agrees with-the recommendation of the Committee that the system of charging electricity tariff on flat-rate basis for the agricultural consumers leads to inefficient use of the electricity. Apart from this, even in the States where the minimum agricultural tariff of 50 paise/kwh has been adopted in principle, as per the provisions included in the Action Plan prepared and adopted by the Power Ministers' Conference in January, 1993, the system of charging flat-rate has resulted in considerable leakage of revenue.

While recommending the minimum agricultural tariff of 50 paise/kwh, the Ministry of Power had advised all State Governments/SEBs to levy the aforesaid rate for all metered supply as also to work out appropriate flat-rate charges on the basis of the HP of the pumpset and the hours of supply by preparing appropriate ready recknors. This has been followed up by the Ministry of Power a number of times. Even though, 21 States/UTs have reported that they have implemented the minimum agricultural tariff, the system of continuing with flat-rate at an unacceptably low rate is causing concern.

In so far as the recommendation of the Committee for implementation of the minimum agricultural tariff of 50 paise/kwh as an interim tariff for agriculture is concerned, this is also whole-heartedly endorsed. As indicated earlier, the Ministry of Power has been endeavouring to implement this ever since October, 1991 and after pursuing the matter through protracted correspondence in the Power

Ministers' Conference etc. The list of States/UTs who have implemented the minimum agricultural tariff for metered supply is enclosed. There are 3 States in the country namely, Tamil Nadu, Karnataka and Madhya Pradesh who are providing electricity free to the agricultural sector up to a certain HP. The Ministry of power has been requesting these States also to implement the minimum agricultural tariff. It will be a major step in improving the financial position of the State Electricity Boards if the recommendations of the Committee is adopted by all SEBs. As per the estimates given by the Planning Commission, implementation of the minimum agricultural tariff by all States would yield an additional mobilisation of resources worth Rs. 1943 crores per year which would go a long way in improving their financial position.

The observation of the Committee that the losses of SEBs on all India basis on account of supply of electricity to the agricultural sector have increased at an annual rate of 25% during the period from 1985-86 to 1990-91 is more pertinent. The Committee has attributed this decline in the average agricultural tariff to the system of switching over to flat-rate tariff for major supply. While it may be administratively difficult to provide meters to all agricultural pumpsets which are located in remote areas, agriculture fields, etc., the fact remains that the un-metered supply leads to inefficient use of electricity, misaccounting of utilisation etc., apart from pilferage. Having regard to this, an Action Plan has been drawn up in the Power Ministers' Conference in January, 1993 which envisages that all pumpsets above 5 HP should be provided with metered supply. This was suggested having regard to the problems in installation of meters for all connections. To some extent, this problem could be overcome by recovery of flat-rat on a realistic basis for pumpsets with less than 5 HP capacity by co-relating the capacity of pumpsets and the number of hours of supply etc. and charging the supply in accordance with a ready Reckoner. (Appendix III)

[Ministry of POWER : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 73

Privatisation of Power Sector

The Committee are of the view that while encouraging privatisation and foreign investments to increase additional resources for this sector, care has to be taken that the long term interests of the country are not jeopardized.

Reply of Ministry of Power

In the context of paucity of resources with Central/State PSUs and SEBs and to bridge the gap between the rapidly growing demand for electricity and supply, and keeping in view the capital intensive nature of the power industry, a policy to encourage greater investment by private entreprises in the power sector has been formulated in 1991 based on the recommendations of the expert group and is in tune with the long term interests of the country.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 74

Other than a broad examination of the methodology of privatisation the Committee would not wish to comment on one single enterprise in the State of Maharashtra. However, a guaranteed return of 16%, with assurances about a fixed exchange rate combined with the possibility of bonus related to PLF makes the Committee wonder whether the Government have taken a wholly judicious step. The Committee feel that a level playing field must be provided to all entrepreneurs, whether foreign or Indian. As regards, debt-equity ratio the Committee holds that with private risk capital what must be taken into account is that in India debt tends to be cheaper than equity. This aspect ought to be considered by the Government.

Reply of Ministry of Power

The 16% Return is an element in the fixed charges which can be recovered fully if the plant (thermal) operates at 68.5% PLF. If the plant operates below this level, the fixed charges are reduced in a *prorata* manner. For generation above 68.5% PLF no fixed charges are given but an incentive in the form of additional Return on Equity subject to a ceiling of 0.7% ROE for each one percent rise in PLF may be given. Since the foreign investor is looking for an equity return free from erosion on account of exchange rate fluctuation, it has been allowed to index ROE up to 16% only for the portion of foreign equity in the currency of the subscribed capital. The Government is aware that the debt tends to be cheaper than equity. Therefore, in private power projects a high debt equity ratio of 4 : 1 has been allowed. It may also be mentioned that the tariff notification is equally applicable to both public and private sector, as also to both Indian and foreign private investors.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 75

Supply of Beneficiated Coal to Load Centres - Power Generation

Load Centre stations, particularly stations located more than 750 k.m. away from coal fields should be supplied beneficiated coal with provision for burning the rejects containing about 67% ash, in captive power plants with fludised bed boilers. Pit head generation with low grade coal should continue to be prefered to avoid long haulags of coal.

Reply of Ministry of Power

The recommendation of the Committee is in order. Decision to supply beneficiated coal to Kayamkulam TPS and Yamuna Nagar TPS which are more than 1000 Kms. from the source of coal supply has already been taken and the beneficiated coal from Kalinga block of Talcher coalfield and Piparwar block of Norh Karanpura coalfield is expected by the end of 8th Plan or early 9th Plan. Further, it is envisaged that the washery rejects should be burnt in captive power plant using fluidised bed combustion technology.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 76

Institutional Changes

The Committee conclude that the power sector has become very unwieldy and requires a separation of generation and EHT transmission functions from the distribution functions.

The role of regulatory bodies needs to be properly defined and these bodies suitably structured wherever necessary.

Reply of Ministry of Power

Regarding the separation of generation and EHT transmission function from the distribution functions, it may be stated as follows :

There is a provision for formation of generating companies in the E (S) Act, 1948. Already, generating companies are functioning in the Central Sector and also in some of the States exclusively for generation. Recently, the Government of India has liberalised the provisions of the Act to permit entry of private

parties into this field with some incentives. A few proposals are forthcoming. Therefore, there is no legal hurdle on this account. Secondly, there are already licensees functioning in the private sector who are also distributing electricity in their area of supply. The IE Act and E (S) Act empower the State Governments to issue licensees and earmark the area for their distribution. There are no legal hurdles in this regard also. It is a question of policy of individual State Governments.

Regarding role of regulatory bodies, it is felt that regulatory bodies, like CEA is well defined. If any problems are encountered in this connection, the same can be examined on merits vis-a-vis any restructuring required.

As far as Central Government is concerned, it is concerned with only generation and transmission. With the creation of POWERGRID Corporation of India, erstwhile NTPC transmission functions has been separated from generation functions.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 80

Small Hydro Projects (SHP) and Reliability of SHP

The reliability of the small hydro system can be substantially increased through inter-linked design of small hydro facilities. The hydropower structure should be arranged so that the head-work (or the intake) of one station follows closely the tail-race (open canal for tail water) of the other. The upstream regulating reservoirs can then be designed so that the cascade process raises the dependable output of the whole basin system.

Reply of Ministry of Power

Small Hydro Projects of less than 3 MW capacity are under the purview of the MNES. However, Small Hydro Projects are particularly suitable to meet the electricity needs of the remote hilly areas; where the extension of the transmission lines from the existing grid is uneconomical infeasible. To improve the reliability of supply of power in those areas where inflows reduce drastically in non-monsoon months, the installation of the diesel stations alongwith SHP may also need consideration.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 88

An additional marginal requirement of about 0.5 mt. of diesel fuel can be released by :

— Increasing the traffic carried by electric suburban rail systems in metropolitan cities by 50% more than projected by the railways (*i.e.* 26 BP KM more) resulting in a saving of 1,60,000 tonnes of diesel.

— Improving fuel efficiency of buses from 3.5 km/litre to 4.5 km/litre resulting in a saving of 4,00,000 tonnes of diesel. This could be achieved partly be better maintenance practices, technological improvements in bus design and partly by traffic management measures leading to less congestion and faster flow of traffic.

The Committee regret that there are no comprehensive traffic management schemes (except in metropolitan cities) which are aimed at reducing travel demand and optimising energy use. The Committee urge that suitable efforts in this direction should be initiated.

Reply of Ministry of Power

The steps taken by Railways to conserve energy include *inter-alia* installation of shunt capacitor banks at traction sub-stations, regulating trains such that maximum demand during extension of traction power supply is controlled, switching off stand-by traction transformers, provision of chopper control on d.c. electric multiple units, increasing costing/switching off power when locomotive have to stop/idle, monitoring driving technique, provision of wheel flange lubricators, working under optimum operating parameters, etc.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 89

Freight Movement

In the past few decades there has been a steady shift in freight movement to read and away from railways. This has been a result of not only limits on rail capacity but also willingness of consumers to pay for a more reliable and personalized private road transport service.

However with limited and diminishing resources of petroleum products and the critical position of balance of payment it is in the interest of the nation

to encourage long distance freight movement by railways keeping in view customers'/Shippers' requirements. This could be achieved through a domestic container service, matching the shippers' requirements. The main benefits of a proper domestic container service would be faster transit, lower operational costs, minimisation of time lost in switching from one mode of transport to another, protection against climatic hazards, minimisation of packing cost and damage during transit, reduction in handling and overall improvement in the quality of service.

Reply of Ministry of Power

The reply as given by the Planning Commission, has already been furnished to the Lok Sabha Secretariate *vide* Ministry of Power's O.M. No. 3/1/94-Coord. dated 19-10-1994, Action Taken Replies (Vol. III) Page. 27. The same is reproduced below :

> This has been identified as one of the thrust areas in the Eighth Plan. Paras 9.2.1 and 9.5.21 of Chapter 9, Vol. II of the Eighth Plan document refer. The Government have already passed the Multi-Modal Act for faster and safer movement of goods.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 90

Implementation of Metro Rail

Constructing a metro system along high density route in major metropolitan cities provides a promising strategy. This involves heavy investments which become a binding constraint and necessities funding from external sources. Yet the net benefits to the society from a suitable metro system would be substantial and exceed those from other alternatives. What could be considered is the Build-Operate-Transfer (BOT) option, which would not only ensure a quick and efficient implementation of the project but also bring into existence management and operational expertise that is essential for maintaining the system. The Committee recommends that this concept needs to be explored and seriously considered by the Government.

Reply of Ministry of Power

The above proposal among the other matters is being considered by the Ministry of Urban Development in their Cabinet Note on "Mass Rapid Transit

System in Delhi". A copy of information received from Ministry of Environment and Forests is enclosed for ready reference. (Appendix IV)

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Comments of the Committee

(Please *See* paragraph 19 of Chapter I of the Report)

Recommendation Serial No. 91

Energy Conservation Measures in Industry

If the Eighth Plan targets of energy savings are to be achieved concrete steps need to be taken urgently. Efforts in this direction have failed to make a head way mainly due to an inadequate information base and/or the sporadic and adhoc nature of activities, along with an uncoordinated approach.

There is considerable untapped conservation potential (about 25-30%) in a whole range of energy intensive industries within the sector for which energy efficiency norms and targets need to be fixed for successful policy implementation. Current domestic efficiencies could be compared with those of the World's best technologies available and the potential for conservation estimated. The variables considered could be planned capacity expansions, capacity utilisation, location technology, raw materials used, there substitutability etc. Further the competibility of the current raw materials available in the country to the current output mixed could also be studied. Associated management issues in the industry can be simultaneously investigated. Required policy instruments can be determined keeping in mind both feasibility (technical and managerial) of the change as well as the economic consequences of the policy measures.

Also commercially viable energy efficient technology should be financed at concessional rates and made attractive through fiscal and pricing incentives and selective legislation. This would require a detailed studies of the existing legislation and incentives, reasons for non-acceptance by the industry or slow penetration, requirements of the industry itself, information dissemination as regards the incentives, data base creation on energy efficient technologies, their economic and domestic availability.

Reply of Ministry of Power

I. Incentives

Recognising the importance of energy conservation several fiscal incentives

Government such as relief in income tax by way of allowing 100% depreciation and exception from Customs Duty and Exise Duty. Besides, certain concessions are also available from State Governments and Union Territories in respect of Sales Tax exemptions for various new and renewable sources of energy and energy conservation equipments.

II. Committees

(i) Standing Committee has been set up to study and revise list of energy saving devices and recommending the same to the Ministry of Finance for various fiscal incentives.

(ii) Ministry of Power had also set up Working Group on Selective Legislation in respect of energy conservation. Report of the Working Group is awaited.

III. Data Base

Based on the various energy audits conducted under Indo-EC UNDP and Government of India programmes energy data base has been developed on various sectors by the Energy Management Centre under Ministry of Power.Information dissemination has also been taken up through awareness compaign, workshops and training programmes.

IV. Demonstration Projects/Energy Audits

Ministry of Power has given financial assistance for conducting energy audits in various segments of Industrial sectors. So far, about 200 industrial units have been audited for which financial assistance was provided from Ministry of Power. Substantial energy saving has been reported to the Government by the concerned industrial units.

At present two energy audit programmes are on-going one each in AP and Haryana. In AP 112 large and medium industrial units are proposed to be covered and in Haryana 25 foundaries are to be covered under the study. For both the schemes, 50% of the cost of audit is being provided by Government of India.

A demonstration project has been completed in Nayagaon Cement Plant of CCI in Madhya Pradesh. Under this project energy efficient equipments have been installed to make the plant energy efficient. The evaluation report in this respect is awaited from the National Productivity Council which has been appointed as evaluating agency for the project. The evaluation report shall *inter alia*, give the actual energy saving as a result of the modernisation of the plant.

V. Energy Management Bulletin

Energy Management Centre is bringing out a quarterly bulletin for dissemination of information regarding energy management practices, technologies, Government incentives. Policies regarding conservation and rational use of energy by various target group of consumers, The bulletin also contain information about current activities in energy conservation in India and abroad and also dissemination of information by publishing case studies.

VI. National Award

Ministry of Power has also instituted a National Award for energy efficiency in Industrial Sector. Every year on Energy Conservation Day on the 14th of December, this Award is given to the best performing industry so far as energy use is concerned.

VII. Action taken by Ministry of Industry

Apart from the above, Ministry of Industry plays both regulatory and promotional role in energy conservation. Regulatory mechanism for energy conservation include energy audits evaluation of new technology and equipments and enforcement of energy efficient norms in industry.

NPC is the lead agency under Ministry of Industry which offers its services in conducting energy audit studies in all the sub-sectors of industry. The council had extended services to small, medium and large industries throughout the country. NPC has completed the survey of energy consumption pattern in the urban and rural house holds and is also engaged in training energy auditors. Regular training programmes on energy management for auditors are held.

VIII. Cement Industry

Cement Industry being one of the major energy intensive industry, National Council for Consumption of Building Material (NCCBM) has concentrated its efforts on energy concerned. NCCBM is the apex National Institute for R&D in energy conservation measures in the Indian cement industry. It has instituted the National Award for energy efficiency in the Indian Cement Industry. In various new/expansion/modernisation projects funded under the World Bank lines of credit, special emphasis is being laid on pollution control, energy conservation etc.

IX. Paper Industry

Energy audit studies in paper industry carried out so far have identified an energy saving potential of 20% for this sector. A central pulp and paper Research Institute is engaged in identifying short and long-term measures for reducing energy consumption in various processes in pulp and paper mills.

X. Boilers

Boilers are the major users of fossil fuel. Schemes have been taken up for introduction of new technology for improving the thermal efficiency such as fluidised bed combustion coal gasification and joint cycle plants in the matter. It is also proposed to undertake a survey for pin-pointing the low efficiency of boilers.

XI. Small Scale Sectors

Energy audit studies have been carried out by the small Industries Services Institutes with assistance from Consultancy organisations such as NPC and Tata Energy Research Institute (TERI). About 40% potential has been identified for the small scale sector. In the rural areas Khadi and village Commission has evolved energy conservation mechanism through measures such as utilisation of bio-gas, solar energy, improved chulas etc.

XII. Asian Development Bank

A project has been taken up with the technical assistance from the Asian Development Bank for energy conservation in industries as also environment improvement in industrial sector. This project would concentrate mainly on the public sector units and suggest ways and means of reducing energy consumption and improving pollution control methods in the Industrial sector. For this project, high energy intensive and pollution intensive industrial sectors, *viz.*, cement, pulp and paper, fertilizers, steel and aluminium have been selected as thrust areas.

XIII. National Energy Conservation Plan/Constitution of an Autonomous non-Governmental body.

Ministry of Industry has requested the Administrative units of energy intensive industries such as cement, pulp and paper and boilers to nominate representatives from these industries consumers and other interested groups in the non-governmental body to be constituted by Ministry of Power.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994.]

Recommendation Serial No. 92

Energy Efficiency in Lighting

Power systems at the State level face a shortage during the evening hours, generally from 6 to 9 P. M. which is when the power systems have their peaks. This is the time when there is a sharp rise in the demand for lighting.

With a view to achieving energy efficient lighting in areas relating to commercial, domestic, five star hotels and street lighting, a task force was constituted in the Ministry of Power. This task force suggested a number of demonstration projects aimed at introduction of white fluorescent lamps, compact fluoresent lamps, triband lamps and accessories such as new design of ballasts, p.f. correction capacitors etc. The Committee is of the view that these projects needs to be strengthened.

"Enhanced efficiency in lighting by the use of nonefficient lamps and fixtures".

Reply of Ministry of Power

(i) A demonstration project to evaluate the performance of electronic ballast has been successfully implemented by CPRI during 1992-94.

(ii) A project to design installation and operation of energy efficient and conservation devices had been successfully completed by CPRI in 1993 at Energy Research Centre, Trivandrum.

(iii) The recommendations of the Task Force Committee for set up demonstration projects for efficient lighting in the cities of Delhi, Bangalore and Pune are being followed by Energy Management Centre (EMC) and Tata Energy Research Institute (TERI) with various organisations/manufacturers working in the field.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 93

Energy conservation in Agriculture

Irrigation is one of the major energy intensive and user in the agricultural sector. Table III. 3 summarises the expected savings from various retrofits measures which should considered.

Table III. 3 : Expected saving from the different retrofits procedures involving sub/system components.

Retrofits measures	Expected Saving (%)
1. Replacement of footvalve and suction pipe line (R I)	8 — 12
2. Replacement of footvalve suction and delivery pipe line (R 2) involving sub-system.	10 — 20
3. R 2 — replacement of pumps (R 3) involving entire system.	20 — 40
4. R 3 — change of motor (*i.e* complete replacement) (R 4)	30 — 50

It is very important to monitor the actual effect of retrofits to the utility through feeder level monitoring of the energy consumption. Apart from replacement of pipelines or pumps retrofits jobs should take into account host of the other factors. These could be development of mobile team of trained personnel equipped with requisite instrumentation and tools to undertake site visits. Besides on the exact nature of the retrofits and execute the job in a processional manner.

Suitable legislation may be formulated to make a standard equipment and power capacitors compulsory in rural pumpset connections. Working out suitable incentives to encourage quality control and adherence to standards by the manufacturers (Small scale units) of irrigation pumpsets.

There also exists ample scope for improving the design of contrifugal pumps for agricultural applications.

Reply of Ministry of Power

(i) Power is mostly consumed in agriculture sector by irrigation pumpsets. It is estimated that the inefficient pumping system consumes about 50% more energy than the efficient one. Keeping this in view, Ministry of Power has taken up several demonstration projects in various states of the country. So far about 1,12,000 pumpsets have been rectified under financial assistance from Ministry of Power. Apart from this, various state level energy development agencies are also engaged in improving the efficiency of agricultural pumpsets.

(ii) Recently for improving the power factor on agricultural loads, Government has approved one pilot scheme for installation of capacitors on transformers predominently feeding agricultural loads in five States *viz;* A.P., Gujarat, Punjab, Haryana and Tamil Nadu. The project is under implementation through REC. On completion of the project and on the basis of the performance of the capacitors more programmes may be taken up on a larger scale.

(iii) Legislative measures for the manufacture of energy efficient equipments to be used in agricultural sector, compulsory is also being contemplated and the entire issue is proposed to be referred to the working Group on selective legislation for energy conservation set up by Ministry of Power to go into the details of legislative measures relating to energy conservation.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial Nos. 96 and 98

Electricity Pricing

Pricing of electricity by the SEBs has generally been based on the principle of recovering the average cost of supply. In practice, however, the Board have been unable to recover their overall cost of generation and supply with the unit deficit rising over time. At the national level, per unit revenue loss has increased from 4.13 paise/kwh in 1974-75 to 8.67 paise/kwh in 1980-1981 and further, to 24.7 paise/kwh in 1990-91.

All the SEBs follow a policy of differntial pricing for the supply of power to different consumer categories. Tarrifs are more often set by social and political considerations than by financial and economic efficiency criterion, with revisions made usually in an *ad-hoc* manner. With escalations in costs, the additional costs to be recovered are calculated first, based on which the extent to which the tariffs for high tension consumers can be raised in decided. The balance cost is then adjusted to the extent possible from the low tension industrial, commercial and domestic consumers.

Energy prices, as they currently set in India, do not reflect the true cost of supply to the consumers, not do they take into account the impact of such a price structure in one energy sub-sector on the other energy sub-sectors.

Reply of Ministry of Power

Section 59 of the Indian Electricity (Supply) Act provides that SEBs should fix their tariff in such a manner as would generate a surplus of 3% on the Net Fixed Asset, after providing for their cost of generation, supply etc., depreciation and other expenses. It is true that the SEBs have not, however, been following the provisions of the Section, but generally fix the price of electricity on *ad-hoc* basis. As a result, there has been shortfall in the recovery of cost of generation and supply with the unit deficit effectively rising over a period of time. As per the data furnished by the Planning Commission, the average cost of generation and supply for all SEBs put together during 1993-94 was 149.19 paise/kwh. as against which the recovery was only 120.71 paise/kwh. Thus, every unit of electricity supplied in the year 1993-94 in the country entailed a loss of 28.48 paise/kwh.

The practice of charging differential pricing for supply of electricity to different consumers, category-wise, is widely followed all over the world. Social and political considerations do play a major role in the tariff policy formulation for electricity as against optimising financial and economic efficiency. Even though tariff should be determined on the basis of scientific studies, in actual practice, these are fixed on *ad-hoc* basis in most cases.

One of the methods for fixing tariff for electricity as recommended by World Bank studies is by the Long Run Marginal Cost (LRMC) which will, however, push up the price of electricity in India considerably. The system of fixing the price of electricity based on the historical cost of assets, as provided in the Electricity (Supply) Act, results in low realisation of the cost. It is, therefore, extremely necessary that at least this cost is fully recovered through pricing mechanism.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial Nos. 99, 106, 107 and 108

The Committee recommends the following for consideration of the Government for achieving an appropriate structure.

— the price paid to SEBs and coal/oil companies should be based on the normative efficient cost;

— all electricity consumption should be necessarily metered;

— time-of-day electricity tariffs for some HT industries could be implemented ;

— cross subsidisation should be within the consuming sectors (amongst consumption blocks) and not across sector.

Reply of Ministry of Power

The recommendation of the Committee that the price should be based on the normative efficiency cost has already been taken care of in the fixation of bulk tariff by Central Generating Companies, through issue of a Tariff Notification dated 30.1.1992, as amended. This could also form the basis for fixation of electricity tariff, payable to SEBs, after setting up of tariff Boards at national and regional level.

While the recommendation that all electricity consumption should be necessarily metered is endorsed in principle, practical considerations will necessitate to restrict this, at least for some years to come, to agricultural pumpsets above 5 HP. In this context, it is relevant to mention that the Ministry had already taken up this issue with the SEBs as part of the Action Plan adopted in the last Conference of Power Ministers. The need to instal tamper-proof meters on all HT consumers is also being impressed upon. The Power Finance Corporation (PFC) had conducted a seminar to bring in awareness among the SEBs in this regard and the recommendations have already been circulated to the SEBs concerned.

The next recommendation of the Committee that TOD meter should be provided for some HT industries could also be implemented provided the Electricity Boards are in a position to workout appropriate system, procedures etc. for implementing the decisions. They will also have to take into confidence the industries concerned since this may have an impact on the cost structure of the products manufactured, since most industries use the power during the day time only in view of the restrictions contained in the labour legislation etc. The recommendation of the Committee will have to be examined carefully by each SEB taking into account the local conditions including the extent of availability of power etc. and considered for implementation.

The recommendation that cross-subsidisation should be within the consumer sector will be difficult to implement. Since the maximum subsidy is extended to the agricultural sector, where the number of consumers who could afford to pay the full cost of power supplied would be limited, mainly to those with connected loads of 10 HP and above, the recommendation is not likely to be suceptiable of implementation. In the Indian conditions where most of the economic activities

take place in the urban centres and the generation of income is substantially more in the industry, it would be necessary to continue with cross-subsidisation of supply of power to agricultural sector by the industry for quite some more time. The element of cross-subsidy has to be restricted only by increasing the tariff levied on the agricultural sector (including minimum agricultural tariff) as discussed earlier.

The recommendation would, however, be feasible of implementation in the case of domestic sector where, idealy, the subsidy should be totally eliminated.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 109

Coal Quality and Environmental Issues

Coal is the predominant fuel used in thermal power plants. Indian coal has a high ash (35%) and low sulphur (0.5% or less) content. This implies that the major environmental problem pertains to disposal of ash. Emission of gases is a relatively insignificant problem (unlike the Europe where for instance, acid rain became a major concern) except in areas with concentration of power units, as at pit-heads or in ecologically sensitive areas.

Ash generated from coal based plants is technically simple, and relatively inexpensive to control. However, the lack of installations of suitable devices (especially in older power plants) and the lack of proper maintenance and operation has led to air pollution from thermal power stations being a major problem in many parts of the country. The levels of air pollution in many regions have far exceeded permissible concentrations resulting in increased health risks. Further, the conventional method of disposing ash collected requires large tracts of land and also results in air and water pollution.

Reply of Ministry of Power

Thermal

The report mentions that the Indian Coal contains high ash (35%) and low sulphur (0.5% or less) and emphasises the problem of ash disposal. In this connection, it may be stated that the coal supplies to our power stations contain ash upto about 45%.

The work of improvement of stack emission control equipments by repairs renovation, replacement, is a major activity included in the R&M scheme

sponsored by the Ministry of Power and being implemented by the CEA under the 7th and 8th Plan in respect of thermal power stations being operated in the country.

The CEA is monitoring, unit-wise, the compliance of standards prescribed by the Ministry of Environment & Forests by thermal power stations of 20 MW capacity and above operating in the country. The Task Force appointed by the Ministry of Power had identified that there were 207 units (as on 31.3.1993) which were not complying with stack emission standards. An action Plan has been drawn up by the Task Force for installation of anti-pollution control treatment facilities. As a result of the steps taken, 45 thermal units started meeting the standards during 1993-94 subject to availability of funds, the installation of stack emission control equipment is programmed as under :

1994-95	—	56
1995-96	—	45
1996-97	—	61

Further, to meet the problems arising out of ash disposal, alternative use of fly ash such as bricks, aggregates, road construction materials, etc. are being encouraged. Further, the indigenous R&D activities are also underway to study the chemical properties of fly ash so as to encourage growth of vegetation and land reclamations.

Hydro

Most hydro-electric stations presently under construction are run-of-river scheme which generally involve minimal submergence and rehabilitations. The problem of rehabilitation is significant only in case of storage schemes like Tehri Dam Project and Sardar Sarovar Project. Even in these cases, the problem relating to rehabilitation have more or less been sorted out. The execution of these projects is proceeding at slow pace on account of paucity of funds.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994.]

Recommendation Serial No. 112

Environmental Damage Costs

In corporate cost of environmental damage/mitigation measures into project appraisals. Adequate and comprehensive incorporation of environmental costs and benefits of using a particular technology or resource should form part of project

analysis. This, the Committee, believes would lead to more rational choices in the energy sector.

Reply of Ministry of Power

At present cost of environmental damage to the environment due to any proposed thermal scheme has not been estimated as environmental clearance to a thermal scheme is accorded only if the emissions from the proposed scheme are within stipulated limits and hence no need is felt, at present, for estimating the costs of environmental damage. The cost of devices required for pollution control is being included in the total cost of the project.

Environment cost benefit analysis of using particular technology requires long term exhaustive and authentic data based on various environmental parameters like air and water quality, epidemiology, vegetal cover etc. Since such data base do not exist in our country, cost benefit analysis has not been attempted in our country so far.

Whenever adequate data base is available, cost benefit analysis of using particular technology could be undertaken.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Comments of the Committee

(Please *See* paragraph 25 of Chapter I of the Report)

Recommendation Serial No. 113

Rehabilitation of Families

Device a comprehensive and humane policy for the rehabilitation of families affected by developmental projects. Such rehabilitation ought to precede, not follow the launching of projects involving displacement of people.

Reply of Ministry of Power

Submission of Rehabilitation and Resettlement (R&R) Plan by the Project proponents to the Ministry of Environment and Forests (MOE&F) is one of the pre-requisite for getting environmental clearance for the scheme. In case of State Sector projects, the Ministry of E&F always insist that R&R Plan has the approval

of the State Government. The R&R Plan submitted by project proponents is examined by the Environmental Appraisal Committee (Thermal) (EACT) of MOE&F and only after EACT/MOE&F is satisfied with the provisions of R&R Plan the scheme is accorded clearance.

In case of NTPC projects, R&R plan formulation takes place simultaneous to land acquisition. In case of State Sector projects, the rehabilitation and resettlement plan is implemented by the project proponents in accordance with the plan approved by the State Government.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Comments of the Committee

(Please *See* paragraph 28 of Chapter II of the Report)

Recommendation Serial No. 115

Pollution Control Measures

Ensure that adequate pollution control measures are undertaken and suitable devices installed, and more importantly operated and maintained in Power Plants and refineries.

Reply of Ministry of Power

While according environmental clearance to a scheme various mitigating measures which are to be undertaken by the project proponents are highlighted by MOE&F and the State Pollution Control Board in its environmental clearance. If the pollution control devices are not installed/operated by the project proponents, the environmental clearance could be revoked by MOE&F till remedial measures are adopted by project proponents.

The CEA is monitoring unit-wise, the compliance of standards prescribed by the Ministry of Environment and Forests by thermal power stations of 20 MW capacity and above operating in the country. Adequate pollution control measures are provided at all the NTPC stations. For ash pollution control, high efficiency Electro-Static Precipitators (ESPs) are provided to control emission of Suspended Particulate Matter (SPM) within the standards. In cases, wherever the emission exceed the permissible limits the ESPs are being augmented. Dust emission from

coal handling areas is controlled by providing appropriate dust suppression extraction systems. To control water pollution in areas where discharge of condenser cooling water is likely to affect the aquatic life, cooling towers are provided. All the effluents emanating from the station including sewage is adequately treated to meet the regulatory standards before discharge.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 117

Use of effluents

Examine and promote the use of effluents as raw materials, as in the use of ash for the manufacture of cement or bricks. The Committee, wishes to emphasize R&D and demonstration projects in this regard. Suitable incentives to entrepreneurs need to be provided to promote such alternative use of effluents.

Reply of Ministry of Power

As per the present guidelines of MOE&F full utilisation of ash within 9 years with 20% of fly ash should be put in use within one year of commissioning and 10% progressively for next 8 years be adopted. The above stipulation may result in Research and Development in utilisation of fly ash and may result in its adoption in coming years.

NTPC has already taken major policy decision/action to promote utilisation of ash. Some of them are :

1. NTPC has already set up demonstration-cum-pilot brick making plant using ash at Badarpur, Ramagundam and Korba Super Thermal Power Stations with a view to internally use and promote ash brick in construction in adjoining areas of power stations. Few more such demonstration-cum-pilot brick plants will be established in other power stations progressively.

2. A policy decision has been taken to utilise fly ash based Port and Puzzalana Cement in future construction activities in NTPC stations from 01/01/95 wherever technically feasible. All cement manufacturers have been informed accrodingly. Presently also, fly ash are being taken by some Cement and Asbestos product manufacturers from NTPC Power Stations for the manufacure of cement and

asbestos sheets. In the year 1993-94 about one lakh tonne of fly ash has been issued to such industries from NTPC Stations. This quantity is expected to increase further if suitable tax concession is given by Government to make such fly ash based cement cheaper than ordinary Portland Cement.

3. NTPC has taken policy decison to give land on concessional lease rent basis (wherever such land is available), ash free of cost to Small and Tiny entrepreneurs, Water/Steam and Electricity on chargeable basis wherever, technically feasible with a view to promote entrepreneurs in setting up ash based industries at or near NTPC Station. As a result of this policy initiative a MOU with an entrepreneur to set up a plant at RSTPP has been signed. A few such proposals for setting up ash based industries are under active consideration in different stations.

4. In the specification for future civil works, ash based bricks, fly ash based portland Pozzolana Cement has been included.

5.Several R&D efforts, both in-house and with outside research organisation *e.g.* CPRI Dhanbad, RRL Bhopal, CPRI Delhi, NCBM Ballabhgarh etc., have been initiated for finding alternative use of ash in agriculture, waste land development, Road Construction, Mortar and plastering etc.

6. Ash is being regularly used in NTPC stations for raising the height of existing ash dykes and filling of low lying areas for development.

7. To increase utilisation of ash by industries, retrofit dry ash extraction and collection system are to be implemented in NTPC stations in a phased manner. All future NTPC units will have dry ash extraction and collection system as a part or the specifications itself while tendering.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 119

Strengthen administrative arrangements for monitoring and enforcing of Environmental standards; decentralise environmental impact assessments and environmental law enforcement based on cooperation with local authorities.

Reply of Ministry of Power

While according environmental clearance to a scheme various measures for monitoring and enforcing of environment standards to be undertaken by the project proponents are high-lighted by Ministry of Environment and Forests in its environmental clearance. If Environmental Standards are not followed by the project proponents, the environmental clearance could be revoked by the Ministry.

For enforcement of environmental standards in any project, the Ministry of Environment and Forests is co-ordinates with the State Government and local bodies, where the project is located.

2. Power

A shift in emphasis from additions to generation capacity to the performance of T & D network so as to reduce the transmission and distribution by 5% 1996—97.

This aspect has been taken in right earnest and various transmission schemes have been planned in the Central Sector. States have been advised to put up various system improvement schemes and give priority to their implementation. PFC has been advised to provide loan for system improvement schemes for both transmission and distribution network on priority.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 118

Integrating the functioning of sectoral ministries, State Governments, local bodies and agencies responsible for planning and implementation of development projects. Integrating environmental concerns more effectively in all policy areas and strengthening governmental and institutional structures dealing with environmental management, especially within the ministries concerned.

Strengthen administrative arrangements for monitoring and enforcing of environmental standards; decentralise environment impact assessments and environmental law enforcement based on cooperation with local authorities.

Reply of Ministry of Power

Ministry of Environment & Forests (MOE & F) *vide* the Environmental Impact Assessment Notification, 1994 (As amended on 4.5.1994) have notified the following procedures for seeking environmental clearance of thermal power projects.

For setting up of a new thermal power project or expansion or modernisation of any existing project (if the investment is Rs. 50 crores or above), an application in the prescribed proforma should be submitted to Secretary, Ministry of E&F together with project report which shall, *inter-alia*, include 20 copies of Environmental Impact Assessment Report/Environment Management Plan and Risk analysis report, NOC from State Pollution Control Board, commitment regarding availability of water, summary of project report/feasibility report, filled in questionnaire, and a comprehensive rehabilitation plan, if more than 1000 people are likely to be displaced (otherwise a summary plan would be adequate). As a comprehensive EIA report will normally take at least one year for its preparation, project proponents may furnish a Rapid EIA report to the Impact Assessment Agency (IAA), for pit-head TPPs, the project authorities will intimate the location of the site to the MOE & F while initiating any investigations and surveys. MOE & F will convey a decision regarding suitability or otherwise of site within a maximum period of thirty days. The site clearance shall be granted for a sanctioned capacity and shall be valid for a period of five years for commencing the construction.

Cases rejected due to submission of insufficient/inadequate data/plans may be reviewed as and when submitted with complete details. Submission of incomplete details for the second time would itself be sufficient reason to reject the case summarily.

The reports submitted with the application shall be evaluated and assessed by the Impact Assessment Agency. A Committee of experts, having experts from various concerned fields, has been constituted by MOE&F under EPA Act for assessing the impact on environment. The assessment shall be completed within a period of ninety days from receipt of the requisite details, after completion of public hearing, where required, and the decision conveyed within thirty days thereafter. If no comments from Impact Assessment Agency are received within the time limit, the project would be deemed to have been appraised as proposed by project authorities. Construction work preliminary or otherwise may be undertaken only after the environmental and/or site clearance is obtained.

Management of Thermal Power Projects

As per the MOE & F's latest environmental guidelines for Thermal Power Plants, following safeguards must be built during the construction phase of TPS and their effectiveness maintained periodically after the plant has become operational :

(i) *Solid Wastes :*

(a) Provision for dry fly ash collection should be made.

(b) Full utilisation of ash should be made for constructive purposes such as in bricks, blocks, cement, construction work etc. The plan should be as follows– 20% of the fly ash should be put into use within one year of commissioning. Thereafter 10% progressively for next 8 years and 100% within 9 years. However, if the project proponent can prove, based on the techno-economic feasibility, that full utilisation is not feasible, relaxation in this regard could be considered by MOE & F.

(c) In case of expansion of the existing capacity, all civil works (filling, bricks etc.) should be done by using fly ash to the maximum extent possible.

(d) When the reuse of solid wastes is uneconomical for any particular location, the ash should be used as land-fill or disposed of in some other environmentally acceptable manner ; *e.g.* in abandoned underground mines, not susceptible to seepage.

(e) Ash disposal areas should be planned downwind of villages and townships.

(f) The site for waste disposal should be such that inorganic substances do not contaminate the ground aquifers, surface water bodies, estuaries, sea etc.

(g) A detailed and phased programme for stabilisation of disposal areas should be prepared through creation of vegetal covers. The ash disposal areas should be divided into a number of blocks so that when one block has been filled up with ash, the other would be taken up for filling. The filled-in blocks should be provided with vegetal cover.

(ii) *Human Settlements :*

(a) The rehabilitation of persons who are displaced or have lost agricultural land due to setting up of the power plant should be carried out by the project authorities in consultation with Central/State Government to the satisfaction of the affected population. The project authorities should meet the cost of rehabilitation.

(b) Residential colonies should be located on upwind side away from the power plant at a distance more than 20 times of the stack height.

(iii) *Air Pollution*

(a) Monitoring of background pollution levels should be carried out regularly with all precautionary measures so that reliable estimates could be made as to the impacts on the ambient air quality from the plant concerned.

(b) The stack height of the TPS should conform to the standards prescribed by Central/State Pollution Control Board for better dispersal of pollutants over a wide area.

(c) Adequate control equipment should be installed for controlling the emission of pollutants from the various stacks as per the standard stipulated by the Central/State Pollution Control Boards. In those special circumstances when sulphur removal is considered essential (*e.g.* for high sulphur fuel), multiple stations in close proximity, future variations in fuel quality etc., provision should be made for desulphurization.

(d) For start-up and for flame stabilisation at partial loads, a low sulphur fuel should be used for reducing SO_2 emissions.

(e) Efficiency of pollution control equipment should be monitored and recorded regularly. Pollution Control equipment should be designed for the worst anticipated quality of coal. The thermal characteristics should be taken care of.

(f) The emission levels of pollutants from the different stacks should conform to the pollution control standards prescribed by Central/State Pollution Control Boards.

(g) An adequate monitoring and recording system for estimation of stack emission of sulphur dioxide, oxides of Nitrogen and particulates from the stack of the TPS should be established. Further, it is recommended to monitor the efficiency of boiler by continuously monitoring the emissions of O_2, CO and CO_2.

(h) Ambient air quality monitoring should be undertaken regularly in areas near the power plant. Infrastructural facilities including meterological observations should be provided for monitoring emissions and measuring the ambient air quality in the areas.

(iv) *Water Pollution*

(a) Liquid effluents especially those containing oils, grease, resins and other chemicals from the power station should be treated as per the standards prescribed by the Central/State Pollution Control Boards.

(b) Mode of final discharge i.e. open channels, pipelines covered drains be judiciously decided and point of final discharge on fallow land, agricultural land, river, lake, bay, estuaries, sea be looked into for quality after discharge.

(c) The hot water discharge from the condenser should be cooled down as per the standards of the Central/State Pollution Control Boards before being discharge into the surface water to avoid any adverse effect due to thermal pollution on the aqautic life (fishes, phyto and zoo-plankton) and marin life (oysters, corals, shrimp, crabs etc.). It is desirable to study the potential impact of heated water on the aquatic life in water sources near the discharge. The rise in ambient water temperature from the discharge should be periodically monitored.

(d) Appropriate steps for disposal/reuse of ash slurry must be taken so that adjoining surface of groundwater supplies are not polluted.

(e) Precautions be taken to prevent pollution of water bodies and ground water from solid waste disposal, especially with regard to coal particles and ash slurry. Special care should be taken to prevent leaching of heavy and toxic chemicals.

(f) Apart from physico-chemical estimation, assessment of water quality by biological indicators (bacteria, algae and mecro-invertebrates) may be periodically carried out.

(v) *Noise and Vibrations :*

Adequate measures should be taken to control the levels of noise and vibrations as per the standards stipulated by Central/State Pollution Control Boards. Workers should be provided with ear plugs or ear muffs for their protection. Vibrations must be controlled at source as ear plugs or ear muffs will not provide protection against vibration hazards.

(vi) *Occupation Safety and Health :*

Proper precuationary measures for the workers engaged in coal handling operations should be taken. They should be examined regularly for lung diseases. Personal protective equipment such as dust masks, respirators, helmets, face shields etc., should be provided to the workers.

(vii) *House Keeping :*

(a) Proper house keeping and cleanliness should be maintained both inside and outside the plant.

(b) A green belt with a width varying between 50—500 metres should be designed in such a way as to help attenuate to the maximum extent possible the noise and fugitive emissions and also to improve aesthetics. Creation of green belt should be taken up simultaneously with the construction activity.

(viii) *Emergency Planning :*

(a) Disaster management planning for meeting emergency situations arising due to fire and/or explosions particularly in the coal, oil and gas handling areas is essential for all power stations. Fire fighting equipment should be kept ready for use during emergencies.

(b) Redundancies and space capacities have to be built into the pollution control system so that the stipulated standards are always adhered to under worst possible scenario.

(ix) *Environmental Management Cell :*

An environmental management cell with multi-disciplinary expertise and training facilities should be established at the TPS for managing the environmental problems arising both within and outside the plant. Environmental Management Cell should be headed by a person of the rank not less than that of Deputy General Manager who would report directly to the Chief Executive of Plant. Environmental Cell should have multi-disciplinary group comprising of biologist, ecologist, environmental/chemical engineers, chemist, sociologist, meterologist with mathematical modelling experience etc.

Based on the above guidelines, MOE & F while according environmental clearance for a particular TPS is stipulating following specific conditions/ safeguards, depending upon the location/type of the plant, which are to be implemented by the project proponents :

(i) Stack height should be provided as per MOE & F's notification dated 19.5.1993 for dispersion of SO_2 emission.

(ii) Electrostatic precipitators (ESPs/alternate dust collecting equipment e.g. bag fitters etc. with operational efficiency of not less than 99.8% should be provided so that the particulate emissions should not exceed 150 mg/Nm3.

Strengthening of Administrative Arrangements

State Electricity Boards and the Central Power utilities have been advised for creation of Environmental Management cells at their power stations and also at their Headquarters.

At some of the power stations, the Environment Management Cells have already been set up while at others these are being established. Efforts are also being made for strengthening the thermal power stations. Environmental Management monitoring system in the CEA.

In case of NTPC, an effective institutional set up exists in the area of Environment Management, Community Development, Horticulture and Safety.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 120

To provide funds, qualified staff and other facilities like laboratories, equipment to implementing organisations.

Reply of Ministry of Power

The Ministry of Environment & Forests is insisting for creation of an Environment Management Cell with appropriate expertise and training for utilities in thermal power projects for managing the environmental problems arising both within and outside the plant. The cost of equipment etc. for creation of various facilities is being included in the cost of the project and this aspect is taken care of while according techno-economic clearance by CEA. Some of the SEBs like MSEB have also proposed to set up an environment management cell at the corporate level and also to strengthen the environment set up at the power station level as a part of the financial assistance extended by the World Bank.

Well equipped chemical laboratories are available at each NTPC station manned by qualified personnel. These laboratory facilities are continuously updated with sophisticated instruments.

To provide professional training in operational maintenance of pollution control treatment devices and laboratories; in setting standards; in management of hazardous waste; and in modelling data processing, legal aspects to the staff concerned.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 121

To provide professional training in operation maintenance of pollution control treatment devices and laboratories; in setting standards; in management of hazardous waste; and in modelling data processing, legal aspects to the staff concerned.

Reply of Ministry of Power

NTPC have informed that they have nominated its staff in various areas for outside training and also holds internal training courses regularly. As regards SEBs and other utilities, CEA have advised that a National Institute of Power and Environment may be established independently or a separate wing under the National Power Training Institute be set up to cater to the requirements of training facilities of power personnel on environmental issues.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Comments of the Committee

(Please *See* paragraph 28 of Chapter I of the Report)

Recommendation Serial Nos. 129 and 130

Improve the efficiency of operations of thermal power plants in respect of thermal efficiency, plant load factor, peaking capacity, reduction in forced outages and in auxiliary consumption of power. The impact of the ongoing R & M programmes need to be monitored and reviewed on a regular basis.

A shift in emphasis from additions to generation capacity to the performance of T & D network so as to reduce the transmission and distribution losses by 5% by 1996-97.

Reply of Ministry of Power

The following actions have been taken to improve the efficiency of operations of thermal power plants in respect of the various performance parameters:

(i) *Thermal Efficiency :*

In respect of thermal power stations the thermal efficiency is normally indicated in the form of heat rate-Kcal/Kwh. In order to improve the heat rate, various actions have been taken including renovation and modernisation to provide better design of components in the boiler and for improving the performance of regeneratives systems etc. Provision of higher capacity units is also improving the heat rate because of better design of the equipments.

(ii) *Plant Load Factor :*

For improving the plant load factor of the existing thermal stations, a number of actions have been taken, like, renovation programme of thermal stations, training of O & M personnel of the utilities, concerted efforts for improving the coal supplies and flattening of the system load curve. As a result of various actions the plant load factor at all India level has improved to 61% in the year 1993-94 against a target of 57.8% for the same period. The target PLF for the year 1994-95 has been kept at 62% and it is expected that it would be possible to achieve this target.

(iii) *Peaking Capacity :*

In order to improve the peaking capacity the partial unavailability of thermal units is to be reduced through R & M efforts as well as better workmanship. Utilities are impressed upon to do their small maintenance jobs during off-peak hours to enable all the auxiliaries to operate at full load during the peak load. In order to improve the peaking capacity, Gas based thermal stations as well as combined cycle gas turbined are being added in the new schemes.

(iv) *Reduction in Forced Outages :*

Various actions taken to reduce the forced outage rate are constant monitoring of the various break-downs, monthly discussions with BHEL and representatives of utilities in CEA Headquarters as well as visits of CEA engineers to various thermal stations. The management of various utilities have been advised to improve their operations and maintenance practices to reduce the occurrence of forced outages as well as to reduce the duration of each outage. One major reason responsible for high forced outage rate is the financial constraints in having the optimum spare-parts management essentially required for thermal stations. As a result of all these efforts, the forced outage rate has reduced from 16.5% in the year 1990-91 to 13.2% in the year 1993-94.

(v) *Auxiliary Consumption of Power :*

The auxiliary consumption for various thermal stations have reduced from 10.8% in the year 1985-86 to 9.6% in the year 1991-92. This parameter does not have much scope for improvement. The auxiliary consumption for relatively new stations is very much on the lower side around 8.3% for 500 MW units. However, it is very difficult to improve the auxiliary

consumption in respect of old stations because all these stations are having electrical equipments of old design which are of inefficient designs. Due to damage/failure the electrical equipments need replacement and the same is being done by equipments of better designs keeping energy conservation in view. Due to financial constraints, it is not possible to replace all the electrical equipments of inefficiency designs with latest equipments of efficient designs.

(vi) *Impact of ongoing R & M Programme :*

The R 7 M Programme (Phase-I) of thermal power plants was launched during Seventh Plan with objectives, which included improvement in availability (PLF), improvement in efficiency, uprating extension of life, sustenance and environmental upgradation. The programme is in advance stage of completion. The R & M Programme (Phase-II) of thermal power plants has also been launched for implementation during Eighth Plan. Both the R & M Programmes are regularly monitored in Central Electricity Authority. Monthly Progress Reports are received from the implementation agencies and are regularly analysed in CEA. Task Force have been constituted by SEB to review the progress and to take the remedial action for ensuring timely completion of R & M scheme. The implementation of the programme is also reviewed from time to time in the Ministry of Power.

(vii) *Reduction in T & D Losses :*

MOP has been advising the power utilities in the country from time to time during Annual Plan discussions to give priority to T & D sector in their States so as to improve the same. In fact the States are impressed upon to formulate specific schemes for system improvement both in urban and rural areas and to earmark exclusive funds for them while preparing Annual Plan proposals.

In the last Power Ministers Conference held in January, 1993, it was resolved that each State would reduce their T & D losses by 1% each year in the 8th Plan in the nation as a whole.

(viii) This aspect has been taken in right earnest and various transmission schemes have been planned in the Central Sector. States have been advised to put up various system improvement schemes and give priority to their implementation. PFC has been advised to provide loan for system improvement schemes for both transmission and distribution network on

priority.

(ix) *Rationalise the supply mix :*

Thermal generation has been increasing in comparison to hydel generation of power as thermal generating capacity has increased in comparison to hydro since 1963.

The main reasons for addition of more thermal capacity as compared to hydro capacity are :

(i) Long gestation period of hydro projects;

(ii) Problems relating to environmental issues, land acquisition and rehabilitation & resettlement;

(iii) Inter-State disputes on sharing of water.

Government has set up a Committee comprising of members from the Planning Commission, Ministry of Finance, Ministry of Power and CEA for evolving ways and means to increase the hydro share to 40% by the end of 9th Plan. CEA has identified sanctioned, CEA cleared and new schemes hydro that should be taken up for implementation immediately to achieve this objective. Special efforts are also made towards harnessing hydro potential such as modification in the financial administrative and legal environment to attract private investment in private sector, liberalisation in the monetary limit of the estimated cost of the project in the State Sector requiring investment sanction by the Planning Commission besides this other measures had also been taken in the past in this regard, such as creation of Central/Joint Sector Corporations like NHPC, NEEPCO, NJPC and THDC etc, providing funds for hydro projects through external assistance.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Comments of the Committee

(Please *See* Paragraph 14 of the Chapter I of the Report)

Recommendation Serial No 131

Rationalise the supply mix so as to restore an optimal thermal-hydel mix.

Reply of Ministry of Power

The hydro thermal mix of 40 : 60 is a considered ideal to meet the power demands in an optimum manner. However, the hydro share which was 50.62% in 1963 has declined to 26.68%. The measures taken to improve the hydro share are as under :—

— Creation of corporations in the Central Sectors/Joint Sectors exclusively for development of hydro potential such as NHPC, NEEPCO, NJPC and THDC;

— Encouraging the Private sector to invest and participate in hydro development;

— Providing funds for hydro projects through external assistance besides budgetary support, through World Bank. OECF, bilateral agreements etc;

— Sanction of a shelf of hydro projects for implementation. In all, 93 H.E. projects with a total installation of 18155.55 MW are sanctioned and some of them are under active implementation.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 133

As identified in this report the savings on account of demand side management run into thousands of crores of rupees. Not only are they low cost, they have a short gestation period implying a quick pay back. The most prominent of these are :—

— a shift from road to rail in freight movement ;

— a shift from private to public means of transport ;

— need for comprehensive traffic management schemes ;

— enhanced efficiency in lighting by the use of more efficient lumps and fixtures ;

— improving the efficiency of motors and pumpsets in the agricultural sector ;

— conservation measures in the industrial sector.

A majority of the measures outlined above, can be implemented in a relatively short period of time, steps should be taken to ensure that conservation measures identified are implemented and that they do not remain on paper. Over the long term, it is important to ensure that institutions are strengthened and capabilities built-up to deal with the challenges and realities emerging in the energy sector.

Reply of Ministry of Power

The steps taken by Railways to conserve energy include *inter-alia* installation of shunt capacitor banks attraction sub-stations, regulating trains such that maximum demand/during extension of traction power supply is controlled, switching off stand-by traction transformers, provision of chopper control on D.C. electric multiple units, increasing coasting/switching off power when locomotives have to stop/idle, monitoring driving techniques, provision of wheel flange lubricators, working under optimum operating parameters, etc.

The use of Sodium Vapour Lamps, Mercury Vapour Lamps and Fluorescent Tube Lamps have been increased in place of Incandescent Lamps at different locations, installing of capacitors banks to improve power factor and reduce maximum demand, staggered working of machine in workshops, sheds, provision of sodium vapour, proper control of street and yard lighting, rationalising of electric pumping hours, providing 80%/20% lighting on railway platforms/ workshops, increasing use of non-conventional sources of energy etc. have been adopted for energy efficient, lighting/conservation.

Power is mostly consumed in agricultural sector by irrigation pumpsets. It is estimated that the inefficient pumping system consume about 50% more energy than the efficient one. Keeping this in view, Ministry of Power has taken up several demonstration projects in various States of the country. So far about 1, 12, 000 pumpsets have been rectified under financial assistance from Ministry of Power. Apart from this, various State level energy development agencies are also engaged in improving the efficiency of agricultural pumpsets. Recently for improving the power factor on agricultural loads, Government has approved on pilot scheme for installation of capacitors on transformers predominantly dealing agricultural loads in five States, *viz.* Andhra Pradesh, Gujarat, Punjab, Haryana and Tamil Nadu. The project is under implementation through REC. On completion of the project and on the basis of the performance of the capacitors more programmes may be taken up on a larger scale.

Regarding conservation measures in industrial sector, the reply is the same as given under :—

"Energy Conservation Measures in Industry"

(Serial No. 91)

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 133

Demand Side

Improving the efficiency of motors and pumpsets in the agricultural sector.

Reply of Ministry of Power

The reply is same as given under Energy Conservation in Agriculture' (Sl. No. 93).

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 134

It is the opinion of the Committee that to meet future energy demands, additional resources for expansion and upgradation of the energy supply system would have to be ensured by means of internal resource generation by the supply companies.

Reply of Ministry of Power

The views of the Committee on the importance of adequate Internal Resources generation by the power supplying companies to meet future energy demands is fully endorsed. Multilateral funding agencies insist on a self-financing ratio of 20% as a condition—precedent for being eligbile for borrowings from them. Ideally, the Generation Companies in the country should be able to achieve the above ratio.

The 8th Five Year Plan envisages a total investment of Rs. 79,589.32 crores for the power sector with an allocation of Rs. 31,181.58 crores for the Centre, Rs. 46,961.86 crores for the States and Rs. 1,445.88 crores for the UTs. The Internal Resources component of the total fund requirement was expected to be

of the order of Rs. 2,206 crores for the Central Sector. Whereas the State Power Utilities had projected Internal Resources generation at Rs. (–) 11,352 crores. Thus, the net IR generation of the power sector was projected as Rs. (–) 9326 crores at the beginning of the 8th Plan.

As reported by Planning Commission if SEBs were to financially break-even, they would be able to mobilise substantial revenue to the extent of around Rs. 6095 crores in 1994-95. In case they could achieve 3% ROR, they would be able to mobilise revenue to the extent of around Rs. 7235 crores, as may be seen from the table below :—

Additional Revenue Mobilisable from various measures

(Rs. in crores)

	With 0% ROR	With 3% ROR	With 50 P/u Agri.
1990-91	3674	4509	1863
1991-92	4052	4959	2176
1992-93	4329	5411	2137
1993-94	4980	6071	1924
1994-95	6095	7235	1943

These surpluses could obviously be generated only through two related means, namely tariff rationalisation and improvements in their operational efficiency. With adeqaute surpluses, the SEBs would be in a position to invest in critical areas such as R & M System, Improvement Scheme etc., which in turn would enhance their viability.

The other aspect of increasing the internal resources is the unrecovered revenues of SEBs outstanding against various categories of retailed consumers. The outstandings of SEBs have increased from Rs. 4477 crores in 1991 to Rs. 6070 crores in 1992-93 working out to about 30% of the annual sales turn over of the SEBs during these years. On the other hand, the SEBs also owe to the major Central Sector power undertakings like NTPC, NHPC, REC, NEEPCO etc. to the tune of Rs. 5,178.60 crores as on 30th June, 1994. These dues have adversely affected the performance of the Central Sector power undertakings and in turn have affected their internal resource mobilisation. Since matters showed no improvement and were only becoming worse we had to seek Cabinet's approval for recovery of outstanding dues through Central Appropriation. The approval that has been recently received in May, 1994 is for the outstanding dues from June, 1992 to 31.3.1994 to NTPC, NHPC, PGCIL, DVC and NEEPCO for a total

of Rs. 1599 crores, to be adjusted in 4 annual instalments. Realising that recovery through Central Appropriation cannot be a long term solution to the problems, the Committee of Secretaries went into this matter and have recommended some of the following measures :—

(a) For the current dues, SEBs shall open an irrevocable LC in favour of their suppliers to the tune of 105% of their past average monthly billing;

(b) As regards the arrears, these are to be cleared at the rate of 25% of the monthly average billing each month;

(c) A convincingly transparent but speedy Dispute Resolution Mechanism to be set up. This will be an informal system where the concerned SEBs and CPSUs put forth their facts for quick scrutiny and equitable decisions. Umpires region-wise would be appointed for this purpose.

Ministry of Power is actively taking up the matter with State Governments/ SEBs to ensure compliance on the above lines. Umpires have been appointed for the Southern & Northern Regions already.

State Electricity Boards/State Governments have been requested from time to time including in the Power Ministers' Conferences etc., to take measures such as tariff rationalisation reduction in T & D losses, introduction of minimum agricultural tariff of 50 paise/Kwh., timely payment of RE subsidy, signing and monitoring of Operational and Financial Action Plan (OFAP) by Power Finance Corporation, improvement in Plant Load Factor, Conversion of State Governments loans into equity etc. Due to the persistent efforts by the Ministry of Power 21 States/UTs have implemented the minimum agricultural tariff of 50 paise/Kwh. The All India Plant availability of Thermal Units in the country increased from 71.7% in 1990-91 to 76.8% in 1992-93. The average PLF increased from 53.8% in 1990-1991 to 61% in 1993-94. 12 SEBs and 6 SGCs have so far signed OFAP with PFC and the others are in the way. Reduction in T & D losses has been brought down to 20.54% in 1992-93 from 21.09% in 1989-90. Nine SEBs have above 3% ROR during 1993.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 135

Resources would have to be mobilized from the private sector, both from within and outside the country. This would require :— identification of areas, the development of which would be completely entrusted to the private sector, such as service activities related to production of crude oil and natural gas, washeries

for non coking coal, SSF/coal briquette units, and T & D operations in the power sector in view of the lukewarm response from the private sector there is a need to continuously review the incentive package for encouraging private sector participation.

Privatisation, though inescapable, ought not to become an indiscriminate free for all.

Reply of Ministry of Power

The present private power policy allows entrusting electricity generation, supply and distribution to the private sector.

The response to the policy is encouraging. As on date proposals have been received for setting up of 75 power projects totalling a capacity of 32,662 MW, and costing approx. Rs. 1,04,152 crores. Proposals have also been received from privage sector to distribution in two electricity circles.

The policy does not discriminate between the public and private sector projects set up after 30.3.1992.

There are adequate institutional and legal safeguards for scrutinising the private power proposals with regard to their essentiality, techno-economic viability and reasonableness of costs.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial Nos. 136, 137 & 139

1. Establishment of an Energy Commission

2. Establishment of an Energy Pricing Commission

3. Constitution of a National Energy Conservation Plan.

Considerable restructuring of the institutions involved in the energy sector appears as vital for a re-orientation of the country's energy policy. The Committee suggests as follows :

an Energy Commission headed by the Prime Minister for evolving and integrated energy policy and to ensure balanced development in an environmentally and socially sustainable fashion. The Commission should draw participation from various Ministries (Power, Coal, Petroleum and Natural Gas, Environment and Forests, Non-Conventional Energy Sources), the Planning Commission and State Governments.

an autonomous regulatory body may be established which could draw participation from the producers, consumers, government, industry and other experts to discharge the following functions :

(i) assist in drawing up medium term plans of energy supply by boards/ companies ;

(ii) set prices based on the normative efficient costs so that the cost of inefficiencies in the supply system are not passed on the consumers ;

(iii) ensure an integrated approach to energy pricing to achieve an optimal energy consumption and desired inter-fuel substitution.

This autonomous body may be in the form of an Energy Pricing Commission, with Statutory powers to set and regulate energy prices for the producers and consumers, while ensuring transparency in its operations.

An empowered Committee should be set up to expedite decision making on the proposals submitted by the private sector for oil and gas exploration and production, marketing of petroleum products, transportation and supply of natural gas, power generation and its T & D, etc.

In a similar manner, an autonomous non-governmental body with representatives from industry, consumers and other interest groups should be constituted to draw up a National Energy Conservation Plan, for each of the energy intensive industries.

This would help in achieving the full energy conservation potential. It is proposed that the National Energy Conservation plan be drawn up in the manner similar to the country programme for India for phasing out Ozone Depleting Substances (OSD) under the Montreal Protocol. Such a programme would require the joint effort of the Government and the industry to bring about a more concrete and well defined sease of purpose in the implementation of the programme.

Reply of Ministry of Power

A note has been submitted by the Ministry of Power for Coordination Committee of Secretaries on the proposal of Planning Commission recommending, *inter alia*, setting up a National Energy Conservation Authority under the Cabinet Secretariat. Once the proposal of Planning Commission and our comments thereon are considered by the Coordination Committee of Secretaries, a note on the

suggestion made by the Standing Committee would be submitted, it necessary, particularly in view of the fact that issue relating to granting autonomy to Energy Management Centre (EMC) is under active consideration.

With regard to constitution of an autonomous non-Governmental body to draw up a national energy conservation plan, it is mentioned that the National Energy Conservation Plan is presently being formulated by the Planning Commission on the basis of the inputs received from various Ministries in the energy sector and various semi-Government/Non-Governmental bodies, like, EMC, National Productivity Council and Tata Energy Research Institute. Simultaneously, the issue of strengthening/restructuring of EMC as an autonomous body suitably strengthened is under active consideration of the Government. The proposed restructuring would reflect the concern shown by the Standing Committee and the needs of the country.

Establishment of an autonomous regulatory body :

This autonomous body may be in the form of an Energy Pricing Commission, with statutory powers to set and regulate energy prices for the producers and consumers, while ensuring transparency in its operation.

Establishment of Statutory National and Regional Power Tariff Boards

Central Cabinet, in its meeting held on 20th May, 1992, has approved the setting up of a National Power Tariff Board at the Centre and five Regional Power Tariff Boards to evolve the tariff policy and fix the Power tariff for the sale of electricity both for bulk supply at the distribution point as also for inter-State/ inter-Regional sale. A resolution to the effect has been published in the Gazette of India on 20th July, '92 (copy enclosed) (Appendix V).

The Search-cum-Selection Committee constituted for the purpose, under the Chairmanship of Cabinet Secretary met on 12.2.93, and decided that the proposed Tariff Boards would be required to be vested with adeqaute powers to enable it to discharge its envisaged function.

The Committee desired that before setting up the Power Tariff Boards it would be advantageous to have a Working Group drawn from among Chairmen of Electricity Boards, one from each region, to consider the entire issue and make recommendation including any amendments to the Act required to vest Tariff Boards with necessary 'Statutory Powers'.

The Working Group, headed by Chairman, APSEB with Chairmen, MSEB, UPSEB, WBSEB, ASEB as Member and Adviser (Energy), Planning Commission as Member Secretary submitted its report to the Ministry. The Working Group has suggested for 'Statutory' Tariff Boards and recommended certain legislative changes to the Electricity (Supply) Act. The report has been examined in detail at the Ministry of Power and the Ministry has since decided that for all issues relating to regulation of Power sector there would be two-tier structured, National Power Tariff Board and Regional Power Tariff Boards whose role also could include consumer grievance on tariff related matters.

Followings are the outlines of the report of the Working Group :

(a) The recommendations of the Power Tariff Boards in respect of tariff policy for the sale of power should not be mandatory. Instead, inputs provided by the Power Tariff Boards should help the State Governments and State Power Utilities in evaluating their tariff policy in a transparent manner.

(b) The Tariff Boards should be vested with adeqaute authority to call for data, records, documents and such other evidence that may be necessary from time to time from the Generating Companies, State Power Utilities licencees and others. Hence, the Power Tariff Boards should be created as Statutory Body with quasi-judicial authority.

(c) The Power Tariff Boards could also resolve issues between the State Power Utilities and groups of consumers. Necessary legislative changes may be made for this purpose.

(d) Pending amendment to the Electricity Supply Act, the Power Tariff Boards may be constituted immediately in line with the Central Government's Resolution dated 20.7.1992 for taking up the immediate pressing task of review of tariff structure of Power Utilities, review and advise the State and Central Governments for tariff principles to be followed for Private Generating Companies and the principle of pooling of power by Power Grid Corporation of India Limited.

The report has been forwarded to all State Governments for their concurrence on the establishment of National/Regional Power Tariff Boards. The matter also considered in the NDC sub-committee on Power and the NDC sub-committee, in its draft report, has recommended for early establishment of Tariff Boards.

The National Power Tariff Boards shall have a Chairman and two members each, and shall be drawn from the experts of Technical, Financial, Mangerial/ Administrative streams. The expenditure for initial set up and running of the Boards shall be met from the Consolidated Fund of India. The 'Power Tariff Boards' may, however, levy an appropriate fee from the beneficiaries concerned, so as to recover their cost of operations and establishments.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : November, 1994]

Comments of the Committee

(Please *See* paragraphs 38, 41 and 42 of Chapter I of the Report)

Recommendation Serial No. 138

An empowered Committee should be set up to expedite decision making on the proposals submitted by the private sector for oil and gas exploration and production, marketing of petroleum products, transportation and supply of natural gas, power generation and its T & D, etc.

Reply of Ministry of Power

"A High Power Board has already been constituted with Cabinet Secretary as the Chairman and Secretary (Power), Secretary (Finance), Additional Secretary (Banking), Secretary (Planning Commission), Secretary (E & F), Secretary (Ind. Development), Secretary (Technical Development) and Chairman, CEA as members. The objectives of the Board include promotion of investment by private units in the electricity sector in India both by indigenous and Non-Resident Indian and foreign entrepreneurs within the ambit of the policy in this regard, keeping in view the optimal utilisation of the country's natural and financial resources. To promote investment by entrepreneurs in the private sector, the Board will, *inter-alia*, serve as a single point forum for faster clearances of the proposals received from them within a definite time frame and resolve outstanding issues pertaining thereto.

Besides the above an Investment Promotion Cell headed by Joint Secretary in the Ministry of Power also assists the promoters in getting various clearances required (both statutory and non statutory) for their projects. The private power proposals involving foreign investment are examined by a high level Foreign

Investment Promotion Board (FIBP) for recommending Government approval from the angle of foreign investment.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 140

Strengthening panchayat or creation of village cooperatives for energy management.

Reply of Ministry of Power

37 Rural Electric Cooperatives are already functioning in the country. To widen the area of operation of such cooperatives, a Workshop on Decentralised Distribution System was organised by Rural Electrification Corporation under the aegies of Ministry of Power. The various issues discussed in the Workshop include the possibilities of setting up area-based power distribution organisations in Joint Sector, private sector or in viable Cooperative Societies. The main recommendation related to the modality for setting up of such organisations.

The practicability and economics of setting up of such organisations will have to be examined on case-by-case basis as and when suitable proposals are received.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Recommendation Serial No. 143

There is a need for a comprehensive document which brings out information and statistics on various aspects of energy including resource availability, supply, consumption, pricing and the environment. Several governmental and non-governmental organisations do bring out such information on a regular basis, however, the Committee believes that there is a need for a document which would at one place provide relevant information on all issues of energy. Hence, the Committee recommends that the Government bring out every year a comprehensive report on energy and lay it in Parliament for the benefit of members and the public.

Reply of Ministry of Power

The Planning Commission has brought out a comprehensive document on energy which forms part of the 8th Five Year Plan. The portion relating to energy deal with various sectors of energy and the linkages between them.

[Ministry of Power : O.M. No. 3/1/94 — Coord. dated : October, 1994]

Comments of the Committee

(Please *See* paragraph 45 of Chapter I of the Report)

CHAPTER III

REPLIES OF THE MINISTRY OF COAL

Recommendation Serial No. 17

Increasing Underground Production

Introduction of suitable scientific production method.

Reply of Ministry of Coal

This suggestion is noted for future guidance. In fact Ministry of Coal is alive to these problems and has been taking appropriate steps for this purpose. Over the years many new technologies have been tried and, some have been introduced by practice. This has enabled CIL to open up large and medium capacity underground mines with PSLW face, sub-level caving, descending shield methods etc. Wider application of these technologies is continuing.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 17

No replacement for natural wastage of work force.

Reply of the Ministry of Coal

Replacement for natural wastage is generally avoided in all subsidiary companies particularly in ECL, BCCL, CCL and WCL. During the year **1993-94** net reduction of manpower in CIL as a whole was **7405**.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 18

Voluntary retirement of over aged workers.

Reply of Ministry of Coal

Drive to rationalise manpower through VRS suffered a serious setback in 1993-94 due to non-availability of fund from National Renewal Fund. In CIL only 4196 cases could be settled against 6204 applicants. However, this year with Rs. 120 crores made available from NRF a target of 9600 cases of VRS has been kept for 1994-95.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 19

Systematic training of workforce to upgrade skill.

Reply of Ministry of Coal

This is already a thrust area and is being pursued. During the year 1993-94 in CIL a total of 8563 executives and 15202 non-executives were trained through 1201 training courses. These training courses were conducted in :

1. Institutes located in subsidiary companies.
2. External organisations.
3. Machine Manufacturers' Training Programme Venue.
4. Coal India Training Institute at different Subsidiary Companies.
5. Overseas Training.

Recently Coal India has started Indian Institute of Coal Management to impart specialised in Service Training in the fields of Management, Mining Practices, Financial Administration, Personnel Management, Survey and Exploration, Management of Washeries, Environmental upgradation, etc.

During 1994-95 CIL has planned to hold 1098 training courses to train 6850 executives, 4442 supervisors and 6674 workers.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 20

Progressive mechanisation of mining and loading operations.

Reply of Ministry of Coal

The suggestion is noted for further action. Ministry of Coal is alive to the issue and has directed introduction of progressive mechanisation in mining and loading operations. The growth of mechanised production in CIL over 1984-85 is as tabulated below :

New U/G Mining Technology	Year/Production (mt)	
	1984-85	1993-94
Mechanised Board & Pillar	0.95	12.24
Longwall Mining	0.79	1.45
Special Methods	0.20	0.53

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 21

Opening up of medium and large capacity mines (especially in Jharia and Ranigunj Coalfields) with high degree of mechanisation.

Reply of Ministry of Coal

Plans are drawn to further increase the mechanised operations in existing mines wherever feasible. Opening up of medium and large capacity mines subject to their viability and availability of funds is also under consideration of CIL. The following large and medium capacity mines with high degree of mechanisation have been/are being opened in Ranigunj and Jharia coalfields.

High and Medium capacity underground mines

Ranigunj Coalfield	Jhanjra (3.50mt), Khottadih (1.38mt), Satgram (1.20mt). J.K. Nagar (0.87mt), North Searsole (0.60mt), Bankola (0.90mt), Bahula (1.20mt), Amritnagar (1.16mt), Kalidaspur (0.54mt).
Jharia Coalfield	Pootkee Balihari (1.00mt), Bhalgora (0.70mt), North Amlabad (0.89mt), Katras (0.72mt).

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 22

Adequate safety measure.

Reply of Ministry of Coal

The following steps are being taken to improve safety in coal mines :

(a) Safety audit of all underground and opencast mines of CIL has been taken on priority basis. One such safety audit of all mines has been completed. Time bound action plan has been drawn and implementation taken up to rectify the inadequacies revealed in the safety audit report.

(b) Intensive monitoring for implementation of the recommendations of safety conferences and decisions taken in Standing Committee on Safety as well as CIL Safety Board is being stressed.

(c) Inspection of mines by all officials have been intensified for implementation of statutory rules and regulations.

(d) Internal Safety Organisation at Company Headquarters has been strengthened and monitoring of implementation of safety plans through Internal Safety Organisation has been intensified.

(e) Tripartite Committee consisting of workers' representative and DGMs officials are reviewing the safety status regularly and decisions taken for improvement of safety are being implemented.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 23

Appropriate measures for stabilisation of mines

Reply of Ministry of Coal

Stabilisation of existing underground workings, wherever necessary are undertaken during the course of mining operations as per the stipulation of Director General of Mines Safety under the extent statutes. Regular audits of each such mine are now being carried out to determine the inadequacies, if any, especially the stowing of voids created during mining operations. In case of any lag in stowing, suitable steps are taken to narrow it down.

For stabilisation of old inaccesible underground workings created during pre-nationalisation period, hydropneumatic stowing has been adopted at two sites in Ranigunj Coalfield after successful completion of the pilot plant level study. This will go a long way in stabilisation of the areas prone to subsidence.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 24

It should be mandatory for undertaking proper rehabilitation on exploitation of any mine.

Reply of Ministry of Coal

Land degradation arising from opencast coal mining is a major environmental issue which needs to be addressed. Prior to 1980 no specific action for back filling of decoaled area was provided for. With increasing environmental awareness reclamation & restoration of land after coal extraction has now become an important activity which is taken care of during mine planning. Although we have

still a longway to go a beginning has been made and in all opencast projects reclamation of land and plantation of trees thereon is provided for. In dragline mining backfilling is a part of the excavation operation. Voids left, if any, are suitably graded and left as water pools for irrigation purpose. Strict vigilance is being exercised by Ministry of Environment and Forests while approving the Environmental Management Plans as well as during monitoring implementation of Environmental protection measures including backfilling & reclamation.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Comments of the Committee

(Please *see* paragraph 8 of Chapter I of the Report)

Recommendation Serial No. 25

Opencast Mining

The capacity utilisation of equipment is low and needs to be enhanced.

Reply of Ministry of Coal.

Ministry of Coal is very much aware of the need to improve utilisation of equipment in opencast mines and has taken the following steps in this regard :

(1) Introduction and strengthening of repair and maintenance facility.

(2) Introduction of Computerised Maintenance Management System.

(3) Improved spare parts management through computer and inventory control.

(4) Regular meetings with manufacturers and users for expediting supply of equipment, spares and after sale support.

(5) Implementation of Integrated Mine Management system in selected mines.

(6) Improvement in communication systems through use of walkie-talkies sets in large opencast mines.

(7) Improvement in operational practices and training/retraining for operation and maintenance teams.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 26

Opencast mining creates environmental problems such as those of land degradation and dust pollution etc. This is an aspect that the future policy would have to come to grips with.

Reply of Ministry of Coal

Committee's suggestion is noted for compliance. Coal mining activities particularly the opencast have an adverse effect on the environment due to degradation of land, air and water pollution etc. However in order to mitigate the adverse effects due to mining operations action is taken for implementation of environmental protective measures *viz.* land reclamation, afforestation, control of air and water pollution etc.

Environmental Management Plans (EMPs) which include the details of Environmental protective measures are an integral part of coal project. These EMPs incorporate the mtigative measures to be undertaken *viz.* land reclamation, afforestation and control of air, water pollution and rehabilitation etc. The implementation of these EMPs are also monitored by the coal companies and the Government.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 27

Manpower

The excess manpower in coal companies is estimated at more than 50,000. By enhancing and upgrading the skills of mine workers it would be possible to reduce this surplus and improve the financial performance of the coal companies.

Reply of Ministry of Coal

There is a limit to which surplus manpower can be gainfully redeployed through enhancing and upgradation of skills. Limiting factors are age group of workforce (generally over 45 years) and level of knowledge and skill required to handle some of the new equipment and technologies. As such besides gainful redeployment of surplus manpower through training and skill upgradation to the extent possible, rationalisation of manpower is being done under voluntary retirement scheme as explained under 1.3.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 28

Productivity

Results of a preliminary estimate indicate that if productivity, as measured by output per man shift (OMS), in the older and less efficient coal mines is increased to the level of average OMS of new and more efficient mines, the reduction in costs per tonne of output could be in the range of 25—30%.

Reply of Ministry of Coal

It is true that improvement in OMS could lead to reduced cost of production due to direct reduction in wage cost. However, the older mines by very nature of their difficulties render themselves unsuitable for modernisation to a great extent. Sometimes the reserve does not justify heavy capital investment which is normally the case for any substantial modernisation package. In view of this feasibility of improvement is examined and where feasible, mines are reorganised.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 29

Problems of Coal Quality

The average quality of Indian coal has declined over the years; at present the production of inferior coal is higher than that of superior grades. This quality deterioration is a consequence of extraction from thick inter-banded coal seams by OC Technology, where large quantities of shale and stone get mixed with coal due to the deployment of large capacity shovels.

Reply of Ministry of Coal

Committee's observation is noted for guidance. In the context of overall quality of coal produced in the country, it has to be appreciated that with rapid increase in production of power grade coal, for which, demand is also increasing, the overall average quality is bound to decline. Further in case of opencast mining which contributes about 70% of the total production in the country because of requirement of large capacity excavation equipments, some admixture of over-burden material and shale/bands is unavoidable. For this purpose, wherever feasible, small size capacity shovels and dumpers are provided to deal with the bands which are thick enough to be mined separately.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 30

Supply of Coking Coal for Steel Sector

A modernisation programme of coking coal washeries is presently underway in the old washeries, the benefits which could largely accrue in the form of improved quality of coking coal supplies to the steel plants and possibility of reducing imports of coking coal from the present level of about 6.5 Mt. to around 2.0 Mt. by the year 2001-02.

Reply of Ministry of Coal

A Technical Group constituted by the Government in Nov. '92 had submitted its report in May '93 and recommended various steps to narrow down the gap between demand and availability of coking coal. Various recommendations of the Group to reduce the dependence on import are :

(i) Expediting completion of all modernisation works in the existing washeries by March, '95 so as to supply 17 ± 0.5% ash coal to steel plants.

(ii) Increasing the raw coking coal availability, through close monitoring of various coking coal projects already under implementation.

(iii) Speedy commissioning of two coking coal washeries under construction, *viz.* Madhuband (2.50 mtpa) in BCCL & Kedla (2.60 mtpa) in CCL.

(iv) Early investment decision on construction of new coking coal washeries at Praej (1.75 mtpa) and Tapin (2.0 mtpa) in CCL and Tikak in Assam area.

(v) Setting up of additional washery capacity to wash Low Volatie Medium Coking Coal (LVMC/NLW coal), 20 mt. of which are currently being produced.

The recommendations of the Technical Group have been accepted by the Government in March, 1994 and Coal India Ltd. have been asked to implement the action plan on a time bound programme.

The recommendations of the Technical Group when implemented will gradually reduce the import of coking coal by the steel plants of SAIL & VSP to about 2 million tonnes by the year 2001-02 from a present level of about 6.5 million tonnes after taking into acccount the increased demand of steel mills in that year.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 31

Non-Coking Coal Washing

(Regarding setting up of washery for non-coking coal)

In view of the financial constraints faced by both power sector and coal sector, there is a clear case here to prepare alternative financing models inclusive of the participation of private capital.

Reply of Ministry of Coal

CIL has floated a global tender to set up non-coking and coking coal washeries on "Build-Own-Operate" (BOO) principle to attract investors from India as well as abroad. The four non-coking coal washeries are (i) Kalinga (8.0 Mt.), (ii) Ananta-Bharatpur (5.2 Mt.), (iii) Sasti (2.0 Mt.), (iv) Dipka (6.0 Mt.). Apart from this CIL is also building a non-coking coal washery at Piparwar (6.5 Mt.) on turn key basis.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 32

Future investments should thus concentrate on the establishment of pilot plant facilities at select locations on.

Characterisation of Indian Coal from different coalfields by the degree to which they can be beneficiated.

Reply of Ministry of Coal

Adequate facilities for this purpose are available with CMPDIL, Central Fuel Research Institute (CFRI), and its Coal Survey Laboratories & Regional Research Laboratories (RRL) of CSIR. Substantial studies for coal beneficiation have also been done. Establishment of further Pilot Plant facilities wherever required could be undertaken after taking into consideration all related aspects of the matter.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 33

The Committee are thus of the view, that future investments should thus concentrate on the establishment of pilot plant facilities at select locations on .

Accessing different technologies and their cost.

Reply of Ministry of Coal

Work in this sphere is being done by CFRI & CMPDIL in association with various research and technical educational institutions.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 34

Future investments should thus concentrate on the establishment of pilot plant facilities at select locations on.

Developing improved coal washing technology suitable for Indian Coal.

Reply of Ministry of Coal

Work in this sphere is being done by CMPDIL, CFRI, Indian School of Mines thro[illegible]rious R & D projects. Certain Pilot Plant facilities are also being estab[illegible] Technical support by foreign collaboration in various R & D work, wherever nee[illegible]d is also being taken. Work in this sphere is proposed to be further intensified.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recomendation Serial No. 35

Introduction of Clean Coal Technologies

The Committee holds that for a suitable R & D strategy, a co-ordinated technology development plan with a time frame of 15—20 years and involving a number of competent institutions and organisations both in India and abroad would have to be launched. The components of such a programme would comprise coal benefication, coal gasification, pressurised fluidised bed combustion (PFBC) and integrated gasification combined cycle (IGCC).

Reply of Ministry of Coal

The concept of clean coal technologies encompasses full coal chain namely production, processing and preparation, transportation, utilisation and dealing with gaseous emissions as well as solid wastes. To elaborate it further, Clean Coal Technologies (CCT) *inter-alia* cover environmentally compatible coal mining; coal cleaning for upgrading the quality; environmentally sound and energy efficient transportation; efficient and clean burning in power plants and dealing with SPM, SOX, NOX, CO2 and environmentally compatible disposal/utilisation of ash.

In the Indian context where most of the coal based electricity generation is through pulverised coal fired stations with thermal efficiency of around 32% and with little possibility of further improvement, Govt. of India have set up a Technology Mission on Clean Coal Technologies. The Technology Mission is proposed to be implemented through demonstrating plant on (i) Integrated Gasification Combined Cycle (IGCC), (ii) Pressurised Fluidised Bed Combustion (PFBC), and (iii) Coal Beneficiation and Slurry Combusion (CBSC). These technologies are more efficient with high ash coal and can improve thermal efficiencies to 42—44%. A site for IGCC demonstration plant with a power generating capacity of 45 MW has already been finalised.

Until such time these clean coal technologies are demonstrated and commercialised, beneficiation of coal can improve combustion efficiency and environment. This will not only ensure supply of consistent and appropriate quality of coal but also lead to cleaner utilisation and improved combustion of coal resulting in better plant performance, lower GHG and toxic gases emission and better environment at power station end. In addition this will result in saving of 12—14% of transportation capacity of the railways.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 36

Coal Gasification

The Committee holds that the need to develop technologies for effective utilisation of indigenous coal reserves in India for the production of a fuel which can be used in the Industrial and domestic sector as well as for pollution-free electricity generation cannot be overstated.

Reply of Ministry of Coal

Ministry of Coal agrees with the views of the Committee. On the issue of pollution, it may be mentioned that Indian coals though, in general, contain high percentage of ash, have many positive aspects like low sulphur content (generally less than 0.5%), lower %age of toxic trace elements etc. Development of technology for pollution-free electricity generation from high ash Indian coals has also been taken up under a Technology Mission which is coordinated by C.S.I.R. as stated in reply to 8.0.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 37

Coal Consumption in the Domestic Sector

Medium coking coal reserves should be utilised to meet a much large fraction of domestic energy demand. The target groups could be low income urban households, small hotels, commercial establishments, shops and households in hilly regions (for space heating). The Committee recommends that SSF/briquette units should be largely set up in the private sector, although the public sector coal companies should ensure the supply of desired quality of coal to these units.

Reply of Ministry of Coal

Efforts are being made to meet the domestic fuel demand by encouraging construction of Special Smokeless Fuel plants (SSF) in private sector in different parts of the country.

Regarding supply of desired quality coal of SSF units, it may be mentioned that CIL is taking necessary action to maximise the raw coal supply as on date, 43 such plants have been commissioned for the production of SSF. During 1993-94, 10.04 lakh tonnes of raw coal was supplied to SSF units as against 5.35 lakh tonnes raw coal supplied in 1991-92.

In addition, low grade medium coking coals are also being supplied for manufacture of briquettes for which a large number of briquetting units have been set up in private sector all over the country.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 38

Pit Head Coal Stock

Increase in coal production only from areas having rail link.

Reply of Ministry of Coal

In order to meet increasing demand of coal from various consuming sectors in different regions of the country, new coal deposits have to be developed. Otherwise it will not be possible to meet the increasing demands. Coal evacuation facility & infrastructure at present are not available in the new coalfields & as much steps will have to be taken to develop/create infrastructure in the areas such as Gopalpur area, IB Valley Coalfields, Rajmahal & other nearby Coalfields in Santhal Pargana area, North Karanpura Coalfield & Hasdeo Arand etc.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 39

Improvement in the quality of coal despatches.

Reply of Ministry of Coal

With a view to improving the quality of coal produced in the country, the following steps have been proposed/taken :

(i) Segregation of stones and shales at the time of loading.

(ii) Ensuring better supervision to maintain quality control and developing quality consciousness among workers. Supervisors and executives engaged in mining and despatch of coal.

(iii) Installation of Coal Handling Plants and feeder breakers etc.

(iv) Collection of samples from coal despatches for the purpose of quality control .

(v) Installation of a number of coal washeries for beneficiating both coking/ non-oking coal.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 40

Performance monitoring of mines including in times like quantity of saleable coal produced and sales realisation.

Reply of Ministry of Coal

Suggestion is noted for future guidance. The quantity of saleable coal produced by each unit is measured monthly. Coal stock measurement is done by each company at quarterly interval as a measure of check. Coal India undertakes yearly coal stock measurement of every producing unit. Sales Realisation is one of the parameters on which performance evaluation of key officials is done.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 41

Coal Movement by Road

Performance of alternative modes of coal transportation like ropeways and conveyor belt have not been satisfactory and should be improved.

Reply of Ministry of Coal

While the share of despatches by road has either stagnated or declined there has been significant growth in despatches by other modes i.e. through MGR, own wagons, Belt and Ropeways etc. In fact despatches by other modes has increased from 3.08 Mt. in 1974-75 to 52.30 Mt. during 1993-94.

Despatches by rail have also achieved a steady growth during these years. From mere 48.60 Mts. during 1974-75 it has gone up to a level of 120.35 Mts during 1993-94.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 42

Budgetary Support

Budgetary support....., will be totally phased out by the end of Eighth Plan. Thus it is estimated that a resource gap of about Rs. 5,500 crore would emerge for the development of Eighth Plan project and Ninth Plan starts. If this amount

is not mobilised by the coal industry, the production plans in the Ninth Plan would be adversely affected.

Reply of Ministry of Coal

For Coal India, Ministry of Coal recommended investment of Rs. 11669 crores in the VIIIth Plan period at 1991-92 price level. government. has approved Rs. 8520 crores. The sources of funding of Rs. 8520 crores is as follows :

Budgetary Support	1155 Crores
Internal Resources	4476 Crores
Bonds	2000 Crores
Others (Recovery of old dues from SEBs.)	547 Crores
Suppliers's Credit	342 Crores
Total	8520 Crores

Mainly because of escalation of price since 1991-92, investment need for the VIIth Plan currently assessed is Rs. 9600 Crores. Steps are being taken to mobilise resources to bridge the gap of Rs. 1100 Crores.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 43

Main Recommendation

Land Reclamation

Reclamation of land should be carried out concurrently with mining. Effective institutional arrangements needs to be made for ensuring this, preferably through a body with statutory powers. This body could also monitor reclamation of abandoned mines especially in Jharia and Raniganj coalfields.

Reply of Ministry of Coal

The Ministry agrees with the recommendation that reclamation should be done concurrently with mining activities. However, with regard to institutional arrangements it may be stated that the problem of coalfields fires in Jharia Coalfield and subsidence in the abandoned mines in Raniganj Coalfield are unique in nature and have to be dealt with accordingly. In case of Jharia fires BCCL is having a separate division under the overall charge of Director (Projects) which deals with Planning and Implementation of various schemes. In Raniganj Coalfield where the problem of subsidence is arising from coal mining activities carried out under shallow cover during prenationalisation days has assumed serious dimension. The Ministry of Coal is in constant dialogue with the Government of West Bengal for making a proper institutional arrangement.

It has been suggested to the Government of West Bengal that Asansol Durgapur Development Authority (ADDA) should be suitably strengthened for undertaking execution and implementation measures and works connected with subsidence and associated environmental control measures. The Ministry of Coal has agreed to provide technical inputs for planning and designing schemes by a team of experts from ECL/CIL. Further it was proposed that a High Powered Committee/Apex Committee with Chief Minister, West Bengal as a Chairman and Coal Minister as Co-Chairman may be constituted to oversee and review the programme of implementation of various schemes. While CIL has already set aside Rs. 5 crores for stabilisation works by ADDA for specific schemes that may be envisaged under the proposed arrangement, the Government of West Bengal should also earmark funds under Cesses collected under the West Bengal Primary Education Act, 1973 and the Rural Employment and Production Act, 1976.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 44

Coal Beneficiation for Long Distance Consumers

A phase approach for establishment of coal beneficiation facilities should be followed and specific time targets established and notified after which non-beneficiated coal would not be moved beyond a certain distance. Establishment of coal washeries at pit-head would require large investments and for this purpose, the private sector could be brought in, to operate these washeries in a viable and efficient manner.

Reply of Ministry of Coal

Regarding setting up of coal washeries at Pit Head, the recommendation of the Committee on Private Sector participation is already being adopted in Coal India's latest approach of offering washeries on "BUILD-OWN-OPERATE" basis.

Imposition of distance limitation for transport of raw coal may need fresh legislation.

It will not be advisable to specify time targets. Choice for beneficiation coal or otherwise is with the consumer and depends upon many factors such as design of the power house, economics of using beneficiated coal, environmental considerations etc. Incidentally, in this context, it may be brought that Indian Coal, though high in ash, is environmental friendly due to low sulphur (generally below 0.5%) and low toxic trace elements compared to the coals of other countries. Not withstanding this, beneficiation of coal is required on a large scale. Actual realisation would depend upon the consumer's willingness to pay extra washing charges and capital funds required to set up washeries.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 45

Clean Coal Technologies—Dissemination of Information

The introduction of clean technology in general requires major information dissemination and educational effort. The economic benefits of improved technologies would not only have to be quantified but the methodologies for such assessment made transparent and convincing the concerned.

Reply of Ministry of Coal

The recommendation is noted. Work of establishing clean coal technologies and dissemination of information particularly with reference to economic benefits in power houses etc. is going on since 1987. In the last few years, it has been possible to convince some of the customers but majority of them are not showing interest in the use of beneficiated coal due to increased cost of washed coal. Efforts in this direction are continuing.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 46

General

Coal India Limited has to play a major role in achieving the modernisation and growth plans of the coal industry. It should accordingly shift its emphasis to implementation of long-term policies.

Reply of Ministry of Coal

Ministry of Coal agrees with this view.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : October, 1994]

Recommendation Serial No. 94

The Committee would wish to comment on some disquieting features about coal prices in India.

There is no systematic principle adopted for inter-grade price differentials. A rational pricing structure should have an in-built allowance to adequately compensate the consumers for using lower quality coal;

the pithead prices have an in-built inefficiency in that the cost of production (on which they are based) is calculated with total disregard for the low output per manshift (OMS). An analysis carried out for this purpose shows that if the productivity (OMS) in case of all the less efficient mines was to rise to a level of average OMS for the more efficient mines, the cost reduction (on account of lower manpower costs) would be about 30%;

the pithead prices are determined on the basis of the industry-wise average cost of production with the result that some of the coal mining companies such as BCCL and ECL, which have old and high cost mine under their control, are not able to recover their costs.

Reply of Ministry of Coal

The Prices of coal are fixed on the basis of the recommendations made by the Bureau of Industrial Costs and Prices (BICP) after detailed cost studies of the coal industry. BICP have taken into account the questions of inter-grade price differential during the course of their study of the coal industry, which may be seen from their observations as under :

Extract from the Report :

The current grade-wise price based on UHV shows marked discontinuity in the 2 district groups (a) Grades A to D ; and (b) Grades E to G. The BICP has attempted to remove the distortion in the proposed scheme, at the same time retaining the present grade designations A to G.'

The average quality for the product mix considered falls in Grade D and the price for this is fixed as per the unit value per 1000 K. Cals per Kg. In the case of grades A, B & C which are of superior quality compared to grades E, F & G, there should be some premium in price charged to the consumer to take into account its scarcity value and also its opportunity costs. However, as the current prices for the grades A, B & C are already on the higher side relative to the lower grades, the BICP proposes a minimum price increase for these grades (with reference to the current level), only to the extent of the average overall increase of 14% pre-tax and 19% post-tax. From this, the prices for the grades A, B, C & D have been fixed.'

As the prices recommended by BICP are based on the principle of normative cost and not on actual cost, the question of any inefficiency creeping into it does not arise. As regards recovery of higher costs of production in ECL/BCCL, the same is reimbursed to them under the mechanisation of CPRA (Coal Price Regulation Account).

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994]

Comments of the Committee

(Please *see* paragraph 22 of Chapter I of the Report)

Recommendation Serial Nos. 99, 100 & 101

Accordingly, therefore, the Committee recommends the following for consideration of the Government for achieving an appropriate structure :

— the price paid to SEBs and coal/oil companies should be based on the normative efficient cost ;

— in the coal sector, price of coking coal must be linked to the border price and for non-coking coal while in the short to medium term the inter-grade coal price differentials need to be rationalised, in the long run there is a need to move away from the present system of linking of non-coking coal producers and consumers to mutually negotiated deals between the producers and the consumers ;

— inter-grade price differentials of coal must be rationalised ;

Reply of Ministry of Coal

The prices of coal are already being fixed on the principle of normative costs as per recommendation of BICP.

The issue of rationalisation of inter-grade coal price differentials has already been replied to in the preceding item. As far the recommendations made regarding linking the price of coking coal to border price and in the case of non-coking coal regarding moving away to mutually negotiated deals between the producers and the consumers from the present system, these are being communicated to the BICP who initiated a fresh cost study of the coal industry in 1991 and are yet to submit their final recommendations. Some progress has already been made in allowing coal companies to negotiate prices with power stations for coal from newly opened fully linked mines.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994.]

Recommendation Serial Nos. 112, 114 and 115

— Incorporate costs of environmental damage/mitigation measures into project appraisals. Adequate and comprehensive incorporation of environmental costs and benefits of using a particular technology or resources should form part of project analysis. Thus, the Committee believes would lead to more rational choices in the energy sector.

— Ensure that land management becomes an integral component of coal mining projects. Care should be taken to minimise adverse effects of mining operations, and reclamation measures should be undertaken to restore degraded land. Afforestation of degraded land and compensatory afforestation where forest land is diverted need special attention. Sufficient provision for these should be made at the planning stage.

— Ensure that adequate pollution control measures are undertaken and suitable devices installed, and more importantly operated and maintained in power plants and refineries.

Reply of Ministry of Coal

The above recommendations are already under implementation in the coal sector. It may be reiterated that all environmental related aspects are carefully studied and environmental management plans are drawn up and prepared

alongwith with project feasibility reports at the planning stage itself. The coal companies are committed to implement all environmental control measures so as to ensure that coal mining is carried out in an environmentally compatible manner.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994]

Recommendation Serial No. 113

The Committee wishes to make the following additional recommendations for consideration of the Government :

'Device a comprehensive and humane policy for the rehabilitation of families affected by developmental projects, such rehabilitation ought to precede and not follow the launching of projects involving displacement of people.'

Reply of Ministry of Coal

Coal India Limited have recently formulated a comprehensive 'Resettlement and Rehabilitation Policy' for Project Affected Persons (PAPs) where resettlement and rehabilitation action plan is to be formulated in consultation with PAPs and the State Governments, as a simultaneous activity with the land acquisition process.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994]

Recommendation Serial No. 117

Examine and promote the use of effluents as raw materials, as in the use of ash for the manufacture of cement or bricks. The Committee wishes to emphasize R & D, and demonstration projects in this regard. Suitable incentives to entrepreneurs need to be provided to promote such alternative use of effluents.

Reply of Ministry of Coal

Noted for future guidance.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994.]

Recommendation Serial Nos. 118, 119, 120 and 121

It is obvious that while sufficient legislation has been introduced enforcement is the weak link in the chain. This institutional mechanism for tackling, managing and enforcing environmental standards needs attention.

In this respect the Committee recommends :

— Integrating the functioning of sectoral ministries, State Governments, local bodies and agencies responsible for planning implementation of development projects. Integrating environmental concerns more effectively in all policy areas and strengthening governmental and institutional structures dealing with environmental management, especially within the ministries concerned.

— Strengthen administrative arrangements for monitoring and enforcing of environmental standards ; decentralise environment impact assessments and environmental law enforcement based on cooperation with local authorities.

— To provide funds, qualified staff and other facilities like laboratories, equipment to implementing organisations.

— To provide professional training in operation and maintenance of pollution control treatment devices and laboratories ; in setting standards ; in management of hazardous waste ; and in modelling, data processing, legal aspects to the staff concerned.

Reply of Ministry of Coal

The Ministry of Environment & Forests are the nodal Ministry for environmental matters. The Ministry of Coal continuously interacts with that Ministry for the purpose of guidance, directions and consultations on environmental related issues in the coal sector. The instructions, policies, rules, Acts etc. are framed by that Ministry and followed by the Ministry of Coal/Coal Sector. Administrative arrangements are available together with infrastructural requirements for undertaking and implementing the environmental protection measures. The planning wing of Coal India Limited, Coal Companies and Neyveli Lignite Corporation have acquired necessary training expertise for implementation of environmental protective measures. Emphasis on ensuring implementation of environmental protective measures in coal mining projects is continuously increasing and arrangements wherever required are being strengthened.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994]

Recommendation Serial No. 122

Improve the productivity of labour by upgrading their skills and by rationalising, rehabilitating or resettling the deployment of surplus manpower.

Reply of Ministry of Coal

Wages constitute the largest component of the cost of coal production and, therefore, proper utilisation of labour is the primary objective of manpower planning. Each subsidiary company makes an assessment of the needs of manpower based on its production plan and project requirement. To ensure proper utilisation CIL and its subsidiaries have got a system of preparation of annual manpower budget for all its establishments right from the collieries/projects to Areas and Company Headquarters. Under this sytem, the designation-wise, category-wise and skill-wise manpower is identified and according to the requirement for different units/establishments such identified manpower is matched and mis-matches, if any, are re-deployed vertically as well as horizontally after upgrading the skills. The identified surplus manpower in some subsidiaries is also re-deployed to other subsidiaries where shortage exist and the aforesaid system is monitored on a continuous basis at Company Headquarters level as well as in Coal India Limited. The surplus manpower are given specific training/ re-training in the skills in which the requirement exists in new projects.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994]

Recommendation Serial No. 122

'Improve the productivity of capital by better capacity utilisation of existing equipment; further mechanise the mining and loading operations ; and adapt (to local conditions), rather than transplant the technology acquired from other countries.'

Reply of Ministry of Coal

Comments of this Ministry regarding better capacity utilisation of equipment have already been exhaustively covered in the Action Taken Report on Recommendation No. 21 of the Committee's report.

Regarding the mechanisation of mining operations, this is a continuous on-going process both in open cast and underground mining. Coal India Limited has

168 open pit mines where it is applying state-of-the-art technology comprising the following mining systems :

—Scrapper

—Dragline

—Shovel Dumper Combination

—Dragline cum Shovel Dumper Combination

—In-pit crushing and conveying

In underground mines, the equipment deployed are the following :

— powered support longwall faces	—	17 sets have been purchased, of which 7 are fully imported and 10 are partly imported and partly indigenous.

— Side Discharge Loader (SDL)

— Load Haul Dumper (LHD)

Mechanisation, however, is a capital intensive process and its limits are dictated by the availability of funds with the coal companies. Furthermore, the surplus availability of labour and their proper utilisation also have to be kept in mind. For mechanising the loading operation and to improve the quality of despatch, CIL has initiated an Action Plan to install coal handling plants and feeder breakers in the subsidiaries as a result of which very substantial improvement has been achieved.

The technology acquired from other countries through bilateral or commercial agreements is usually adapted to conditions in the country. This is inevitable since the geological structure of coal seams and management practices in India have their special features and present their own characteristics. The complex structural disturbances due to drifts, origin of coal, thick and steep seams, intrusions and extrusions, etc. are the conditions which dictate and govern adaptation of imported technologies.

CIL has been able to successfully absorb and adopt special mining methods, such as descending shields, blasting gallery, in-pit crushing and conveying, sub level caving for extraction from thick seams, normal powered support longwall technology, etc. The ability to absorb these technologies satisfactorily was initially a limiting factor in the process of overall mechanisation.

However, over the years a level of expertise has been achieved whereby the progress in future of mechanisation and adaptation of state-of-the-art mining technology, particularly in bord and pillar system of mining, is expected to be faster.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994]

Recommendation Serial No. 122

Ensure satisfactory quality of coal supply by installing coal handling plants, promote beneficiation and improved washing technology.

Reply of Ministry of Coal

With a view to improving the quality of coal, supplies to various consumers, Coal India Limited have taken steps including augmentation of the capacity of coal handling plants as well as setting up of washeries for beneficiation of both coking as well as non-coking coal.

Presently, the installed capacity of coal handling plants in CIL is about 158 million tonnes per year which works out to 75% of the total coal produced by CIL. An Action Plan has been drawn to add about 27 million tonnes of CHP capacity in the current year and another 31.5 million tonnes in 1995-96. Once this capacity is commissioned, almost 90% of the coal produced in CIL shall be despatched through CHP.

In the area of coal washeries, the existing 15 washeries of CIL wash almost the entire quantity of coking coal (excepting about 10% of direct feed and blendable variety) before being supplied to the steel plants. However, the ash content in the washed coking coal is in the range of 19-20% as against the stipulated 17 +/–0.5%. This increase in the ash content of washed coal is due to depletion of good quality coal reserves resulting in increased ash in the raw coal feed. Modernisation of some of the old existing washeries, to ensure supply to 17 +/– 0.5% ash content coal to the steel plants, is in progress and is expected to be completed by 1995-96. Construction of 2 new coking coal washeries with a total annual capacity of 5.1 million tonnes is in progress. These washeries are designed to produce clean coal of quality acceptable to steel plants.

In the area of non-coking coal beneficiation, construction of two plants with a total annual capacity of 11 million tonnes is in progress for supplying the beneficiated coal to power plants. More such plants are planned to be set up in

private sector under 'Build-Own-Operate' scheme. CIL has already floated global tender enquiry for setting up of seven such plants.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994]

Recommendation Serial No. 122

Promote the use of coal as a domestic fuel.

Reply of Ministry of Coal

Considerable efforts have gone into promising the use of coal as a domestic fuel. CMPDIL has developed a technology for mechanised production of domestic coke which would cause minimum of environmental pollution on burning. The product commercially named as special smokeless fuel (SSF) has found wide acceptance in the market. The technology has been thrown open to private entrepreneurs for setting up plants in different parts of the country. Already 46 such plants have gone into commercial operation and 12 are under various stages of implementation.

Technology has also been developed for production of agglomerates from slack coal, lignite, lecofines, and CILCOKE fines for domestic use.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994]

Recommendation Serial No. 122

Ensure adequate inter-grade price differentials to reflect quality differences.

Reply of Ministry of Coal

The issues relating to inter-grade price differentials have been replied to in the preceding paras.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994]

Recommendation Serial No. 122

Provide greater thrust on R & D efforts for clean coal technologies including for gasification and IGCC. It is important that this be an area for continual work ; demonstration projects should be undertaken and adequate incentives be provided to investors to encourage wider dissemination of such technologies.

Reply of Ministry of Coal

Ministry of Coal agrees with the observations of the Committee. The details of some of the steps taken in this behalf, in addition to the beneficiation of non-coking coal for the use in the power plants and other industries are given below :

(I) (A) ***Underground Coal Gasification (UCG) :***

An S & T project was taken up in August, 1987 with the objective of generation of necessary data to evaluate the suitability of the tentatively selected sites for underground coal gasification and subsequently planning for pilot scale application of the technology. Extensive drilling has been carried out in Merta Road block to establish the feasibility of this technology in lignite deposits.

(B) ***Coal Gasification for production of Fuel Gas :***

For production of fuel gas for replacement of furnace oil in small/medium scale industries, a technology on fluidised bed gasification of high ash coal has been developed by IICT, Hyderabad with funds provided from coal S & T grant. The prototype unit has been developed at a capacity of 4 TPD coal throughput. The design basis for similar plants has been prepared for installation of similar or near capacity plants.

(C) ***Integrated Gasification Combined Cycle (IGCC) :***

A project titled 'Data Generation and Scale-up of moving bed pressure gasification system using coal containing 40% Ash' was taken up as a joint collaborative project by Indian Institute of Chemical Technology, Hyderabad with the following objectives :

1. To generate data for testing coal containing about 40% ash in the 24 TPD IICT and 150 TPD BHEL moving bed pressurised gasification plant.

2. To evaluate the Data for establishing optimum parameters and identifying design changes required for effective and reliable plant operation.

3. To develop scale up methodology for commercial size moving bed gasification technology for IGCC system.

In all, five specific experimental runs were conducted to achieve the above mentioned objectives. The results clearly affirm the capability of indigenous design, installation and observation of high pressure moving bed gasification plant for gasifying high ash coals. The successful demonstration of combined cycle plant in gas mode signifies the technical feasibility of IGCC plants based on moving bed coal gasification. It was also established that IGCC offers potentially higher efficiencies and better cost effectiveness through optimised thermodynamic cycle. The development of combined cycle plants utilising coal gas generated from coal of high ash content holds high priority. Setting up of a demonstration plant is now being coordinated between Department of Power and CSIR under the Clean Coal Technology Mission.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994]

Recommendation Serial No. 122

— Incorporate environmental consideration in planning for coal production as well as its utilisation.

— Avoid over-exploitation of mines at the cost of human safety.

Reply of Ministry of Coal

As already stated else where, environmental management in coal mining has become an integral part of planning and implementation of projects. Implementation of Environmental protective measures also being monitored so as to ensure compliance of various standards. Mine's safety is also an integral part of mine planning, designing and implementation. DGMS is the enforcement agency of safety aspects in coal mines.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994]

Recommendation Serial No. 136

'The Energy Commission headed by the Prime Minister for evolving an integrated policy and to ensure balanced development in an environmentally and

socially sustainable fashion. The Commission should draw participation from various Ministries (Power, Coal, Petroleum & Natural Gas, Environment & Forests, Non-Conventional Energy Sources), the Planning Commission and State Governments.'

Reply of Ministry of Coal

Ministry of Coal has no objection to the recommendation made regarding the Energy Commission.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994]

Recommendation Serial No. 137

— An autonomous regulatory body may be established which would draw participation from the producers, consumers, Government, industry and other experts to discharge the following functions :

(i) assist in drawing up medium term plans of energy supply by boards / companies ;

(ii) set prices based on the normative efficient costs so that the cost of inefficiencies in the supply system are not passed on the consumers ;

(iii) ensure an integrated approach to energy pricing to achieve an optimal energy consumptions and desired inter-fuel substitution.

This autonomous body may be in the form of an Energy Pricing Commission, with statutory powers to set and regulate ensuring transparency in its operations.

Reply of Ministry of Coal

Ministry of Coal holds that it would be advisable to think in term of deregulation of prices and distribution of coal in the present context of liberalisation and environment in which the industry is required to function.

[Ministry of Power : O.M. No. 3/1/94—Coord. Dated : December, 1994]

CHAPTER IV

REPLIES OF THE MINISTRY OF PETROLEUM & NATURAL GAS

Recommendation Serial No. 1

Increasing dependence on imports of crude oil and petroleum products.

Reply of Ministry of Petroleum & Natural Gas

1. Measures to increase the production of crude oil

1.1. The Government have taken a number of steps—both short term and long term—to boost indigenous production of crude oil and to reduce our dependence on imports. The figures of indigenous production of crude oil during last five years are indicated below :

Production of Crude Oil

Year	Million Tonnes
1989-90	34.09
1990-91	33.02
1991-92	30.35
1992-93	26.95
1993-94	27.02

1.2. As would be seen from the details given above, there has been a decline in the production of crude oil since 1990-91. The broad reasons for shortfall in earlier years are given below :

(i) Reservoirs in BRBC and ERBC having entered the declining phase.

(ii) Environmental conditions in ERBC like bandhs/barricades/theft/sabotage etc.

(iii) Rectificatory measures in Bombay High.

(iv) Delay/slippages in projects by contractors beyond the control of ONGC.

(v) Frequent power shut downs in ERBC.

1.3. The crude oil production which reached a peak of 34.09 million tonnes in 1989-90 declined to a low of 26.95 million tonnes during the year 1992-93 (this was the lowest during the last five years). As a response to this situation Government initiated a number of short-term and medium-term measures to arrest this declining trend. These measures have already resulted in arresting this declining trend and are now expected to put the crude oil production on a upward path.

1.4. The following table indicates the latest available crude oil production scenario for the 8th Plan :

(Million Tonnes)

Year	ONGC/OIL	JV	Total	Remarks
1992–93	26.95	Nil	26.95	Actual
1993–94	27.02	Nil	27.02	Actual
1994–95	32.30	Nil	32.30	Target
1995–96	38.17	0.20	38.37	Expected
1996–97	39.22	5.23	44.45	Expected
	163.66	5.43	169.00	

1.5. As would be seen from the above table the indigenous production of crude oil during 1994–95 is expected to increase by about 5.28 million tonnes over the actual production achieved last year (1993–94). The production in 1995–96 and 1996–97 is also expected to register a quantum jump so as to reach a level of 44.45 million tonnes by the end of the current plan period *i.e.* 1996–97.

1.6. This increase in crude oil production is expected through additional development of certain fields like L—II and L—III in Bombay High, as also through development of certain new fields like Neelam, South Heera, Ganbhar Phase—II etc. Some discovered fields have also been offered for development through Joint Ventures and by private parties.

In order to reduce expenditure on the import of crude oil and petroleum products efforts are being made to increase the refining capacity by taking up expansion of existing refineries and by setting up of new grassroot refineries in the public sector, joint venture and private sector.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 2

Retardation in oil production resulting from flogging of wells in the initial rush of exploiting recoverable reserves.

Reply of Ministry of Petroleum & Natural Gas

1.1. In view of various reports suggesting over exploitation of the Bombay High field, Government had appointed a Committee headed by Shri A.B. Dasgupta to look into various aspects of the development of Bombay High field. The Committee dealt with in detail all aspects of initial development and exploitation of this field and made several recommendations which have since been accepted by the Government. ONGC have been implementing many rectificatory measures suggested by the Bombay High Review Committee.

1.2. The measures being taken by ONGC especially in the areas of closure of high GOR/water cut wells, repair of sick wells, putting wells on artificial lift and improved water injection have started yielding positive results in the field in terms of lower GOR(s), water cut, pressure maintenance and improvement in oil production. These measures are being regularly discussed at regional and board level within ONGC and are also being monitored by Director General of Hydrocarbons and the Ministry of Petroleum & Natural Gas.

1.3. It may, however, be noted that there has been no wanton flogging of wells in any of the fields for higher production. The production rates are assigned on the basis of initial well test information and the rates of exploitation broadly confirmed to this range. In some cases in the past, water injection inputs lagged behind while the production schedules went as planned. This has resulted in decline in production.

Of late, a practice is being followed to control production rates at a safer level, in the event of any anticipated delay in water injection inputs, even if the potential of the wells is higher.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 3

Immediate attention to optimizing production of oil through :

(a) liquidating sick oil wells ;

(b) giving enhanced oil recovery schemes a time dimension;

(c) development of offshore marginal fields.

Reply of Ministry of Petroleum & Natural Gas

(a) *Liquidation of Sick Oil Wells*

1.1. At any point of time in the producing life of a field, there are always a number of sick and non flowing oil wells. Quarterly work-over plans are prepared for repairing the sick oil wells based on priorities/potential of wells and the wells are accordingly taken up for repair. The process of repairing sick oil wells and the production wells turning sick is dynamic *i.e.* while the earlier sick oil wells are being worked over/put back on production, a certain number of oil wells from flowing category become sick in the meantime, specially so in aged oil fields which have entered the phase of production decline. It may be mentioned that most of the producing oil fields in ONGC have entered the declining phase.

1.2. The status of oil wells, flowing oil wells, sick wells and other non-flowing oil wells of ONGC is given below :

Details	1-4-92	1-4-93	1-4-94	1-8-94
Total Oil wells	3007	3138	3321	3378
Flowing Oil Wells	2195 (73.0%)	2299 (73.3%)	2467 (74.3%)	2548 (75.4%)
Sick Oil Wells	364 (12.1%)	342 (10.9%)	320 (9.6%)	337 (10.0%)
Other non-flowing Oil Wells	448 (14.9%)	497 (15.9%)	534 (16.1%)	493 (14.9%)

(Percentage in bracket is w.r.t. total oil wells)

From the above table, it is evident that whereas percentage of sick oil wells is declining the percentage of other non-flowing oil wells have remained around 15 to 16%.

1.3. In so far as Oil India Limited is concerned they have a fleet of their own work over outfits which are being deployed for reviving the sick wells both old and new. Additionally, coiled tubing units are also being deployed for speeding completion of work-over jobs. As of now, the percentage of sick oil wells in respect of OIL is less than 10% of the total number of wells they have.

(b) *Enhanced oil recovery schemes*

ONGC

2.1. The Institute of Reservoir Studies of ONGC has formulated schemes for polymer flooding in Sanand and Jhalora fields and insitu combustion in the heavy oil fields of North Gujarat.

2.2. In case of Sanand field, the pilot has been successfully tested and the method is being applied on an expanded scale. Commercialisation of the process for the whole field has been approved and is in the process of implementation. According to this scheme, the drilling of wells will be completed by July 1995 and the process will be commissioned by the end of August 1995. In another nearby field, Jhalora, the polymer injection pilot is in progress.

2.3. In case of heavy oil fields of North Gujarat, that is Balol, Santhal, Lanwa etc., the insitu combustion has been considered as the most suitable EOR process for exploitation. The insitu combustion pilot in Balol field was initiated in March 1990 and the results have been extremely encouraging. Based on these results, the pilot area has been expanded in January 1992 and the same is in progress. Meanwhile, the commercialization scheme has been drawn up for Balol field which envisages incremental recovery of 37% over and above the estimated primary recovery of 12% from this field. The scheme envisages additional oil production of 5.6 MMT over a period of 19 years.

2.4. The Santhal field, which is contiguous to Balol has been selected as the next candidate for application of insitu combustion process and the scheme has been formulated for S1 and S2 sands of this field. The scheme envisages 35.69% of incremental recovery, amounting to approximately 14 MMT of oil. The process is expected to run for 18 years in this field. The scheme is presently under the consideration of the Government. Two more pilots on insitu combustion in Lanwa and Becharji fields were also approved. The Lanwa pilot has already been initiated (August 1992). If these pilots also lead to encouraging results, the scheme will

be expanded towards commercialisation in these fields also. Thus there is a time dimension built in the projections of EOR recoveries.

OIL INDIA LIMITED

2.5. Oil India Limited have been applying Enhanced Oil Recovery Schemes since 1960. These include water injection, gas injection in the fields of Nahorkatiya and Moran in Assam. Later on water flooding and polymer flood were also resorted to in the same fields. These schemes which have given encouraging results have been extended to other young fields namely Jorajan, Shalmari, etc. As of 1.1.1994, about 14 MMT of crude oil reserves have been added to the proved category of oil reserves in the fields where EOR schemes have been operated. The schemes implemented recently are also expected to add about 5 MMT of additional reserves in the immediate coming years.

(c) ***Development of marginal offshore fields***

3.1. In Western Offshore, a total of 66 oil and gas strikes have been identified till June 1992. Out of these, 13 are large and medium sized fields which have been developed/planned to be developed by ONGC or through joint venture participation. 48 are small fields, individually having hydrocarbon in-place reserves of less than 16 MMT of oil/oil equivalent of gas (ORG) and 5 are having negligible reserves. In order to take a view in regard to development of small and marginal fields, a Task Force was constituted in April 1993. The Task Force completed its study and presented the report by June 1993.

3.2. The Task Force shortlisted 21 of the 48 fields for further study. For each shortlisted field, details such as development drilling plan, production profile well bore hydraulics, tentative scheme for development such as processing and transportation facilities etc. have been worked out alongwith order of magnitude of investments.

3.3. The Task Force found that the following fields are *prima facie* economically viable for independent development or integrated development by clubbing some of them together.

Oil : B—173A, R—9, R—10, B—179, R—13, CA, B—121.

Gas : B—119/121, B—55, BS—12, BS—13, B—149 & B—46, B—48.

A total number of 9 conventional and 7 horizontal wells in oil fields and 33 conventional wells in gas fields are required to be drilled for exploitation of the above structures. Cumulative oil production of 2.31 MMT and gas production of

10.18 BCM is envisaged from these fields. Innovative ideas for accelerated production like use of horizontal wells and light-weight platforms and clubbing of production from one or two structures have been envisaged in the development scheme.

3.4. Development plans for fields B—119/121, B—173A & B—55 have been further optimised and feasibility report for development of B—119/121 & B—173A have been submitted to the Government. In case of B-119/121, the envisaged plateau rate for gas production is 1.5 million m3/day for 3.5 years followed by a peak oil production rate of 2000 BOPD for one year. In case of B-173A, the envisaged peak production rate of 9500 BOPD which declines to 2300 BOPD after 6 years. In B—55, the envisaged gas production rate through 12 wells is 2.64 MMSCMD maintained for 5 years.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 4

Rationalisation of the production profile from refineries to meet the growing demand for middle distillates.

Reply of Ministry of Petroleum & Natural Gas

The Standard Product pattern of a refinery is based on the optimum utilisation of the crude and yield of the products. The product patterns are reviewed and revised from time to time with changes in refinery configurations and maximise the production of deficit products like middle distillates.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 5

Provisions to encourage private capital participation in oil exploration, production, refining and marketing of petroleum products.

Reply of Ministry of Petroleum & Natural Gas

Following liberalisation of Industrial Policy, Government of India has welcomed proposals for private investment including foreign investments in the

different segments of oil sector. For exploration of oil and gas the blocks are being offered on a continuous round-the-year basis to private companies. The main attractive features of these offers are :

— The possibility of a seismic option in the first phase of the exploration period.

— No minimum expenditure commitment during the exploration period.

— No signature or production bonus.

— No royalty payment.

— No payment of customs duty.

— Progressive fiscal regime with sharing of profit oil/profit gas being tied to the post tax profitability of the venture for the companies.

— No ring fencing of blocks for corporate tax purposes.

— Provisions for encouraging the production and marketing of gas.

— Purchase of company's share of oil at an international market price.

— Provision for assignment.

— Provision for international arbitration.

Government have also cleared and granted letters of intent for setting up refineries in the private sector to the parties.

Private participation in the marketing of lubricants

According to the new Industrial policy, 1991, the manufacturing and marketing of lubricants is not reserved for the public sector. A number of companies in the private sector and the joint sector are accordingly manufacturing and marketing various categories of lubricating oils. Some of the private sector companies have formed joint ventures with multinational companies for this purpose.

The total sale of lubricating oils in the country in 1993-94 was 912,489 MTs. Of this, the share of the public sector companies was 903,692 MTs only which works out to about 77%. This implies that the private sector companies have made tremendous inroads into the lube market which was dominated by the four public sector oil companies just a few years ago.

MARKET SHARE (%)

Year	Public Sector Companies	Others
1989-90	91	9
1990-91	91	9
1991-92	91	9
1992-93	89	11
1993-94	77	23

As can be seen, the market share of the public sector companies started to decline in 1992-93 with the decanalisation of lube base oil imports and the subsequent opening up of the lube market to private and foreign companies.

The reduction in import duties on lubes from 85% to 30% and the rationalisation of excise duties at 10% *ad valorem* have made the non-PSU companies very competitive. Probably, it is cheaper and more profitable for these companies to import finished lubes in packed condition rather than import base oils, and additives and blend them locally. International brands will find it easier to enter the Indian market now.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial Nos. 8, 9 and 10

It is the view of the Committee that :

(a) The Government does not have a coherent, rational energy policy for the country which would also emphasize sustainability. The principal concern of the Government has been with a reduction in the gap between supply and demand with the balance of payment being a major constraint. The hefty injection of investible resources have been largely aimed at augmenting energy supply rather than attaining higher levels of efficiency and optimal resource utilization ;

(b) Despite the Government's preoccupation with increasing energy supplies, extensive shortages of good quality coal, electricity and oil remain ;

(c) After years of planning and attempts at modernisation the supply systems continue to be inherent inefficient. To quote a few cases—existence of surplus manpower and low capacity utilization of equipment in the coal sector, low operating efficiencies and high T & D losses in power generation, flogging of oil wells leading to dwindling production, natural gas flaring etc.

Reply of Ministry of Petroleum & Natural Gas

(a) & (b) The Government has a well defined and coherent policy for the development of petroleum sector. Under the new liberalised policy for petroleum sector Government is encouraging private sector investment, both from Indian private companies and foreign companies in all the segments of the petroleum industry. The participation by private parties would supplement Government efforts in improving the state of art and result in more R & D work in producing good quality oil.

(c) In view of various reports suggesting over exploitation of the Bombay High field, Government had appointed a Committee headed by Shri A.B. Dasgupta to look into various aspects of the development of Bombay High field. The Committee dealt with in detail all aspects of initial development and exploitation of this field and made several recommendations which have since been accepted by the Government. ONGC have been implementing many rectificatory measures suggested by the Bombay High Review Committee.

The measures being taken by ONGC especially in the areas of closure of high GOR/water cut wells, repair of sick wells, putting wells on artificial lifts and improved water injection have started yielding positive results in the field in terms of lower GOR(s), water cut, pressure maintenance and improvement in oil production. These measures are being regularly discussed at regional and board level within ONGC and are also being monitored by Director General of Hydrocarbons and Ministry of Petroleum & Natural Gas. It may, however, be noted that there has been no wanton flogging of wells in any of the fields for higher production. The production rates are assigned on the basis of initial well test information and the rates of exploitation broadly conformed to this range. In some cases in the past, water injection inputs somewhat lagged behind while the production schedules went as planned. This has resulted in decline in production, which gave some wrong impression. Of late, a practice is being followed to control production rates at a safer level, in the event of any anticipated delay in water injection inputs, even if the potential of the wells is higher.

Flaring of natural gas takes place due to lack of required compression and transportation facilities, technical requirements of operational safety, availability

of gas from isolated pools which could not be economically connected to the transportation network, non-lifting of gas by consumers etc.

During 1993-94 out of an average production of 50.23 MMSCMD of natural gas, a flaring of about 5.27 MMSCMD took place which is about 10% of the total production. Both ONGC and OIL have initiated a number of schemes to reduce flaring to the barest minimum. The steps being taken in this regard include setting up of facilities for transportation and compression at Gujarat, Tamil Nadu, Andhra Pradesh and Assam. Moreover, Oil India Ltd. is implementing a scheme for underground storage for surplus gas. In addition ONGC are implementing a large and prestigious project known as Gas Flaring Reduction Project in the Western Offshore. It is expected that with the completion of these schemes, flaring of natural gas will be reduced to minimum by 1996-97 except for flaring which is of technical/unavoidable nature and also that which takes place due to non-lifting of gas by consumers.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Comments of the Committee

(Please *see* paragraph 5 of Chapter I of the Report)

Recommendation Serial No. 15

The Committee is of the view that the Government does not have a well defined, coordinated and time bound plan adequately backed by financial resources for implementation in the energy sector.

Reply of Ministry of Petroleum & Natural Gas

Ministry of Petroleum & Natural Gas has a well defined policy for petroleum sector. To overcome the problem of resource crunch Government has invited private participation in different segments of the petroleum industry and raising of resource from the capital market.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Comments of the Committee

(Please *see* paragraph 5 of Chapter I of the Report)

Recommendation Serial No. 16

Hence, it is clear that by suitable utilization energy conservation methods and renewable energy technologies, it should be possible to achieve the goals of sustainable development, reduction in energy consumption and in controlling environmental damage.

Reply of Ministry of Petroleum & Natural Gas

This Ministry has been attaching great importance for the conservation of petroleum products. A number of steps have been initiated at the instance of this Ministry by oil industry and PCRA for improving energy efficiency of refineries, increasing fuel-efficiency in the transport sector; upgradation of lubricants; replacement of inefficient boilers and furnaces and promotion of fuel efficient equipment and practices in the industrial sector; rectification of irrigation pump-sets in the agriculture sector; development and promotion of fuel efficient kerosene and LPG stoves and hurricane lanterns in the domestic sector ; and launching multi-media awareness campaigns and imparting of education and training to the various target groups of oil users. As a result of various measures taken, a quantifiable savings of petroleum products of about Rs. 1174 crores was achieved during 1993-94 besides contributing to susbstantial reduction of environmental pollution which gives an indication of the impact created by the efforts made in this direction so far.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 47

That the administrative machinery for organising and conducting the bidding process needs to be defined, strengthened and the process made more commercially efficient.

Reply of Ministry of Petroleum & Natural Gas

A separate cell headed by a Deputy Secretary is already functioning in the Ministry to deal exclusively with the work relating to offer of blocks, receipt of bids, evaluation of bids, negotiating with bidders and finally signing of the contract with companies for exploration and production of oil and gas in India.

In order to strengthen the process further, Director General of Hydrocarbons has also been involved in the above job from Sixth Round of Exploration bidding, II Round of discovered fields onwards and in the speculative survey bidding rounds.

An exclusive group called the exploration contracts monitoring group exists in ONGC to look after the work relating to exploration and production of oil and gas by private companies under various rounds of bidding. It is recognised that the bidding process should be quick and efficient and, towards this end, specific time periods are being fixed for concluding negotiations expeditiously.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 48

Negotiations should be conducted and contracts should be finalised without delay. For this it is important that the decison making body is suitably empowered to take timely and objective decisions on the bids submitted by parties. Inter-ministerial interactions in this regard resulting in inordinate delays in decision making should be avoided.

Reply of Ministry of Petroleum & Natural Gas

An empowered negotiating committee is already functioning to conduct negotiations with bidders and finalise the contracts expeditiously for exploration and production of oil and gas by private companies in India.

The empowered negotiating committee comprises Petroleum Secretary, Finance Secretary, Revenue Secretary and Law Secretary, as also the CMDs of ONGC and OIL.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 49

There is need to re-examine the need for continuation of the bidding rounds. Unless additional incentives/informations are provided, future rounds of bidding inviting private sector participation for the same block are likely to evoke only declining interests. The alternative of continuous basis rather than rounds to be examined.

Reply of Ministry of Petroleum & Natural Gas

The blocks for which no bids have been received in a particular round are either dropped in the future rounds or their boundaries are changed to make them more prospective. ONGC/OIL is also continuously doing seismic work and drilling exploration wells in various sedimentary basins of India. The latest information gathered by ONGC/OIL is also included in the data packages and dockets of various blocks/basins which are offered to enable the private oil companies to access the prospectivity of these blocks more accurately. Thus, with each round, new information is added in the data packages and dockets of these blocks/basins and adjoining areas are included to make them more attractive.

The offer of bloccks on a regular basis implies that there is continuity in the offer of such blocks.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 50

Indian Private Companies that have been given exploration rights be encouraged to develop available blocks and should not be placed at any disadvantage *vis-a-vis*, foreign companies. The entire process of awarding blocks must be wholly transparent ;

Reply of Ministry of Petroleum & Natural Gas

Indian Private Companies are welcome to participate in bidding for exploration blocks. They have been placed on an equal footing with foreign companies as far as terms and conditions are concerned.

The bid documents provided to all interested companies prescribe the format and content of the bid to be given by each bidder. These include *inter-alia* details of the bidding company/consortium, technical information relating to reservoir assessment, reserve estimates and work programme and the commercial terms offered.

Clarifications are sought from bidders, both before and during negotiations with them on their proposals and the non-negotiable terms are made clear to them. Bidders are also told to give their response by a specified last date.

The technical evaluation of the proposals received after negotiations and clarifications is carried out and the commercial terms offered by all technically acceptable bidders are then evaluated.

Adequate knowledge regarding the bid evaluation criteria is given to all bidders both before submission of bids by them as also during the course of negotiations with them and last dates are set for their firm replies to terms made known to be non-negotiable. Therefore, the entire evaluation process is transparent and bids are evaluated as per bid criteria.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : December, 1994]

Recommendation Serial No. 51

The price of crude oil paid to the national companies has remained constant for a long period, thereby leading to declining or unstable profits on account of rising costs. A more remunerative crude oil price paid to ONGC and OIL could help in the generation of additional internal resources that could be canalised through a properly deviced exploration programme. The consequent short term effect on prices could be taken care by adjusting taxes and duties. In the long-term, the best insurance against oil price increases would be a greater production of hydrocarbons, which is impossible without greater exploration efforts.

Reply of Ministry of Petroleum & Natural Gas

The system of crude oil pricing has been revised based on review by Cabinet Committee on infrastructure in 1992. The price of crude payable to ONGC and Oil India is now based on the average cost of production of both the producers plus a post tax return of 15% on capital employed. The current price being paid to ONGC/OIL is Rs. 1741/MT on provisional basis.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 52

As regards the status of implementation of the recommendations of the P.K. Kaul Committee, the Committee observed that the Government have so far accepted only three recommendations. The Committee urge that the remaining recommendations of the Kaul Committee be considered for an effective implementation. It is also recommended that the Directorate General, Hydrocarbons is strengthened and made more effective.

Reply of Ministry of Petroleum & Natural Gas

Report of the P.K. Kaul Committee was considered by the Government in detail. Out of 21 recommendations made in this report, 10 recommendations were accepted by the Government. Apart from this, two more recommendations made by this Committee were accepted with modifications. Out of these, six recommendations have been implemented.

As regards the strengthening of Directorate General of Hydrocarbons, the Directorate had been set up on 8.4.1993 under the Ministry of Petroleum & Natural Gas in acceptance of one of the recommendations of the P.K. Kaul Committee Report, and it has already started functioning effectively under the Directorate General of Hydrocarbons.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 53

Available data for ONGC indicates that funds have been earmarked for an additional recovery of a-mere 0.82 mt. of crude oil during the entire Eighth Plan Period. Although, for the Ninth Plan it is proposed to recover an addditional 3 mt. of crude oil by EOR schemes, detailed plans, including financial commitments, are yet to be made for that the Committee holds here is a clear case for stepping up the planning and implementation of schemes for EOR.

Reply of Ministry of Petroleum & Natural Gas

For the EOR schemes of ONGC also, there is no resource constraint.

ONGC

2.1 The Institute of Reservoir Studies of ONGC has formulated schemes for polymer flooding in Sanand and Jhalora fields and *insitu* Combustion in the heavy oil fields of North Gujarat.

2.2 In case of Sanand field, the pilot has been successfully tested and the method is being applied on an expanded scale. Commercialisation of the process for the whole field has been approved and is in the process of implementation. According to this scheme, the drilling of wells will be completed by July 1995 and the process will be commissioned by the end of August 1995. In another nearby field, Jhalora, the polymer injection pilot is in progress.

2.3 In case of heavy oil fields of North Gujarat, that is Balol, Santhal, Lanwa etc., the *insitu* combustion has been considered as the most suitable EOR process for exploitation. The *insitu* combustion pilot in Balol field was initiated in March 1990 and the results have been extremely encouraging. Based on these results, the pilot area has been expanded in January 1992 and the same is in progress. Meanwhile, the commercialization scheme has been drawn up for Balol field which envisages incremental recovery of 37% over and above the estimated primary recovery of 12% from this field. The Scheme envisages additional oil production of 5.6 MMT over a period of 19 years.

2.4 The Santhal field, which is contiguous to Balol has been selected as the next candidate for application of *insitu* combustion process and the scheme has been formulated for S1 and S2 sands of this field. The scheme envisages 35.69% of incremental recovery, amounting to approximately 14 MMT of oil. The process is expected to run for 18 years in this field. The scheme is presently under the consideration of the Government. Two more pilots on *insitu* combustion in Lanwa and Becharji fields were also approved. The Lanwa pilot has already been initiated (August 1992). If these pilots also lead to encouraging results, the scheme will be expanded towards commercialisation in these fields also. Thus there is a time dimension built in the projections of EOR recoveries.

OIL INDIA LIMITED

2.5 Oil India Limited have been applying Enhanced Oil Recovery Schemes since 1960. These include water injection, gas injection in the fields of Nahorkatiya and Moran in Assam. Later on water flooding and polymer flood were also resorted to in the same fields. These schemes which have given encouraging results have been extended to other young fields namely Jorajan, Shalmari, etc. As of 1.1.1994, about 14 MMT of crude oil reserves have been added to the proved category of oil reserves in the fields where EOR schemes have been operated. The schemes implemented recently are also expected to add about 5 MMT of additional reserves in the immediate coming years.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial Nos. 54, 56 and 95

The Committee thus, holds that the Government should clearly bring out the approach that is sought to be followed, in the medium term, to effect a possible transition from the present system of administered prices. If, on the other hand, the current pricing system with assured returns is to continue, its implications need

to be studied carefully in the face of a possible surplus refining capacity. Irrespective of whether the proposed refining capacities materialise or not, the present policy of retention prices for refineries needs to be re-examined.

The Committee are of the view that the implications of a dual pricing for LPG should be properly examined for ensuring stable price regime that will also take into account the market forces, apart from any other pricing objectives that the Government may lay down.

The Committee is, therefore, constrained to observe that the prevailing pricing policy, guided by short term objectives coupled with inadequate administrative supervision has led to several distortions in consumption such as adulteration of diesel with kerosene in the transport sector with the target consumers having to resort to black market purchases (due to shortages of kerosene) at 3-4 times the administered price of kerosene. There is diversion of domestic LPG for commercial and even transportation purposes and a lower substitution of Naphtha and FO/LSHS by natural gas in the fertiliser industry owing to the concessional prices of the former.

Reply of Ministry of Petroleum & Natural Gas

The petroleum products are divided broadly into two categories for the purpose of pricing-Price Administered and Free Trade. High volume products or the products which are essential for common man are kept under administered pricing system in the overall public interest. For the same reason, the products which have very low sales volume or the products which are consumed by a few large industrial units or products manufactured and marketed by other than oil companies are treated as Free Trade products. The prices of the Free Trade products are determined by market forces or through negotiations by oil companies with consumers.

The goal of the Government is to move a way in a gradual phased manner from the controlled mechanism of pricing. As an initial measure, the entire trade in lubricating oils, RPC and CPC have been taken out from the purview of administered pricing so as to provide PSU oil companies a flexibility and ability to compete with private sector in the liberalised economic environment.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Comments of the Committee

(Please *see* paragraph 11 of Chapter I of the Report)

Recommendation Serial No. 55

It is estimated that for every incremental reduction in technical fuel losses in refineries by one perecentage point, the additional benefits would be of the order of Rs. 122 crore/annum for the refinery sector as a whole. It is estimated that achievement of the above target would cost about Rs. 330 crores, with a pay-back period of less than 3 years. This area needs particular attention. **(Page 28 of the 3rd Report)**

Reply of Ministry of Petroleum & Natural Gas

Action on the reduction in fuel and loss in the refineries is a continuous process. The investment required to reduce fuel and loss depends on many factors such as refinery's configuration, in-built margin in the design of the equipments and capacity utilisation of the equipment etc. Therefore, it would not be possible to generalise that for every unit per cent saving in fuel and loss would require an investment of Rs. 330 crores. As a matter of fact there are areas where there may not be any scope to reduce fuel and loss. Similarly in certain areas investment required could be prohibited for any saving in fuel and loss which can be realised.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 57

To increase penetration and thus the market share of these vehicles, active participation from gas companies would be needed on a continuous basis. Also, awareness of the concept and expected fuel cost savings needs to be increased. Inadequate post-conversion follow-up and support in terms of proper servicing of vehicle and refueling stations would also hamper penetration.

Reply of Ministry of Petroleum & Natural Gas

An experimental programme was launched in 1992-93 for introducing CNG in the transport sector in Delhi, Bombay and Baroda. Use of CNG in vehicles required lot of work to be done before it can be used in a large scale which, *inter-alia* includes obtaining 'Prototype Approvals' of various makes of CNG kits for each type of car from approving agencies, setting up of dispensing units, importing CNG kits, training various workshop personnel who can safely fit CNG kits etc. Since use of CNG reduces the power of engine, exhaustive work has to be done

by Automobile Manufacturers too. CNG has inherent limitation in fuel storage resulting in the slower customer acceptance. The present high rate of custom duty on imported kit is also acting as hindrance in popularising CNG. Since use of CNG for automobiles in India is a new concept, the public demand is expected to pick up slowly in the beginning. However, the first phase of the programme involving conversion of 220 petrol vehicles have been completed. In order to encourage the use of CNG the GAIL, in consultation with oil marketing companies, has drawn up plans for converting 2100 vehicles during 1994-95.

DTC have been running six buses on CNG-diesel mode on experimental basis since December 1992. Besides, the Madras Refineries Limited (MRL) has taken up in March 1992 a pilot project to convert and operate a few buses using CNG-diesel dual-fuel on an experimental basis. The expansion of CNG-diesel dual fuel operation would depend on the techno-economic viability of the experiment which remains to be established.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 99

The price paid to State Electricity Boards and coal/oil companies should be based on the normative efficient cost.

Reply of Ministry of Petroleum & Natural Gas

The pricing of petroleum products is based on the retention concept whereunder the oil refineries, marketing the pipelines are compensated operating costs and return at 12% post tax on net worth. Under this concept, a fixed level of profitability for oil companies is ensured subject to their achieving laid down capacity. In addition, the refineries processing crude oil beyond the standard norms get margins for the additional crude processed. The refineries are also provided incentive schemes for better product pattern achieved.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 102

In the oil sector, diesel and kerosene prices, mindful of their utilisation, have to be rationalised.

Reply of Ministry of Petroleum & Natural Gas

The domestic pricing of petroleum products is so structured as to discourage its non-essential use, promote interfuel substitution and subsidise essential fuel for socio economic reasons to vulnerable section of the society. Therefore, price of kerosene and diesel—items of mass consumption and sensitive to the economy are kept low (subsidised). Higher pricing of kerosene for industrial use is also adopted to achieve this objective by pricing it higher than for domestic use.

With a view to enhance the availability of kerosene import of SKO has been decanalised and a scheme of parallel marketing is introduced without disturbing the existing system of distributing kerosene through PDS. The PDS kerosene has been coloured with blue dye to maintain its distinction from the kerosene supplied by parallel marketeers.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 103

Kerosene distribution system needs to be strengthened.

Reply of Ministry of Petroleum & Natural Gas

Kerosene is distributed through the Public Distribution System (PDS) under the control and supervision of State Governments. The Government have taken a number of steps to strengthen the kerosene distribution system. One of them is the scheme of delivered supplies of kerosene. Under this scheme, the responsibility for transporting and delivering kerosene to the wholesalers storage premises would be taken over by the oil companies in a phased manner. This will help prevent diversion of kerosene from the Public Distribution System for unauthorised uses while under transportation to wholesale storage points. This will also ensure timely availability of kerosene to the retailers and the consumers. Some States/UTs have already implemented the scheme, and the remaining States/UTs require more time to study the scheme before implementing it.

The enforcement work by the oil companies has been stepped up in order to check diversion of kerosene for unauthorised uses. The State Governments have been requested by the Ministry of Petroleum & Natural Gas and the Ministry of Civil Supplies, Consumer Affairs and Public Distribution to study the system of

retail distribution of kerosene with a view to plugging the loopholes and reorganising it in order to check diversion of kerosene at that level. They have also been requested to form vigilance committees at different levels with people's representatives to keep watch on retail distribution.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 104

Subsidy on LPG should be gradually reduced.

Reply of Ministry of Petroleum & Natural Gas

With a view to achieve interfuel substitution, namely to motivate the kerosene users to LPG and users of wood fuel to kerosene, LPG is being subsidised. In order to arrest the increasing burden of subsidy in LPG Government decided to reduce the subsidy on LPG meant for domestic use by Rs. 10/- cyclinder of 14.2 Kg. in January 1994. As a result of this, the selling price of LPG cylinder of 14.2 Kg. increased by Rs. 10/- cylinder from 14-1-94 exclusive of local taxes.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 105

Natural gas prices should be linked to the replacement values in various end uses.

Reply of Ministry of Petroleum & Natural Gas

1. The Committee on Pricing of Natural Gas (Kelkar Committee) had examines this question and observed as follows :

2. "The proposed producer price of Rs. 1500/1000 cu. mtrs does not fully reflect the value of gas to the consumers. Gas is a substitute for alternatve fuels/ feedstock in the consuming sectors such as power, fertilisers, petrochemicals etc. The price applicable to the consumers should be such that the gas markets are cleared on the basis of the price rather than physical quotas. For this purpose, the replacement value of gas provides the appropriate framework for designing

consumer prices. The replacement value, reflects the opportunity cost of the use of gas in each sector. Thus, for each user, a different price can be fixed in such a manner that the cost of production in the user sector with natural gas is the same as with the cheapest alternative. Fixing these prices would also mean that the producers and transporters are given an incentive to minimise their cost and thus deliver the gas in the most efficient manner (as compared to cost plus pricing which does not distinguish between efficient and inefficient production).

3. In the present gas pricing policy there is no price discrimination among the various sectors. As indicated above, for optimum utilisation of a given quantity of natural gas, the consumer prices should reflect the opportunity cost i.e. user's capabilities of paying a particular price for natural gas given the cost of alternative fuels/feedstock. Naturally, these being different for different sectors, it would follow that consumer prices should also vary in the fertiliser sector, gas price should be linked to the Naphtha replacement value while in the power sector it would be proper to link it to the fuel oil value. Admittedly, when one is dealing with a situation of allocating a given amount of gas, such a procedure would help the Government to retain the maximum amount of resource rent. However, it is felt that given the situation in India, there are some difficulties in adopting such an approach. This is due to several important reasons which are discussed below.

4. Firstly, in the interest of long term development of the gas sector, the Committee felt that it would be important to adopt a pricing policy formula that is transparent and easy to implement. This would enable the down-stream industries to suitably plan their investments. Secondly, differential prices would lead to difficult issues of monitoring every consumer on its use of natural gas by the type of use and this will create problems of implementation. Thirdly, natural gas market in our country may move towards supplementing the domestic natural gas supply through the import of natural gas either in the form of LNG for through substitute liquid fuels. In other words, in the gas market the large users will be able to have natural gas at nearly the same prices, (without any significant distinction with reference to the end-use) i.e. at the international supply price, like the emerging trend in North sea and other markets. Thus for most of the bulk users the long term supply price at the margin is its CIF price and which would be closely linked to international prices of liquid hydrocarbons, given their close substitutability. Fourthly, the determination of opportunity value to a user is a complex issue and can be controversial especially when the monopoly supplier, i.e. GAIL is itself involved as a user in some of the down-stream industries. Finally, the differential prices have a potential to become discriminatory prices and this can create avoidable litigation-which would only retard the development of this potentially important energy source. It may also be recognised that one of

the key implications of the increased deregulation in the downstream sectors and energy markets will be to reduce the spread in opportunity values i.e. reduced demand price spread among the different users. On account of the above reasons the adoption of differential prices for the different users at a given point is not recommended."

5. In fixing the price of natural gas, the Government have accepted the above recommendation of a uniform consumer price. Due regard will be accorded to the recommendation of the Committee while fixing the gas prices after the expiry of the present price regime.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 112

Incorporate costs of environmental damage/mitigation measures into project appraisals. Adequate and comprehensive incorporation of environmental costs and benefits of using a particular technology or resource should form part of project analysis. This, the Committee, believes would lead to more rational choice in the energy sector.

Reply of Ministry of Petroleum & Natural Gas

Instructions have already been issued on 20th December 1993 to all Chief Executives of the PSUs under the control of this Ministry that the Note for PIB/ CCEA should also include component-wise cost and the total cost for implementation of the measures prescribed by the Ministry of Environment and Forests for environment clearance.

Instructions are being issued to the PSUs to incorporate environmental cost-benefit analysis in their project proposals.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 113

Device a comprehensive and humane policy for the rehabilitation of families affected by developmental projects. Such rehabilitation ought to precede, not follow the launching of projects involving displacement of people.

Reply of Ministry of Petroleum & Natural Gas

The recommendation of the Committee regarding devising a comprehensive and human policy for the rehabilitation of families affected by development projects concerns the project authorities of the Government of India and PSUs as a whole. However, this recommendation has been noted in the Ministry.

[Ministry of Power : O.M.No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 115

Ensure that adequate pollution control measures are undertaken and suitable devices installed, and more importantly operated and maintained in power plants and refineries.

Reply of Ministry of Petroleum & Natural Gas

The power plants installed in the refineries use only oil or gas as fuel. This eliminates the pollution problems associated with the fly ash.

The measure adopted to reduce the emission of sulphur dioxide which is the only major pollutant are as under :

(a) Use of low sulphur fuel oil and gas available in the refinery.

(b) Reducing the fuel consumption in the power plant by having boiler with high efficiency. Heat from the exhaust gases is recovered in air preheaters. The efficiency of these boilers is monitored from time to time.

(c) Major portion of the steam is used for other useful purposes. This optimises the fuel requirement of the refinery as a whole.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 117

Examine and promote the use of effluents as raw materials, as in the use of ash for the manufacture of cement or bricks. The Committee, wishes to emphasize R & D, and demonstration projects in this regard. Suitable incentives to entrepreneurs need to be provided to promote such alternative use of effluents.

Reply of Ministry of Petroleum & Natural Gas

Liquid effluent generated in the refineries is mainly water with small quantity of oil. The oil is recovered in the effluent treatment plants and reprocessed in the refinery to produce regular products. The treated effluent contains less than 10 parts per million of oil which is permissible. The water is also required as a resource in the refinery for various purposes. To cut down the dependence on the fresh water refineries have found ways and means of reusing the treated effluent within the refinery itself. The amount of treated effluent reused *vis-a-vis* the total quantity in the refineries is as follows :

Refinery	Quantity reused	Total Quantity
Digboi	100 M3/hr	150 M3/hr
Guwahati	100 M3/hr	160 M3/hr
Barauni	250 M3/hr	500 M3/hr
Gujarat	300 M3/hr	650 M3/hr
Haldia	80 M3/hr	180 M3/hr
MRL	150 M3/hr	220 M3/hr
CRL	80 M3/hr	400 M3/hr

At Mathura and Gujarat the treated effluent from the refinery is used by farmers for irrigating their fields. MRL is receiving city sewage from Madras city which is used in their refinery after elaborate treatment.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial Nos. 118, 119 and 121

Integrating the functioning of Sectoral Ministries, State Governments, local bodies and agencies responsible for planning implementation of development projects. Integrating environmental concerns more effectively in all policy areas and strengthening governmental and institutional structures dealing with environmental management, especially within the ministries concerned.

Strengthen administrative arrangements for monitoring and enforcing of environmental standards.; decentralise environment impact assessments and environmental law enforcement based on cooperation with local authorities.

To provide professional training in operation and maintenance of pollution control treatment devices and laboratories ; in setting standards ; in management of hazardous ; and in modelling, data processing legal aspects to the staff concerned.

Reply of Ministry of Petroleum & Natural Gas

All the public sector undertakings under the administrative control of Ministry of Petroleum & Natural Gas have their own dedicated groups of experts dealing with the matter relating to environment aspects of the installation concerning them. There is an advisory committee on environmental planning and coordination presently under the convenorship of Director (National Environmental Engineering Research Institute, Nagpur). This Committee has been constituted to advise on all aspects of environmental planning for schemes and programmes of the Ministry. This committee holds periodical meetings at different installations of different oil companies to appraise the steps taken by oil companies in controlling the pollution. The Ministry has also set up a organisation *viz.* Centre for High Technology which looks after the matters pertaining to environment etc. All the oil companies abide by the guidelines and regulations notified by Ministry of Environment and Forests in regard to environment.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 120

To provide funds, qualified staff and other facilities like laboratories, equipment to implementing organisations.

Reply of Ministry of Petroleum & Natural Gas

Funds are no constraint to the PSUs and other organisations under the administrative control of this Ministry.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 123

Steps be undertaken to encourage exploratory and drilling activities. The price

of crude oil should be so fixed as to allow for adequate internal resource generation for undertaking such activities. As for mobilizing private Indian or foreign capital participation, timely decisions should be taken keeping in view the national interest.

Reply of Ministry of Petroleum & Natural Gas

During VIII Plan period (1992—97), 228565 LK/GLK/SLK of 2D seismic data and 42843 SK/SSK of 3D seismic data and 3.04 million mtr. of exploratory drilling is envisaged to be carried out by ONGC and OIL.

The exploration strategy adopted at the beginning of the VIII Plan period envisaged :

(a) Optimal mix of intensive and extensive exploration consistent with results and requirements in each basin/sector ;

(b) Deliberate focus on areas that are likely to contribute significantly during IX Plan and after ; and

(c) Extension of exploration to probable high risk and high reward areas.

The identified VIII Plan exploration thrust areas were reviewed recently in light of the results of exploration during the initial VIII Plan period i.e. 1992-97. Additional inputs are identified in less or unexplored basins/sectors and frontier areas with a specific focus on long-term perspectives and futuristic gains.

Government is also offering exploration blocks for exploration by multi-national/Indian companies on continuous round the year basis. In additional 35 blocks (14 in onland and 21 in offshore area) have also been offered by Govt. to private companies (both Indian and foreign) for carrying out speculative surveys.

Government of India has been offering exploration blocks round-the-year basis with bidding rounds twice a year. The fiscal and contract terms have been framed after reviewing the fiscal and contract terms of other countries with a view to make our terms attractive for companies to participate in oil and gas exploration. The bids are evaluated and contracts are finalised with expediency. The selection of blocks for offer to private companies is done in consultation with Oil & Natural Gas Corporation Ltd. and Oil India Ltd.

To provide private companies with a single window, fast track decision

Petroleum & Natural Gas to liaise with companies interested in participation in this sector and expeditiously finalise contracts for exploration blocks and discovered fields.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 124

Indian private companies that have been given exploration rights be encouraged to develop available blocks and should not be placed at any disadvantage *vis-a-vis,* foreign companies. The entire process of awarding blocks must be wholly transparent.

Reply of Ministry of Petroleum & Natural Gas

Indian private companies are welcome to participate in bidding for exploration blocks. They have been placed on an equal footing with foreign companies as far as terms and conditions are concerned.

The bid documents provided to all interested companies prescribe the format and content of the bid to be given by each bidder. These include *inter-alia* details of the bidding company/consortium, technical information relating to reservoir assessment, reserve estimates and work programme and the commercial terms offered.

Clarifications are sought from bidders, both before and during negotiations with them on their proposals and the non-negotiable terms are made clear to them. Bidders are also told to give their response by a specified last date.

The technical evaluation of the proposals received after negotiations and clarifications is carried out and the commercial terms offered by all technically acceptable bidders are then evaluated.

Adequate knowledge regarding the bid evaluation criteria is given to all bidders both before submission of bids by them as also during the course of negotiations with them and last dates are set for their firm replies to terms made known to be non-negotiable. Therefore, the entire evaluation process is transparent and bids are evaluated as per bid criteria.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 125

Steps be undertaken to achieve enhanced oil recovery from existing wells.

Reply of Ministry of Petroleum & Natural Gas

Maximizing oil production from existing wells/fields through enhanced oil recovery has been one of the focus activities. In order to achieve enhanced oil recovery from the existing fields ONGC has already undertaken a number of steps. Two E.O.R. (Enhanced Oil Recovery) processes *viz.* Insitu Combustion and Polymer Flooding have been implemented at pilot and expanded pilot scale in some of the fields in Western Region (Balol, Lanwa, Sanand and Jhalora). Both these processes are now slated for implementation on commercial scale in the fields where pilots have been successfully implemented in the past. In addition to these, Insitu Combustion is planned in two more fields in the near future (Santhal and Becharaji) steam stimulation, which is also a technique to enhance oil production is being planned in one field (Lanwa) in North Gujarat. Bombay High Field, where at later stage, a suitable EOR process can result into significant additional production of oil, has also been studied and planning of a pilot using 'Miscible Gas Process' is underway.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 126

Prices of products should reflect the economic cost of supply. This is particularly important if private sector marketing of products is to be promoted.

Reply of Ministry of Petroleum & Natural Gas

Government policy on pricing of petroleum products is directed towards meeting the petroleum product demand required for the growth of economy and also to make the essential petroleum product available at an affordable price. The pricing mechanism is so structured as to discourage non-essential use, promote inter-fuel substitution and subsidise essential fuels for socio-economic reasons to vulnerable section of the society. Therefore, prices of kerosene and diesel etc., items of mass consumption are kept low (subsidised) and products like Aviation Fuel, Motor Spirit etc. are priced in a manner so as to discourage their non-

essential use. Differential pricing in kerosene and LPG for non essential/industrial use is also adopted to achieve this objective by pricing these products higher than for domestic use.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Comments of the Committee

(Please *see* paragraph 34 of Chapter I of the Report)

Recommendation Serial No. 127

Immediate steps be taken to first reduce and subsequently eliminate flaring of natural gas. It is also important to determine the role of natural gas in the competing sectors of power production, fertilisers and petrochemicals. While regional gas grids already exist, techno-economic suitability and advisability of establishing a national gas grid in the sub-continental country like India needs to be closely examined. The advisability of gas imports from the Gulf or from neighbouring countries also needs serious consideration.

Reply of Ministry of Petroleum & Natural Gas

Flaring of natural gas takes place due to lack of the required compression and transportation facilities, technical requirements of operational safety, availability of gas from isolated pools which cannot be economically connected to the transportation network, non-drawal of gas by consumers etc. Both ONGC and OIL are implementing a number of schemes for reducing the flaring of gas. The Gas Flaring Reduction Project in the Western offshore fields is being implemented with financial assistance from the World Bank, ADB and Exim Bank of Japan. The project is scheduled to be completed by July 1996. Facilities for transportation and compression are also being set up at Gujarat, Tamil Nadu, Andhra Pradesh and Assam. The Oil India Ltd. is implementing a scheme for the underground storage of surplus gas. It is expected that as a result of these measures, flaring will be reduced to technical and unavoidable flaring and flaring due to non-lifting by consumers by the year 1996-97.

The allocation of gas to the competing sectors of power production, fertilisers, petrochemicals etc. are based generally on the Imputed Economic Values of gas use, preference being given to the power, fertiliser and the sponge iron sector.

The gas available from the Western offshore fields is being transported to Uran and Hazira. At Hazira, it is being fed into the HBJ pipeline for further transportation to Rajasthan, Madhya Pradesh, UP, Delhi and Haryana. The gas available at Gujarat, K.G. and Cauvery basins and the North-East are utilised through regional grids. The Government have accepted in principle the concept of laying a pipeline to the Southern States from a suitable point on the Western Coast. The feasibility of establishing a national gas grid can be examined when the availability of gas increases either from domestic sources or through imports.

In view of the growing demand for natural gas in the country and the limited projected availability from domestic sources, the Government have taken the initiative to explore the feasibility of importing natural gas from the Middle-East. A Memorandum of Understanding was signed with Oman in March, 1993. An MOU was signed with Iran in July, 1993 followed by a second MOU signed in November, 1993. The terms and conditions of importing gas from Oman are under discussion with the Sultanate of Oman/Oman Oil Company. For the proposed gas pipeline from Iran, bids have been invited for a feasibility study from reputed international engineering firms.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 128

Encourage the use of CNG as a replacement for conventional fuels in the transport sector.

Reply of Ministry of Petroleum & Natural Gas

An experimental programme was launched in 1992-93 for introducing CNG in the transport sector in Delhi, Bombay and Baroda. Use of CNG in vehicles required lot of work to be done before it can be used in a large scale which, *inter-alia* includes obtaining 'Prototype Approvals' of various makes of CNG kits for each type of car from approving agencies, setting up of dispensing units, importing CNG kits, training various workshop personnel who can safely fit CNG kits etc. Since use of CNG reduces the power of engine, exhaustive work has to be done by Automobile Manufacturers too. CNG has inherent limitation in fuel storage resulting in the slower customer acceptance. The present high rate of custom duty on imported kit is also acting as hindrance in popularising CNG. Since use of CNG for automobiles in India is a new concept, the public demand is expected to pick up slowly in the beginning. However, the first phase of the programme

involving conversion of 220 petrol vehicles have been completed. In order to encourage the use of CNG the GAIL, in consultation with oil marketing companies, has drawn up plans for converting 2100 vehicles during 1994-95.

DTC have been running six buses on CNG-diesel mode on experimental basis since December 1992. Besides, the Madras Refineries Limited (MRL) has taken up in March, 1992 a pilot project to convert and operate a few buses using CNG-diesel dual-fuel on an experimental basis. The expansion of CNG-diesel dual-fuel operation would depend on the techno-economic viability of the experiment which remains to be established.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 135

In view of the lukewarm response from the private sector, there is a need to continuously review the incentive package for encouraging private sector participation.

Reply of Ministry of Petroleum & Natural Gas

On the exploration front, where no bids are received for particular blocks, efforts are made to upgrade the geological information on these blocks before putting them on offer again. Upgradation is done through the seismic work and exploration drilling activity carried on by ONGC and OIL in these blocks and the latest information gathered by ONGC and OIL is incorporated in the basin dockets and data packages made available to companies. Continuous round the year inspection facilities are available at the ONGC offices in Delhi and Houston, USA, so that companies can, at any time, evaluate the prospectivity of different basins in the country.

In view of the fact that a large number of countries are competing for the relatively scarce exploration risk, capital of companies, a continuous review of the incentives available to companies is undertaken to make the terms internationally competitive. The Ministry has a cell working under a Director which frequently assesses the terms and conditions to see what changes are required in order to make the regime more attractive to private companies.

The response from the private sector to set up the refineries in India is extremely good. As a result, based on the LOIs so far issued and with existing capacities and on-going implementation programmes, the refinery capacity by the

end of the century would be around 135 million tonnes per annum.

The private sector has already entered parallel marketing of SKO and LPG. The parallel marketeers are free to import and market SKO and LPG at market determined prices. Lubricants have been decanalised and private companies can import and manufacture on their own or in collaboration with foreign companies and market lubricants. This has been done with a view to make available quality lubricants and meeting the full demand in the case of SKO and LPG.

[Ministry of Power : O.M.No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 135

Privatisation, though inescapable ought not to become an indiscriminate free for all.

Reply of Ministry of Petroleum & Natural Gas

The offer of exploration blocks or discovered fields is made keeping the national interest in mind. The basic objective behind the opening up of the exploration and production sector is to augment the production of hydrocarbons and to accelerate the pace of exploration activities to add to the hydrocarbon reserves of the country, with the objective of ensuring that the long term energy requirements of the country can be met. Every effort is made, when negotiating an award for an exploration block or a discovered field, to obtain as favourable terms as possible for the Government. The intention is to enable private investment to actively supplement the role of the public sector in exploration and production activities in the country.

While recommending the setting up of a refinery in the private sector, the proposal is evaluated technically as well as based on financial capability of the applicant. MOP & NG also examine whether the value addition is as per prescribed norms.

Disinvestment of about 40% has already taken place in the BPCL and HPCL. There is a proposal to make disinvestment upto 5% in the Indian Oil Corporation. It is being ensured that privatisation does not become an indiscriminate free for all.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 135

Identification of areas, the development of which could be completely entrusted to the private sector such as service activities related to production of crude oil and natural gas.

Reply of Ministry of Petroleum & Natural Gas

Private Companies and public sector undertakings are used to provide production services to ONGC and OIL in certain areas such as—

— Workover rigs.

— Crude oil transportation by tankers (land/sea).

— Operation & Maintenance (O & M) of multisupport vessel (MSV) used for offshore operations.

— Equipment maintenance.

— Inspection/certification of offshore structures, pipeline and vessels.

— Manufacturing & supply of certain equipment, chemicals and other materials.

— Well stimulation services.

— Liquid Nitrogen Services.

— Coil tubing services.

— Well testing (sub-sea test tree) services.

— Line flushing services.

— Compressed air services.

In addition, private companies and PSUs can be considered for the following production services :

— Workover fluid supply services.

— Downhole wireline tools/services.

— Mechanical wireline scrapping services.

— SRP maintenance services.

— Mobile SRP services.

In the Related Technical Services following areas have been identified for disinvestment partly or wholly :

—Offshore Engineering & Construction

(i) Design and Engineering Consultancy.

(ii) Construction, Transportation, Erection and Commissioning of offshore crude oil and gas processing facilities.

(iii) Procurement, Coat & Wrap and laying of offshore pipelines.

—Technical support including overhaul and maintenance of equipment

(i) Capital overhaul of equipment in BRBC, SRBC and CRBC.

—Logistics

(a) Onland

Category

(i) Light vehicles (car, jeep, pick-up, ambulance, emergency vehicles and cash vans).

(ii) Medium vehicles (bus, water tanker, truck and prime-mover 20 tons).

(iii) Heavy vehicles (Prime-mover with trailer 30 tons, 20 tons) .

(iv) Cranes.

(b) Marine

(i) Offshore Supply Vessels (OSVs), Chartering of OSVs, Operation & Maintenance of owned GTVs.

(ii) Geo Technical Vessels (GTVs), Operation & Maintenance of owned GTVs.

(c) Air

Air logistics support for offshore operations.

Civil Construction

(i) Construction.

(ii) Maintenance of owned estate.

However, for strategic reasons it may not be always desirable to divest all of the services completely and enstrues all these to private sector.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : December, 1994]

Recommendation Serial No. 138

An enpowered committee should be set up to expedite decision making on the proposals submitted by the private sector for oil and gas exploration and production, marketing of petroleum products, transportation and supply of natural gas, power generation and its T & D, etc.

Reply of Ministry of Petroleum & Natural Gas

An empowered negotiating committee is already functioning to conduct negotiations with bidders and finalise the contracts expeditiously for exploration and production of oil and gas by private companies in India.

The empowered negotiating committee comprises Petroleum Secretary, Finance Secretary, Revenue Secretary and Law Secretary, as also the CMDs of ONGC and OIL.

[Ministry of Power : O.M. No. 3/1/94 — Coord. Dated : December, 1994]

CHAPTER V

REPLIES OF THE MINISTRY OF NON-CONVENTIONAL ENERGY SOURCES

Recommendation Serial No. 77

Efforts need to be devoted to a serious re-assessment of what current technologies are actually able to achieve, and to arrive at a realistic estimate of the potential of these technologies within the context of the overall energy system.

Reply of Ministry of Non-Conventional Energy Sources

Ministry of Non-Conventional Energy Sources, based on various reports and studies, has made the following assessment about the potential of renewable energy resources :

Source/Technology	Approx. Potential Availability
Biogas Plants	12 Million Nos.
Biomass//Bioenergy	17,000 MW
Improved Chulha	120 Million Nos.
Mini-Micro Hydel Power	10,000 MW
Wind Power	20,000 MW
Ocean Thermal Power	50,000 MW
Tidal Power	9,000 MW
Sea Wave Power	20,000 MW
Total Solar Insolation over land area of India	5×10^{15} KWhr/year (equivalent)

Efforts to update the potential of renewable energy resources on a regular basis are being made. For example, under the Wind Energy Programme, regular wind energy data are collected and analyzed under the wind mapping, wind monitoring and complex terrain projects funded by the Ministry. There are

189 wind mapping and 59 wind monitoring stations, in operation in the country. Three handbooks on wind energy resource survey in India have so far been published.

Similarly, the Ministry has a data base on potential sites of small hydro power projects. 1344 sites aggregating to a capacity of 1171 MW have so far been included in the data base. There is an estimated potential of 10,000 MW in the small hydro sector. Realistic estimates are continuously being made to know details about the potential. The information about solar insolation in the country is being compiled and taken from Indian Meteorological Department. The potential in respect to other renewable energy resources is being updated by assessing and compiling data from various sources.

The sectors where renewable energy resources can be utilized are :

Sl. No.	Sector		Sources/Technologies
1.	Cooking Energy	:	Biogas, Improved Chulha, Solar Cookers.
2.	Power Generation	:	Wind, Mini-Micro Hydro, cogeneration, Waste recycling, Solar Photovoltaic, Biomass based technologies, Ocean Thermal, Tidal, Sea Waves, Geothermal, Fuel cells.
3.	Process Heat	:	Solar Thermal Energy Systems, Biomass Energy Systems, Geo-Thermal Systems.
4.	Surface Transportation	:	Alternate Fuels : Battery Operated Vehicles, Alcohol-Petrol operated, Diesel vehicles, Compressed Natural Gas fueled Vehicles Hydrogen operated vehicles.

The Ministry has introduced market-drive programmes for only those technologies which are commercially available. These include low grade solar thermal systems such as solar water heating systems, solar cookers ; solar photovoltaic systems including solar lanterns, street lights, small decentralized SPV power generation, SPV applications in various sectors like Railways, Tele-

communication etc.

Market orientations has also been taken up for programmes relating to wind power generation and small hydro.

Demonstration and limited extension programmes are being taken up for those technologies which though commercial are not fully matured. These include technology for energy recovery from urban and industrial wastes, utilization of biomass and other agricultural residues.

R&D and Demonstration programmes are being taken up for new technologies which include promotion of alternate fuels for surface transport including battery operated vehicles, alcohol-driven and fuel cells etc.

The above new strategy is in keeping with the recommendation of the Standing Committee on Energy.

[Ministry of Non-Conventional Energy Sources : O.M. No. 9/27/93-P & C Dated the 6th October, 1994]

Recommendation Serial No. 78

Grid connected wind electric generators (WEGs) have emerged as a cost competitive option for the power sector. The demonstration programme has built up a significant capacity and the results though mixed, show potential. This resource, of course, is very site specific. In India, Tamil Nadu, Gujarat and Rajasthan seem to hold more promise. Facilities such as wheeling, banking and buy-back of power have helped attract participation from the private sector. This programme is also likely to receive substantial amount of funding from international funding agencies.

Reply of Ministry of Non-Conventional Energy Sources

The Ministry of Non-Conventional Energy Sources have noted the comments of the Committee. Efforts are continuing to expand wind resource assessment activities and secure greater private sector participation. International agencies have also been approached for further funding support for the programme.

A comprehensive wind mapping programme to identify prospective sites for wind farming has been undertaken. 189 wind mapping and 59 wind monitoring stations are operational in the country. 69 sites in States have so far been identified

in the state of Tamil Nadu, Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra and Lakshadweep. The total capacity of wind energy to be generated is expected to be 3000 MW in these areas. The installed capacity in the wind farm sector is 116 MW and 58.44 MW of wind farm projects are under installation in the country. Another 900 MW proposals are under various stages of process with Governments of Tamil Nadu, Gujarat, Andhra Pradesh, Kerala, Karnataka and Madhya Pradesh.

[Ministry of Non-Conventional Energy Sources : O.M. No. 9/27/93-P & C
Dated the 16th November, 1994]

Recommendation Serial Nos. 79 and 80

Another significant initiative is likely to be in the area of small hydro projects (SHPs) of less than 3 MW capacity. The programme is most suitable and well poised to meet the energy needs of rural and remote hilly areas. Such projects can also make use of the existing irrigation infrastructure. The Energy Sector Management Assistance Programme (ESMAP) of the World Bank reviewed many such projects and identified several deficiencies : the unwarranted high costs due to the initial batch of schemes being conceived, designed and executed as scaled down versions of large conventional hydro installations, high gestation periods due to complex layout of schemes and high manpower requirements causing concerns regarding viability.

Following substantial work on these projects costs were reduced improving their viability. Through a combination of design modification and standardization of equipment, the unit cost of small hydro plants can be reduced by 30%. The reliability of the small hydro system can be substantially increased through inter-linked design of small hydro facilities. The hydro power structure should be arranged so that the head-work (or the in-take) of one station follows closely the tail-race (open canal for tail water) of the other. The upstream regulating reservoirs can then be designed so that the cascade process raises the dependable output of the whole basin system.

Reply of Ministry of Non-Conventional Energy Sources

This Ministry deals with Small Hydro Power Projects upto 3 MW capacity and, in order to provide focussed attention to this sector, the subject was transferred in February, 1989 from Ministry of Power to MNES. This programme has been considered as one of the thrust areas of this Ministry in Eighth Five Year Plan. Joint UNDP/World Bank Energy Sector Management Assistance Programme

(ESMAP) conducted a pre-investment study regarding Mini Hydro Development at irrigation dams and canal drops in India. ESMAP concluded that all the basic pre-requistes for economically viable Mini Hydro Power generation exist at sites in India that are associated with irrigation, water storage and distribution infrastructure.

The principal objective of this study was to apply techno-economic criteria to improve the design and economic viability of irrigation based mini-hydro schemes, and to identify and prepare a medium term investment programme to develop a series of irrigation based mini-hydro schemes in the southern region of India. Accordingly, the study covered previously identified and investigated sites in the States of Andhra Pradesh, Karnataka, Kerala and Tamil Nadu, which have similar topography and irrigation regimes. At the request of MNES, the scope of the study was expanded to include twelve prospective sites in the State of Punjab, all of which are earmarked for development under the mini-hydro component of the ongoing World Bank/IDA financed Punjab Irrigation and Drainage Project.

To improve upon the original design, attention is now being focussed on identifying practical measures to minimize capital costs. For turbine-generator units, this is being achieved by developing a set of standardized specifications according to available heads and discharges. As a result, a set of eight standardized specifications/type designs based on runner diameters have been developed for the turbine requirements under all 53 schemes.

The cluster/cascade approach is also being followed, where possible, for development of Small Hydro Power Projects in order to reduce the overall costs. In a recent development, U.P. Government have been allotting entire river basins for private sector development.

[Ministry of Non-Conventional Energy Sources : O.M. No. 9/27/93-P
Dated the 6th October, 1994]

Recommendation Serial No. 81

Solar Photovoltaics (PVs) are a viable option in remote areas for specialized applications including telecommunications, railway signalling, telemetry (oil exploration), microwave repeater stations and for refrigeration (cold chains). PV systems for lighting are also a viable option in remote, non-grid connected and

low-load-demand villages where the cost of providing power through conventional means is prohibitive.

Reply of Ministry of Non-Conventional Energy Sources

Solar Photovoltaic Systems are mostly installed in rural and unelectrified areas. The socially oriented scheme of the SPV programme is mainly for difficult and economically backward areas *i.e.* Special Category States/UTs, hill regions, deserts and Islands where the market oriented scheme is unlikely to pick up. In addition, specific projects meant for SC/ST and certain other category of beneficiaries are entitled for subsidy under the socially oriented scheme.

An aggregate capacity of about 10 MW Solar Photovoltaic Systems for electricity generation have been installed in the country under the programmes of MNES and other user organisations. These systems include street lights, domestic lights, solar lanterns, small village level power plants, water pumping systems, rural telecommunication systems, railway signalling, microwave repeater stations, and for other applications. There is no consumption of fossil fuels in these systems. The above SPV systems are capable of generating/saving about 15 million units of electricity per annum.

Under the MNES SPV Demonstration Programme, so far about 70,000 solar photovoltaic systems for domestic, street and community lighting, water pumping and small village level SPV power plants of an aggregate capacity of about 530 KWp have been installed in the country. The Ministry is implementing an ambitious programme on solar lanterns, under which it is proposed to distribute 4,00,000 solar lanterns during this period.

[Ministry of Non-Conventional Energy Sources : O.M. No. 9/27/93-P & C Dated the 16th November, 1994]

Recommendation Serial No. 82

Programmes such as windmills for pumping and gasifiers have not quite lived upto expectations and need more developmental work before they are likely to make an impact on the energy scene.

Reply of Ministry of Non-Conventional Energy Sources

In the new programme of water pumping windmill only proven wind pumps, namely modified 12 PU 500 and gear type wind mills, are being promoted. As suggested by the Standing Committee on Energy development and improvement on other models would be supported before introducing these under the Demonstration Programme.

The Biomas gasifiers have been developed indigenously with different ratings ranging from 3.5 MW to 100 KW for various applications like lift irrigation and other mechanical systems, thermal and power generation through MNES support. These systems are mainly promoted in the use of woody-biomas and agricultural residues like cotton stack, maize cobs etc. Research and Development work for utilisation of non-woody biomass namely rice husks, saw-dust, groundnut shells, sugarcane trashes etc. have been supported at four Action Research Centres at IIT, New Delhi and Bombay, Indian Institute of Science, Bangalore and Madurai Kamraj University, Madurai. IISc., Bangalore has already demonstrated a 100 KW biomass gasifier using rice husks, saw-dust and sugarcane woody biomass above 100 KW is under way. Biomass gasifiers of 5 HP and 10 HP for water pumping for irrigation use have been demonstrated in the fields. However, these systems could not be supported on large scale due to problems of tar content and cleaning. Research and development work has been supported to minimise this problem so that large scale programme could be undertaken.

[Ministry of Non-Conventional Energy Sources : O.M. No. 9/27/93-P & C
Dated 16th October, 1994]

Recommendation Serial No. 83

The potential of the two biomass based programmes—improved chulhas and biogas has not been realised though they are possibly the most attractive of the various renewable energy devices.

Reply of Ministry of Non-Conventional Energy Sources

The year-wise achievement during VIIIth Plan Period under National Project on Biogas Development Programme is as follows :

1992-93	1.88 lakh Biogas Plant
1993-94	2.15 lakh Biogas Plant
1994-95	2.00 lakh Biogas Plant (expected)

With the above achievements and targets proposed for 1995-96 and 1996-97 at 2.40 and 2.50 lakhs, respectively, the total achievement during the VIIIth Plan Period would be 10.00 lakhs. This would be higher by 33% over the VIIIth Plan target of 7.50 lakhs.

With the achievement of 10.00 lakhs during the VIIIth Plan period, the cumulative achievement till the end of March, 1997 would be 25.75 lakh family-type biogas plants which would be about 21% of the potential of 12 million.

The year-wise achievement during the VIIIth Plan period under the NPIC Programme is as follows :

1992-93	Rs. 19.75 lakhs
1993-94	Rs. 24.26 lakhs
1994-95	Rs. 26.00 lakhs (expected)

With the above achievement and target proposed based on the experience, for 1995-96 and 1996-97 at 28 and 30 lakhs respectively, to total achivement during the VIII Plan period would be 128 lakhs. this would be higher by 28% over the VIII Plan target of 100 lakhs. However, this would be short by 42 lakhs with reference to the enhanced targets of 180 lakh improved chulhas under the revised Strategy and Action Plan.

With the achievement of 128 lakhs during the VIII Plan period, the cumulative achievement till the end of March 1997 would be 253 lakh chulhas which would be about 21% of the potential of 120 million.

[Ministry of Non-Conventional Energy Sources : O.M. No. 9/27/93-P & C
Dated 16th November, 1994]

Recommendation Serial No. 84

Ocean thermal energy conservation (OTEC) using the principal of termperature difference between the warm ocean surface waters and the cold water at greater depth can be harnessed to generate electricity. An ambitious project to generate 600 MW of power through this technology is proposed to be set up off the coast of Tamil Nadu. Initially, 100 MW of capacity is likely to come up. India's potential of generating energy from the renewable, non-polluting source is estimated at 50,000 MW.

Tidel power is another means of tapping ocean technology—the potential in India is estimated at 9,000 MW. Techno-feasibility of tidal energy needs to be established and this Committee recommends action in this regard.

Reply of Ministry of Non-Conventional Energy Sources

An MOU has been signed between the Sea Solar Power Inc., USA and Tamil Nadu Electricity Board and TEDA for generation of 100 MW OTEC plant to be

demonstration programme

installed off the coast of Kulasekarapatnam in Tamil Nadu. Detailed project proposal is not yet obtained. The same is being pursued.

The estimated cost of the 900 MW Tidal Power Plant at Kutch is about Rs. 6296 crores at May, 89 price levels. Proposals are proposed to be invited from interested parties to assess techno-economic feasibility of this project. The West Bengal Government has also been asked to submit a project for assessing the techno-economic feasibility of tapping tidal energy in the Sundarban areas.

[Ministry of Non-Conventional Energy Sources : O.M. No. 9/27/93-P & C
Dated 6th October, 1994]

Recommendation Serial No. 85

The Committee recommends that to attract sufficient level of funding the level of incentives provided to RETs should be not less than those provided for conventional sources of supply. This is especially true of incentives such as guaranteed rates of return and assured buy back of power now been offered to power projects using fossil fuels. In fact, considering the positive effects of renewable devices, there is a need to provide additional incentives over and above those meant for conventional sources.

Reply of Ministry of Non-Conventional Energy Sources

A number of incentives are being offered by Central and State Governments to encourage potential investors/developers to take up power projects based on non-conventional sources of energy. The incentives being offered include :

— Budgetary support for selected, state of the art demonstration projects.

— Financial assistance for survey & investigation and preparation of Detailed Project Reports in the areas of small hydro and bagasse based cogeneration.

— 100% rate of depreciation in the very first year is available to all power projects based on non-conventional sources of energy, except small hydro projects. The issue of allowing accelerated rate of depreciation on small hydro projects also, has been taken up with the concerned Ministry.

— Soft loans are available from Indian Renewable Energy Development Agency for various non-conventional energy based power projects.

private sector projects is applicable for non-conventional energy based power projects also.

— A number of components/devices required for non-conventional energy power projects are eligible for concessional rates/full exemptions on custom duties. It has also been suggested to Ministry of Finance that captive power plants based on non-conventional energy sources, which are presently not allowed to be imported under 'project imports' should also be made eligible under this concessional tariff category.

— Central Government has allowed exemption from payment of excise duty on most of non-conventional energy devices. Most States also allow exemption from payment of sales tax. In addition to above, the Ministry has also suggested to States that to ensure a reasonable return on the investments, a suitable policy package, incorporating power purchase price/ wheeling & banking facilities/permission for third party sales, industry status etc. The standard two part tariff formula proposed by Central Electricity Authority for determining purchase price of energy from private sector power projects can not be easily applied to power from non-conventional energy based projects due to site dependent costs and plant load factors. Accordingly, it has been suggested that initially it may be worthwhile to offer an uniform purchase price for power from all non-conventional energy based projects. A price of Rs. 2.25/unit has been suggested. After consideration of MNES suggestions, several States have already announced general policies for purchase/wheeling/banking/third party sales, etc. for power from various non-conventional energy based projects. Other States are also reportedly considering enactment of such policies.

[Ministry of Non-Conventional Energy Sources : O.M. No. 9/27/93-P & C
Dated the 6th October, 1994]

Recommendation Serial No. 86

There is a need for considerable R & D work in RETs. This is to be in the area of both basic research as well as in applied engineering work. Attention should be focused on removing technical glitches and adapting technologies to suit local conditions. The latter is especially true off biomass based technologies. Hither to the industry has had a marginal role in such efforts. A more collaborative effort is likely to prove fruitful.

Reply of Ministry of Non-Conventional Energy Sources

The Ministry of Non-Conventional Energy Sources recently undertook a comprehensive review of the R & D programmes with a view to assess the effectiveness of the approach followed in the past and to formulate appropriate strategy in the light of new orientation given to the programmes. A Committee was appointed for this purpose drawing members from both within the Ministry and with outside experts. The Committee has recommended that the Ministry's efforts to strengthen R & D should be guided by a strategy which should by and large be industry-driven and goal oriented. The Committee has also suggested that the R & D priorities in each field should be derived from the objectives of respective programmes and should be directed towards specific tasks for achieving improvement in efficiency, cost reduction, enhancement of reliability etc. In order that technology transfer could take place in the most expeditious manner, the involvement of industry should be insisted upon from the very beginning in all applied research projects. The Committee has also identified priority areas in each Renewable Energy Technology area.

As a follow up of this Report, the Ministry has constituted a R & D Advisory Committee under the Chairmanship of Dr. A. Ramachandran and consisting of members from all disciplines of Renewable Energy. This Committee will provide directions to the new R & D efforts of the Ministry, with special focus on promoting collaborative role of industry in R & D and adopting technologies to local conditions, as per the recommendations of the Standing Committee on Energy.

[Ministry of Non-Conventional Energy Sources : O.M. No. 9/27/93-P & C
Dated the 6th October, 1994]

Recommendation Serial No. 87

There is great scope for innovation and greater dynamism in the field of social engineering. For instance, for programmes such as biogas and improved chulhas, there is a need to further decentralize the dissemination of these devices. Private entrepreneurs and non-governmental organizations need to be involved in such efforts.

Reply of Ministry of Non-Conventional Energy Sources

In 1994-95, State Governments and nodal agencies are being given funds specifically for publicity and awareness compaign and users training courses under the National Project for Biogas Development and on Improved Chulha. This would help in using local idioms, folk-art forms etc. and also both print and electronic

media for decentralized dissemination of biogas plants and improved chulhas. Besides, the Ministry has got manuals prepared on construction of biogas plants for entrepreneurs and instruction film on operations and maintenance of biogas plants to be used in user courses. State Governments are being asked to publish these material in local language for wider dissemination.

Guidelines have been revised for implementation of NPBD and NPIC. State Governments have been requested to sub-allocate State targets upto 50% for private entrepreneurs and at least 25% for NGOs during the year 1994-95. In the meeting of Chief Ministers and Ministers of Non-Conventional Energy Sources of States/UTs held in New Delhi on 17th September, 1994, State Governments were requested to involve NGOs and private entrepreneurs for installation of biogas plants and improved chulhas. The Ministry is also actively promoting rural energy entrepreneurs for operation and maintenance of renewable energy systems installed in rural areas.

The Ministry of Non-Conventional Energy Sources has constituted an Advisory Committee of NGOs to examine various aspects of involving NGOs in various programmes of MNES for wider dissemination of renewable energy technologies at the grass roots level. Efforts are also being initiated to involve Panchayats in the biogas and improved chulha programmes.

[Ministry of Non-Conventional Energy Sources : O.M. No. 9/27/93-P & C
Dated the 6th October, 1994]

Recommendation Serial No. 116

Promote the use of more efficient devices–Biogas Plants and Improved chulhas—in respect of biomass based devices to mitigate environmental problems in this sector.

Reply of Ministry of Non-Conventional Energy Sources

Ministry of Non-Conventional Energy Sources is enlarging the programme of Biogas and Improved Chulha through universalisation of these devices. So far, over 20 lakh family type Biogas Plants and over 1.74 lakh Improved Chulhas have been installed in the country. The 8th plan targets of installing 7.5 lakh family type Biogas Plants and 100 lakh Improved Chulhas have been revised to 10 lakh Biogas Plants and 180 lakh Improved Chulhas during the 8th plan period under the new strategy and action plan prepared by the Ministry.

2. Continuous efforts are being made to further improve efficiencies of Improved Chulhas and biogas plants through indigenous R & D efforts. Presently there are about 50 models of fixed Improved Chulhas and 20 models of portable Chulhas. In the initial stages of NPIC, the minimum thermal efficiency was prescribed as 15% which has now been enhanced to 20% and 25% for fixed and portable chulhas respectively. Efforts are continuing to develop more efficient models. Under the National Project on Biogas development, 7 designs are being propagated. Further R & D efforts are continuing to improve efficiencies and effective utilisation of gobar. R & D efforts are continuing to develop and optimise the productivity of Biomass based Gasifier systems for thermal and electrical applications.

[Ministry of Non-Conventional Energy Sources : O.M. No. 9/27/93-P & C
Dated the 6th October, 1994]

Recommendation Serial No. 132

The major recommendations of the Committee are :

(a) provided incentives to renewable energy technologies that are at least on par with those provided for conventional sources of supply;

(b) give R & D efforts a renewed thrust and a focus; and involve the industry in such efforts;

(c) involve non-governmental organisations in dissemination programmes especially in respect of devices used in rural areas.

Reply of Ministry of Non-Conventional Energy Sources

The above three recommendations have been dealt in detail with reference to the recommendations of the Committee which have been enlisted in page No. 41 of the Third Report. The recommendations given in page No. 58 are the brief points of the main recommendations which are given elaborately in page No. 41. The replies for the above recommendations are given against the recommendations at page 41 of the Third Report.

For 'a' above, reply is given at point IV.

For 'b' above, reply is given at point V.

For 'c' above, reply is given at point VI.

Of the Report submitted by MNES *vide* OM No. 9/27/93-P & C dated 6th October, 1994.

[Ministry of Non-Conventional Energy Sources : O.M. No. 9/27/93-P & C
Dated the 6th October, 1994]

Recommendation Serial No. 140

In the rural areas, specific institutional requirements could include:

(i) strengthening panchayats or creation of village cooperatives for energy management;

(ii) forwarding fiscal incentives and soft loans to rural entrepreneurs to disseminate renewable energy technologies (biogas, gasifiers, briquettes) on a commercial basis;

(iii) creation of training infrastructure at the district level for better implementation and monitoring of the energy programmes; and

(iv) supporting R & D infrastructure at the State level to develop location specific eco-suitable technologies.

Reply of Ministry of Non-Conventional Energy Sources

Ministry of Non-Conventional Energy Sources is involving Panchayats and local bodies, NGO's etc. specifically in rural energy programmes, for promotion, monitoring, awareness creating etc. to disseminate renewable energy technologies. The Ministry is also promoting the concept of energy entrepreneurs where the Government will act as facilitator to propagate Non-Conventional Energy technologies on commercial basis.

Under the Improved Chulha, Biogas and Integrated Rural Energy Programme implemented by MNES training infrastructure is created at State, District and Block level. Technical back up units are created to provide training at various levels for implementation, maintenance and monitoring of various programmes. This infrastructure is being continuously strengthened under these programmes.

Regarding R & D infrastructure at the State level, a few R & D projects are given to state agencies for developing NRSE systems based on local requirements. However, this aspect needs strengthening and efforts in this direction are being made.

[Ministry of Non-Conventional Energy Sources : O.M. No. 9/27/93-P & C
Dated the 8th December, 1994]

Recommendation Serial No. 141

With particular reference to the renewable sector it is felt that CASE (Commission for Additional Sources of Energy) needs to be revived and strengthened. The revitalised CASE enlarged to include representative from the industry and the R & D community, should focus on:

(i) developing detailed programmes of research in different technologies;

(ii) fixing specific technology development goals and finite time frames;

(iii) determining the scope of R & D institutions and industry involvement in achieving the set goals; and

(iv) recommending structural changes within the RET sector to the EPAC.

Reply of Ministry of Non-Conventional Energy Sources

The question of strengthening of CASE was recently examined by the Ministry. In view of the important linkages of Ministry of Environment and Forests and Ministry of Rural Development with the Non-conventional Energy sector, the Secretaries of these two Ministries have been made ex-officio members of the CASE. The reconstituted CASE now consists of:

(i)	Secretary MNES	Chairman
(ii)	Secretary, Department of Expenditure	Member
(iii)	Secretary, Ministry of Science and Technology	Member
(iv)	Secretary, Ministry of Power	Member
(v)	Secretary, Planning Commission	Member
(vi)	Secretary, Ministry of Rural Development	Member
(vii)	Secretary, Ministry of Environment And Forests	Member

The Joint Secretary of the Ministry has been made Secretary, CASE.

The question of associating Non-Officials with CASE was also carefully examined : Since CASE is empowered committee, having administrative and financial powers of the Government of India, associating Non-Officials as Members in CASE was not considered appropriate.

MNES have constituted three Advisory Committees with representatives from renewable energy industry and R & D community :

(i) Advisory Committee of MNES;

(ii) Advisory Committee of NGO's; and

(iii) Advisory Committee on Research and Development.

These Advisory Committees are to give advice to the Ministry on various matters concerning overall strategy for implementation of NRSE programmes, developing the detailed programmes of research in different technologies, drawing specific technology development goals, role of NGO's in NRSE programmes etc.

[Ministry of Non-Conventional Energy Sources : O.M. No. 9/27/93-P & C
Dated the 8th December, 1994]

CHAPTER VI

REPLIES OF THE DEPARTMENT OF ATOMIC ENERGY

Recommendation Serial Nos. 15 and 68

The Committee is of the view that the Government does not have a well defined, co-ordinated and time bound plan backed by financial resources for implementation in the energy sector.

The Committee note with concern, however, that the plan to produce 10,000 MWe of nuclear power by 2000 AD has, for all practical purposes, been abandoned.

Reply of Department of Atomic Energy

The programme to achieve 10,000 MWe of nuclear power by the year 2000 AD was drawn up in 1984. Following the Three Mile-Island (TMI-1979) and Chernobyl (1986) accidents, detailed safety reviews and elaborate environmental clearances in the 80's have slowed down the pace of setting up of nuclear power projects. The construction of only Kaiga 1 & 2 and RAPP 3 & 4 was sanctioned in 1986/87. Actions were initiated based on partial financial sanctions accorded during 1986—91 by Government of India for advance procurement of long delivery and critical equipment and components for additional 4 x 220 MWe and 6 x 500 MWe units beyond Kaiga 1 & 2 and RAPP 3 & 4 to take the total installed nuclear capacity to 6700 MWe. The programme was reviewed in 1989 and the target continued to appear feasible at that time. Subsequently, in 1990, taking into consideration the resource constraints, in the Eighth Plan proposals of DAE, the target was pruned to about 5700 MWe by the year 2002. Out of the new projects on which advance actions have been taken, only TAPP 3 & 4 (2 x 500 MWe) was accorded project financial sanction in January 1991 and commencement of main plant civil works of this project has not so far been possible due to fund constraints. With the reduced Govt. budgetary support and difficulties in mobilising funds through market borrowings, even the target of 3820 MWe is not considered feasible now. The present programme is to achieve a total nuclear installed generating capacity of 2820 MWe by the year 1997, with the commissioning of the projects under construction, namely, KAPP-2 (220 MWe), Kaiga 1 & 2 (2 x 220 MWe) and RAPP 3 & 4 (2 x 220 MWe). Efforts are in progress to commence the main plant civil works of TAPP 3 & 4 (2 x 500 MWe) project which could not commence as yet, due to financial constraints. Efforts in progress for joint sector projects have also not met with

any success so far, though these are being pursued. Therefore, adequate and all needed budgetary support recommended by the Committee (*Vide* Para. 9 on Page 58) is required to meet the revised target of 3820 MWe including TAPP 3 & 4 and also continue the programme.

[Ministry of Power: O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 71

Normative tariffs for consumers' satisfaction: It is necessary that tariffs are regulated by an independent authority based on normative performance of plant and equipment and personnel. For this purpose, regional tariff commissions were suggested and agreed upon by all the Chief Ministers. These should be established at the earliest.

Reply of Department of Atomic Energy

DAE have constituted an Experts Committee in May, 1994 to determine the normative values for parameters of operation of atomic power stations for fixing the nuclear power generation tariff. These normative values could be used as standards while arriving at the tariff for nuclear power stations, in consultation with CEA.

[Ministry of Power: O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 111

The long term considerations (Nuclear Energy) relate to the satisfactory disposal of wastes and the decommissioning of the plants after their useful life is over.

Reply of Department of Atomic Energy

The waste management programme to effectively deal with gaseous, liquid and solid wastes is implemented at all operating nuclear power stations, keeping in line with the evolving technologies/practices.

Satisfactory Disposal of Radioactive Wastes

Processes & Technology have already been developed and are being applied for the treatment and safe containment of all kinds of radioactive wastes generated

during the operation of power reactors. Centralised waste management facilities are being co-located with power reactors at every nuclear power station. These facilities include plants for the treatment and conditioning of liquid and solid wastes and disposal facilities with engineered barriers, for the conditioned wastes. A constant surveillance is also kept on the surroundings of these disposal sites to ensure the integrity of containment of the wastes.

By the R & D efforts undertaken in Bhabha Atomic Research Centre, these technologies are being constantly upgraded. The R & D initiatives include development of new & improved processes for the treatment of wastes, matrices for the immobilization of the wastes, so that they don't get redispersed into the environment, and specialised hardware.

Decommissioning of Nuclear Plants

Studies have been undertaken in BARC for the "Condition Monitoring" of the critical components of the Power Reactor Systems to ascertain the health of the nuclear power plants. Various hardware and software are being developed for this purpose and are being applied for the study of the operating plants. Simultaneously, technologies for the maintenance and repair of vital reactor components as well as for their replacement, wherever required, are under development. *With these measures, it is proposed to extend the useful life of the operating power reactors so that the need for their decommissioning may not arise in the near future.*

The first step in decommissioning of nuclear plants is the decontamination of the active systems. BARC has developed the required technology for this. This has also been successfully tested under actual reactor conditions.

After decontamination, the reactor systems will have to be dismantled with the help of specialised equipments like remote cutting & welding machines. Keeping this requirement in view, BARC is developing robots and remote handling tools for various specialised applications.

Plants which are assessed for their healthiness are taken up for decommissioning once it is decided that it is not safe or economical to continue the operation of the power plants. In this regard, strategies have been considered taking into account safety and economics. Mothballing option which envisages, after the final shut down of the reactor, the removal of the spent fuel out of the reactor building with all activity transferred inside for a period of 30 to 50 years to allow for the decay of the various components. Development of remote handling and cutting tools for removal and disposing of the very highly active reactor

components is also being planned. A tariff component of 2 paise per KWH is being collected to accumulate a de-commissioning fund.

[Ministry of Power: O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 112

Incorporate costs of environmental damage/mitigation measures into project appraisals. Adequate and comprehensive incorporation of environmental costs and benefits of using a particular technology or resource should form part of project analysis. This, the Committee, believes would lead to more rational choices in the energy sector.

Reply of Department of Atomic Energy

The Indian nuclear power programme has evolved over a period of time. Since its inception, the design of our nuclear power incorporated a number of safety features including several barriers to release of radio-activity to the environment, featuring several safety features, sound waste management practices, a reactor building containment system, ventilation system and ventilation stack etc. Adequate emergency preparedness plans and procedures are also drawn up well before the reactors are commissioned. Environmental survey laboratories monitor the environmental aspects around the atomic power stations. An environmental impact assessment is carried out as part of the project analysis before finalising a site for setting up an atomic power project. Therefore, the measures to minimise environmental damage/mitigation are incorporated into the design itself. Over the years, the design and operational safety provisions have been progressively improved and the improved safety features take into account the potential environmental damage/mitigation aspects. Such environmental assessment includes arriving at appropriate rehabilitation package for project affected persons (PAPs) in terms of the guidelines of Government prevalent from time to time. The associated costs as above are already built into the project cost.

[Ministry of Power: O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 113

Device a comprehensive and human policy for the rehabilitation of families affected by developmental projects. Such rehabilitation ought to precede, not follow the launching of projects involving displacement of the people.

Reply of Department of Atomic Energy

A rehabilitation package is worked out by NPCIL as per guidelines in consultation with the respective State Government authorities/representative bodies to rehabilitate the project affected persons (PAPs). It may not always be possible to implement the rehabilitation programme before launching the project due to the timing of financial sanction and allocation of funds which are required for acquisition of land. However, the spirit of the recommendation has been understood for expeditious implementation of the rehabilitation programme prior to commencement of the construction work on the projects, wherever possible by advance financial sanctions for this purpose subject to certainty of the project being implemented.

[Ministry of Power: O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 115

Ensure that adequate pollution control measures are undertaken and suitable devices installed, and more importantly operated and maintained in power plants and refineries.

Reply of Department of Atomic Energy

Mandatory clearances are obtained from Ministry of Environment and Forests and State Pollution Control Boards prior to setting up of atomic power projects. Nuclear Power is considered environmentally benign as nuclear power stations do not produce chemical pollutants of any significance. They give rise to radio active gaseous, liquid and solid wastes which are effectively treated through a comprehensive waste management programme as per regulatory requirements specified by Atomic Energy Regulatory Board.

[Ministry of Power: O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 129

The major recommendations of the Committee are :

Improve the efficiency of operations of thermal power plants in respect of thermal efficiency, plant load factor, peaking capacity, reduction in forced outages and in auxiliary consumption of power. The impact of the ongoing R & M programmes need to be monitored and reviewed on a regular basis.

Reply of Department of Atomic Energy

The thermal efficiency of nuclear power plants have been maintained at the

optimum level by promptly identifying and correcting steam leak and repairing thermal insulation wherever required.

Nuclear power plants are operated as base load stations and therefore, the question of improving the peaking capacity does not arise.

Renovations and modernisation programmes are continuing based on the need for repair/replacement of worn-out machinery, retrofitting and upgrading of safety systems and also replacement of equipment for which spares are difficult to get and to overcome obsolescence. The need for renovation is based on the through Inservice Inspection (ISI) which are being carried out in all the nuclear power stations, especially, in respect of Tarapur Atomic Power Station which has completed 25 years of operation.

In the case of Rajasthan Atomic Power Station-2, ISI is carried out to assess the healthiness of coolant channels to take up their replacement at an appropriate time. Following the Narora fire incident, modifications are being carried out progressively in all indigeneous turbine generators in subsequent units. De-contamination of the primary heat transport systems has also been taken up progressively in the operating units in order to minimise radiation exposure to the personnel. Lessons learnt from Narora incident have been implemented at subsequent units as well. In respect of Madras Atomic Power Station-1 & 2, where the power level has been restricted to 75% full power due to failure of the moderator inlet manifold, experimental as well as theoretical analysis is carried out to find a solution.

Nuclear power stations at Narora and Madras to a great extent, and also Kakrapar Atomic Power Station suffer due to grid frequency disturbances with a deleterious effect on the turbine generator, increasing the number of outages and reducing the capacity utilisation. This matter has been taken up with State Electricity Boards/Regional Electricity Boards. A satisfactory solution to this problems is yet to emerge. Constant liaison is maintained with the state electricity boards and other bodies concerned such as the Central Electricity Authority for improving the condition of the grid which causes several forced outages of nuclear power plants.

The condition monitoring programme for equipment at the stations and the training programme of operating personnel have been strengthened to reduce the number of forced outages. Better scheduling of planned maintenance outages also helps in lowering the number of unplanned outages.

In order to reduce auxiliary consumption of power the following energy conservation measures have been taken :

— Formation of dedicated groups at each station for energy conservation.

— Replacement of electric lamps with more energy efficiency lamps inside and outside the buildings and the colonies.

— Running the minimum of high capacity pumps as required.

— Modifications in the equipment and procedures to minimise downgrading of recovered heavy water to reduce the energy consumption in its upgrading.

— Continuous training for updating the awareness of the importance of energy saving at the plants and colonies.

[Ministry of Power: O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 130

Rationalize tariffs to ensure adequate resource generation for utility and to promote efficient use of electricity.

Reply of Department of Atomic Energy

Refer to reply to Recommendation Serial No. 71 above.

Finalisation and revision of tariffs in consultation with Central Electricity Authority and State Electricity Boards do take time. In order to speed up the process, Department of Atomic Energy have constituted an Experts Committee in May 1994 to determine the normative parameters to be used in the nuclear power station tariff so that tariff finalisation can be carried out early.

[Ministry of Power: O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 131

Adequate and all needed budgetary support be provided to meet the target of 10,000 MWe in respect of nuclear power by 2000 A.D.

Reply of Department of Atomic Energy

Refer to reply to recommendation Serial No. 68 above.

[Ministry of Power: O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 134

Additional Resources to be met by internal resource generation by the supply companies.

Reply of Department of Atomic Energy

The scope for the internal resource generation in the case of NPCIL is low mainly due to the relatively small operating base and also due to low tariffs in the case of stabilised, older units namely Tarapur, Rajasthan and Madras Atomic Power Stations. Rationalisation of tariffs is one of the proposed measures to facilitate, reasonable generation of internal resources. However, this is not expected to yield sizable resources to finance new projects. Budgetary support is required to be provided as per recommendation given by the Committee on Page—58 and preferred in 6 (c) above.

[Ministry of Power: O.M. No. 3/1/94 — Coord. Dated : October, 1994]

Recommendation Serial No. 143

There is a need for a comprehensive document which brings out information and statistics on various aspects of energy including resource availability, supply, consumption, pricing and the environment. Several governmental and non-governmental organisations do bring out such information on a regular basis, however, the Committee believes that there is a need for a document which would at one place provide relevant information on all issues of energy. Hence, the Committee recommends that the Government bring out every year a comprehensive report on energy and lay it in Parliament for the benefit of members and the public.

Reply of Department of Atomic Energy

The inputs required from NPCIL/DAE for such a report to be brought out by Department of Power will be furnished in the requisite proforma as and when these are received.

[Ministry of Power: O.M. No. 3/1/94 — Coord. Dated : October, 1994]

CHAPTER VII

REPLIES OF THE PLANNING COMMISSION

Recommendation Serial No. 7

National Energy Efficiency Programme

Considering the broad focus of the NEEP which covers all the energy consuming sectors the effect may get diffused. The Plan document does not elaborate on how the Government proposes to achieve the targets set for energy conservation or the institutional structure to carry out the NEEP. The financial allocation also seems to be incompatible with the broad scope and coverage of the programme.

Reply of Planning Commission

The action taken by the Planning Commission on the above recommendation is as follows :

(i) Since energy conservation in general and NEEP in particular is a multi-faceted activity involving four major sectors of the economy namely, Industrial Transport, Agriculture and Domestic sectors and the main areas of conservation relate to power and petroleum products, an institutional set up is the basic necessity to coordinate and implement the programme. In this context, the first step would be to have an Energy Conservation Act which would set up an Energy Conservation Authority and provide for conducting energy audits, devise norms of energy consumption, provide for suitable legislation, laying down standards for energy efficiency etc. At present, Ministry of Power through the Energy Management Centre (EMC) is co-ordinating and implementing the energy conservation programme for power sector and the Ministry of Petroleum & Natural Gas through PCRA is implementing energy conservation in the oil sector.

(ii) The Eighth Plan document has indicated an outlay of Rs. 1,000 crores for NEEP during the Plan which includes activities on energy conservation being carried out in different energy departments.

(iii) The different energy Ministries like the Ministry of Power, the Ministry of Petroleum & Natural Gas, Ministry of Surface Transport, Ministry of Coal and Ministry of Non-Conventional Energy Sources have indicated their action plans and these action plans have already been forwarded to the Ministry of Power and

also to Energy Management Centre during September 1994. EMC is presently engaged in the process of preparing the action plan for NEEP.

(iv) At the instance of the Cabinet Secretariat, a comprehensive paper on the scope and Imperatives of Energy Conservation with special reference to NEEP in the Eighth Plan has been prepare in the Planning Commission. The paper has been forwarded to the Cabinet Secretariat for consideration.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : December 2, 1994]

Recommendation Serial No. 89

Demand Side Management

With limited and diminishing resources of petroleum products and the critical position of balance of payments it is in the interest of the nation to encourage long distance freight movement by railways keeping in view customers'/shippers' requirements. This could be achieved through a domestic container service, matching the shippers' requirements. The main benefits of a proper domestic container service would be faster transit, lower operational costs, minimisation of time lost in switching from one mode of transport to another, protection against climatic hazardous, minimisation of packing costs and damage during transit, reduction in handling and overall improvement in the quality of service.

Reply of Planning Commission

This has been identified as one of the thrust areas in the Eighth Plan. Paras 9.2.1 of Chapter 9, Vol. II of the Eighth Plan document refer. The Government have already passed the Multi-Modal Act for faster and safer movement of goods.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 91

Demand Side Management

Commercially viable energy efficient technologies should be financed at concessional rates and made attractive through fiscal and pricing incentives and selective legislation. This would require a detailed study of the existing legislation

and incentives, reasons for non acceptance by the industry or slow penetration, requirements of the industry itself; information dissemination as regards the incentives, data base creation on energy efficient technologies, their economics and domestic availability.

Reply of Planning Commission

A draft comprehensive Energy Conservation Bill was got prepared by the erstwhile Advisory Board on Energy through the Indian Law Institute. This is being re-examined by the Ministry of Power.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 112

Environmental Issues

Incorporate cost of environmental damage/mitigation measures into project appraisal. Adequate and comprehensive incorporation of environmental costs and benefits of using a particular technology or resource should form part of project analysis. This, the Committee, believes would lead to more rational choices in the energy sector.

Reply of Planning Commission

The cost of environmental damage/mitigation measures is included in the project cost. The adequacy of this provision made in the Project Cost for this purpose is analysed taking into consideration the particular technology adopted in the project implementation. The Planning Commission have issued the guidelines for the inclusion of environmental costs in the project cost in the preparation of feasibility reports for Energy Sector projects like coal and power.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 113

Environmental Issues

Devise a comprehensive and humane policy for the rehabilitation of families affected by developmental projects. Such rehabilitation ought to precede, not follow the launching of projects involving displacement of people.

Reply of Planning Commission

As per the Eighth Plan document, measures have already been initiated for the satisfactory rehabilitation of oustees, many of whom belong to the tribal and other backward communities.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 114

Environmental Issues

Ensure that land management becomes an integral component of coal mining projects. Care should be taken to minimize adverse affects of mining operations, and reclamation measures should be undertaken to restore degraded land. Afforestation of degraded land and compensatory afforestation where forest land is diverted need special attention. Sufficient provision for these should be made at the planning stage.

Reply of Planning Commission

The Eighth Plan envisages a major thrust in environmental management in coal mining areas. The environmental management will aim at (i) concurrent restoration of land in on-going and new projects and (ii) restoration of land and implementation of environmental safeguards in the old worked out areas.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 117

Environmental Issues

Examine and promote the use of effluents as raw materials, as in the use of ash for the manufacture of cement or bricks. The Committee, wishes to emphasize R & D, and demonstration projects in this regard. Suitable incentives to entrepreneurs need to be provided to promote such alternative use of effluents.

Reply of Planning Commission

The Ministry of Science & Technology has identified utilisation of fly ash as one of the programmes that can be taken up in a Technology Mission mode.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 122

Coal

Improve the productivity of labour by upgrading their skills and by rationalising, rehabilitating or resettling the deployment of surplus manpower.

Reply of Planning Commission

This has been identified as one of the priority areas in the Eighth Plan. Particular emphasis has been placed on the need to increase the productivity in the underground mines since the underground mining is going to play a major role in the long-run. The Eighth Plan envisages an increase of 20% in the productivity of underground mines of Coal India Ltd. Similarly, in the case of opencast mining the productivity of Coal India mines is targeted to increase by 40%. In absolute terms, the overall OMS of Coal India to be achieved by the end of the Eighth Plan is targetted at 1.65 tonnes against 1.21 tonnes achieved at the end of the Seventh Plan.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 122

Coal

Improve the productivity of capital by better capacity utilisation of existing equipment ; further mechanised the mining and loading operations ; and adapt (to local conditions), rather than transplant the technology acquired from other countries.

Reply of Planning Commission

The continuing under-utilisation of the capital intensive equipment used in excavation and transport in coal mining has been identified as a matter of serious concern by the Planning Commission. The Eighth Plan has placed emphasis on improving the utilisation of such equipment. Adoption of new technologies especially those aimed at improvement in efficiency and conservation is identified as a priority area.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 122

Coal

Ensure satisfactory quality of coal supplies by installing coal handling plants ; promote beneficiation and improved washing technology.

Reply of Planning Commission

A Technical Group set up by the Department of Coal in 1986 has formulated a comprehensive programme to ensure supplies of washed prime coking coal of stipulated quality to the steel plants by modification of the existing washeries with the provision of deshaling plants, fine coal beneficiation, finer crushing of coal, setting up instrumentation/automation systems, ash monitors etc. These modifications should be introduced in all the washeries by 1994-95. It is envisaged that all coal will pass through coal handling plants having crushing, screening and sizing facilities.

As far as the beneficiation of coal is concerned, studies undertaken at the instance of the Planning Commission have clearly established cost savings by the use of beneficiated non-coking coal in power stations situated at long distances from coal fields. Based on this two integrated mining-cum-beneficiation projects, namely, Kalinga and Piparwar, have been sanctioned and they are under various stages of implementation. In addition to this, the private sector has been permitted to set up washeries on Build-Own-Operate (BOO) basis to supply the quality coal of all consumers.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 122

Coal

Promote the use of coal as a domestic fuel.

Reply of Planning Commission

Identified as one of the priority areas in the Eighth Plan. Item (vi) of Para 8. 40.1 and item (iv) of Para 8.53.1 of Chapter 8, Vol. II of the Eighth Plan document refer.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 122

Coal

Ensure adequate inter-grade price differentials to reflect quality differences.

Reply of Planning Commission

The subject of coal pricing is dealt with by the Bureau of Industrial Costs & Prices (BICP). The BICP has already taken up a comprehensive study on coal pricing keeping in view the cost of mining, quality of coal, efficiency of coal production and utilisation etc. The final report of the BICP on the subject is awaited.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 122

Coal

Provide greater thrust on R & D efforts for clean coal technologies including for gasification and IGCC. It is important that this be an area for continual work; demonstration projects should be undertaken and adequate incentives be provided to investors to encourage wider dissemination of such technologies.

Reply of Planning Commission

This is identified as an important R & D scheme for implementation during the Eighth Plan. Item (viii) of Para 8.40.1 and Para 8.57.1 of Chapter 8, Vol. II of the Eighth Plan document refer.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 122

Coal

Incorporate environmental considerations in planning for coal production as well as its utilisation.

Reply of Planning Commission

The Eighth Plan envisages a major thrust in environmental management in coal mining areas. Item (v) of Para 8.40.1 and Paras 8.46.1 to 8.46.4 of Chapter 8, Vol. II of the Eighth Plan document refer.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 122

Coal

Avoid over-exploitation of mines at the cost of human safety.

Reply of Planning Commission

Safety and welfare of mine workers have always received the utmost attention of the Government during successive Plans. The Eighth Plan has laid strong emphasis on this very important aspect of coal mining industry. Item (xii) of Para 8.40.1 and Para 8.58.11 of Chapter 8, Vol. II of the Eighth Plan document refer.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 123

Hydrocarbons

Steps be undertaken to encourage exploratory and drilling activities. The price of crude oil be so fixed as to allow for adequate internal resources generation for undertaking such activities. As for mobilising private Indian or foreign capital participation, timely decisions should be taken keeping in view the national interest.

Reply of Planning Commission

Planning Commission has been supporting various programmes initiated by the Government of India, Ministry of Petroleum & NG for intensifying exploratory drilling. This includes (i) continuous exploratory bidding rounds for onland and offshore blocks, (ii) speculative seismic survey round, (iii) development of oil and gas fields, and (iv) accelerated exploration programme proposed by the national oil companies recently. The pricing aspects of crude oil, petroleum products and natural gas etc. are decided by the Ministry of Petroleum & Natural Gas. However, the Ministry constitutes inter-ministerial Groups/Committees to periodically review and recommend the pricing approach.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 125

Hydrocarbons

There is clear case for stepping up the planning and implementation of schemes for Enhanced Oil Recovery (EOR).

Reply of Planning Commission

This is dealt with by the Ministry of Petroleum & Natural Gas. The Planning Commission has also emphasised time and again, the need for greater application of EOR techniques for increasing oil recoveries and has been supporting all such proposals as and when submitted.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 126

Hydrocarbons

Prices of products should reflect the economic cost of supply. This is particularly important if private sector marketing of products is to be promoted.

Reply of Planning Commission

The Ministry of Petroleum & Natural Gas deals with the subject of petroleum product pricing. As far as Planning Commission is concerned, the overall policy on administered prices is spelt out in paras 4.3.8 and 4.3.9 of Vol. I of the Eighth Plan document in addition, para 8.14.1 of Vol. II also refers.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 127

Hydrocarbons

Immediate steps be taken to first reduce and subsequently eliminate flaring of natural gas. It is also important to determine the role of natural gas in the competing sectors of power production, fertilizers and petro-chemicals while regional gas grids already exist, techno-economic suitability and advisability of establishing a national gas grid in the sub-continental country like India needs to be closely examined. The advisability of gas imports from the Gulf or from neighbouring countries also needs serious consideration.

Reply of Planning Commission

Planning Commission has fully supported all the projects related to optimal utilisation of natural gas. Such projects which on implementation would reduce/ eliminate the flaring of gas involve very large investments on (i) off-shore gas compression and evacuation facilities, (ii) onland gas receipt and processing facilities, (iii) gas based LPG plants, and (iv) augmentation of gas transportation and distribution network. The subject of gas imports from Gulf or from neighbouring countries is under consideration of the Ministry of Petroleum & Natural Gas.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 128

Hydrocarbons

Encourage the use of CNG as a replacement for conventional fuels in the transport sector.

Reply of Planning Commission

The Planning Commission, in its natural gas utilisation policy for the Eighth Plan, has already emphasised the need for promoting the use of compressed natural gas (CNG) for substitution of petrol and diesel in the transport sector.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 129

Power

Improve the efficiency of operations of thermal power plants in respect of thermal efficiency, plant load factor, peaking capacity, reduction in forced outages and in auxiliary consumption of power. The impact of the ongoing R & M programmes need to be monitored and reviewed on a regular basis.

Reply of Planning Commission

The Planning Commission recognises the importance of an efficient utilisation of the assets already created in the energy sector. The energy strategy adopted for the Eighth Plan underlines the importance of initiating measures for reducing technical losses in production, transportation and end-use of all forms of energy. This subject covered under the recommendation is also under consideration of the NDC Committee on Power. The report of the Committee is awaited.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 129

Power

Rationalise the supply mix so as to restore and optimal thermal-hdyro mix.

Reply of Planning Commission

The Eighth Plan has laid emphasis on the necessity to increase the share of hydel capacity in power generation. There should be an accelerated hydro power development for achieving the goal of increasing the share of hydel capacity to 40% by the end of the Ninth Plan. The subject is also under consideration of the NDC Committee on Power whose report is awaited.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 130

Power

A shift in emphasis from additions to generation capacity to the performance of T & D network so as to reduce the transmission and distribution losses by 5% by 1996-97.

Reply of Planning Commission

The transmission and distribution losses in the terminal year (1989-90) of the Seventh Plan were 223.28%. The Eighth Plan envisages a reduction in such losses through specific schemes to be taken up in this direction on a much larger scale. As per the Eighth Plan programme for power sector development, the R & M programme for rehabilitating the ageing thermal and hydel units initiated in the Seventh Plan will be enlarged in its scope to cover T & D systems also.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 130

Power

Rationalise tariffs to ensure adequate resource generation for utilities and to promote efficient use of electricity ; in particular, for the agricultural sector the tariff should be pro-rata and not a flat rate. While tariff must be based on normative cost of supply this must be done by ensuring that consumers do not have to pay for the high cost, low efficiency operations of power plants.

Reply of Planning Commission

Governments. The tariff charged to the agriculture sector is quite low as compared to the cost of supply. This results in heavy commercial losses to the State Electricity Boards. At the Conference of the State Power Ministers held in 1991, it was agreed to that a minimum floor tariff of 50 paise/Kwh should be charged to the agricultural consumers. The subject is also under consideration of the NDC Committee on Power whose report is awaited.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 131

Power

Adequate and all needed Budgetary support be provided to meet the target of 10,000 MW in respect of nuclear power by 2000 AD.

Reply of Planning Commission

The Department of Atomic Energy has now revised the target of additions to the installed nuclear generating capacity so as to achieve a cumulative capacity of 3820 MW by the year 2000.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 133

Demand Side Management

It is of primary importance to strengthen the public transport system for a shift from private to public means of transport.

Reply of Planning Commission

It is one of the thrust areas of the Eighth Plan. Para 9.2.1. of Chapter 9, Vol. II of the Eighth Plan document refers.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 133

Demand Side Management

There is a need for comprehensive traffic management schemes.

Reply of Planning Commission

The Planning Commission shares the view that there is a need for comprehensive traffic management schemes, However, the subject of traffic management schemes primarily concerns the State Governments and urban local bodies. At the Central level the nodal Ministry for urban transport is the Ministry of Urban Development. The Ministry of Urban Development have been requested to take appropriate action in this regard.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Recommendation Serial No. 143

Energy Sector Data Base

There is a need for a comprehensive document which brings out information and statistics on various aspects of energy including resource availability, supply, consumption, pricing and the environment. Several Governmental and non-governmental organisations do bring out such information on a regular basis, however, the Committee believes that there is a need for a document which would at one place provide relevant information on all issues of energy. Hence, the Committee recommends that the Government bring out every year a comprehensive report on energy and lay it in Parliament for the benefit of members and the public.

Reply of Planning Commission

As per the Business Rules, the subject of energy policy comes under the purview of the Ministry of Power. The document should, therefore, beprepared by the Ministry of Power.

[Planning Commission: O.M. No. H—11011/1/94—EPD Dated : October 21, 1994]

Comments of the Committee

(Please *see* Paragraph 42 of Chapter I of the Report)

JASWANT SINGH,
Chairman,
Standing Committee on Energy.

NEW DELHI;
April 18, 1995
Chaitra 28, 1917 (Saka)

APPENDIX—I

Statement of recommendations/conclusions contained in the 3rd Report of the Standing Committee on Energy on "Energy for 90's and beyond : Prospects, Reality and Challenges"

Sl. No.	Page No. of the Report	Ministry/ Deptt.	Recommendations/Conclusions
			The major issues which need examination in this sector are :
1.	4	Petroleum & Natural Gas	— increasing dependence on imports of crude oil and petroleum products.
2.	4	Petroleum & Natural Gas	— retardation in oil production resulting from flogging of wells in the initial rush of exploiting recoverable reserves.
3.	4	Petroleum & Natural Gas	— Immediate attention to optimizing production of oil through — liquidating sick oil wells ; — giving enhanced oil recovery schemes a time dimension ; — development of offshore marginal fields.
4.	4	Petroleum & Natural Gas	— Rationalisation of the production profile from refineries to meet the growing demand for middle distillates.
5.	4	Petroleum & Natural Gas	— Provisions to encourage private capital participation in oil exploration, production, refining and marketing of petroleum products.

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6.	5	Power	The major concerns regarding the power supply system in the country are : — the demand for power continues to outstrip its supply resulting in continued shortage of energy (10%) and peak electricity (19%) ; — relatively low availability of thermal power plants due to unforeseen outages ; — low plant load factors of thermal power plants; — low efficiencies of conversion of coal to electricity; — high transmission and distribution losses (over 20% of total electricity generated); — absence of power saving culture or incentives.
7.	17	Planning Commission	— Considering the broad focus of the NEEP which covers all the energy consuming sectors the effect may get diffused. The Plan document does not elaborate on how the Government proposes to achieve the targets set for energy conservation or the institutional structure to carry out the NEEP. The financial allocation also seems to be incompatible with the broad scope and coverage of the programme.

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8.	17	Power, Petroleum & Natural Gas	— The Government does not have a coherent, rational energy policy for the country which would also emphasize sustainability. The principal concern of the Government has been with a reduction in the gap between supply and demand with the balance of payment being a major constraint. The hefty injection of investible resources have been largely aimed at augmenting energy supply rather than attaining higher levels of efficiency and optimal resource utilization.
9.	17	Power, Petroleum & Natural Gas	— Despite the Government's preoccupation with increasing energy supplies, extensive shortages of good quality coal, electricity and oil remain.
10.	17	Petroleum & Natural Gas	— After years of planning and attempts at modernisation the supply systems continue to be inherently inefficient. To quote a few cases—existence of surplus manpower and low operating efficiencies and high T & D losses in power generation, flogging of oil wells leading to dwindling production, natural gas flaring etc. ;
11.	17 to 18	Power	— The energy policy has repeatedly laid emphasis on greater reliance on coal and hydropower, the two relatively abundant energy resources. However, in the last two decades, the share of coal in total primary energy supply

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			has gone down from about 64 to 61%, and that of hydro-power in total utility capacity declined sharply from 43 to 28%.
12.	18	Power	— Despite the continuing importance being assigned to a greater use of non-conventional energy sources the attention to this area, in terms of both R & D and dissemination alongwith financial allocation, has been inadequate. The dissemination of renewables has been far from satisfactory since organisational machinery entrusted with this task has been more concerned with meeting targets of numbers rather than involving the final users; this has led to poor operation and maintenance of these technologies.
13.	18	Power	— The targets for energy conservation are not achieved because of the absence of a well defined plan of action, a suitable package of financial incentives and the needed institutional infrastructure to facilitate the implementation of such schemes.
14.	18	Power	— Energy will continue to be under the control of the public sector. Private sector participation in power generation, hydrocarbon exploration and supply though welcome will play only a subsidiary role.

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15.	18	Power, Petroleum & Natural Gas	— The Committee is of the view that the Government does not have a well defined, coordinated and time bound plan adequately backed by financial resources for implementation in the energy sector.
16.	18	Power, Petroleum & Natural Gas	— It is clear that by suitable utilisation of energy conservation methods and renewable energy technologies, it should be possible to achieve the goals of sustainable development, reduction in energy consumption and in controlling environmental damage.
17.	20	Coal	— Introduction of suitable scientific production method : No replacement for natural wastage of workforce.
18.	20	Coal	— Voluntary retirement of overaged workers.
19.	20	Coal	— Systematic training of workforce to upgrade skills.
20.	20	Coal	— Progressive mechanisation of mining and loading operations.
21.	20	Coal	— Opening up of medium and large capacity mines (especially in Jharia and Raniganj Coalfields) with high degree of mechanisation.
22.	20	Coal	— Adequate safety measures.
23.	20	Coal	— Appropriate measures for stabilisation of mines.

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24.	20	Coal	— It should be mandatory for undertaking proper rehabilitation consequent on exploitation of any mine.
25.	20	Coal	— The capacity utilisation of equipment (in OC mining) is low and needs to be enhanced.
26.	21	Coal	— OC mining creates environmental problems such as those of and degradation and dust pollution which have been neglected in the past. This is an aspect that the future policy would have to come to grips with.
27.	21	Coal	— The excess manpower in coal companies in estimated at more than 50,000. By enhancing and upgrading the skills of mine workers it would be possible to reduce this surplus and improve the financial performance of the coal companies.
28.	21	Coal	— Results of a preliminary estimate indicate that if productivity, as measured by output per manshift (OMS) in the older and less efficient coal mines is increased to the level of average OMS of new and more efficient mines, the reduction in costs per tonne of output could be in the range of 25—30%.
29.	21	Coal	— The average quality of Indian coal has declined over the years; at present the production of inferior coal is higher than that of superior grades. This

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			quality deterioration is a consequence of extraction from thick inter-banded coal seams by OC technology, where large quantities of shale and stone get mixed with coal due to the deployment of large capacity shovels.
30.	21	Coal	— A modernisation programme of coking coal washeries is presently underway in the old washeries, the benefits of which could largely accrue in the form of improve quality of coking coal supplies to the steel plants and possibility of reducing imports of coking coal from the present level of about 6.5 mt. to around 2 mt. by the year 2001-02.
31.	22	Coal	— It is estimated that if the non-coking coal washery capacity is to be expanded to 65 mt. by 1999-2000 the investment required would be about Rs. 1,3000 crore. In view of the financial constraints faced by both the power sector and the coal sector, there is a clear case here to prepare alternative financing models inclusive of the participation of private capital.
32.	22	Coal	— Future investments should concentrate on the establishment of pilot plant facilities at select locations on: Characterisation of Indian coals from different coalfields by the degree to which they can benefited;

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33.	22	Coal	— Assessing the different technologies available and their costs.
34.	22	Coal	— Developing improved coal washing technology suitable for Indian coals.
35.	23	Coal	— The Committee holds that for a suitable R & D strategy, a coordinated technology development plan with a time frame of 15—20 years and involving a number of competent institutions and organisations both in India and abroad would have to be launched. The components of such a programme would comprise coal beneficiation, coal gasification pressurised fluidised bed combustion (PFBC) and integrated gasification combined cycle (IGCC).
36.	23	Coal and Power	— The Committee holds that the need to develop technologies for effective utilisation of indigenous coal reserves in India for the production of a fuel which can be used in the industrial and domestic sector as well as for pollution-free electricity generation cannot be overstated.
37.	24	Coal	— The Committee suggests that medium coking coal reserves should be utilised to meet a much larger fraction of domestic energy demand. The target groups could be low income urban households, small hotels, commercial establishments, shops and households in hilly regions (for space heating). If 7% of the population uses coal by the

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			year 2000, and 10% by 2004-05, its above targets, it is imperative that briquetting and devolatilisation technologies are developed and promoted as a National Technology Mission. The Committee recommends that SSF/briquette units should be largely set up in the private sector, although the public sector coal companies should ensure the supply of desired quality of coal to these units.
38.	24	Coal	— Coal stocks at the pithead have mounted steadily in all the Plan periods; this is considered wasteful since it blocks scarce resources. In order to ensure that pithead stocks are reduced to a reasonable level, action is required in the following areas:
			— increase in coal production only from areas having adequate rail links.
39.	24	Coal	— Improvement in the quality of coal despatches.
40.	24	Coal	— Performance monitoring of mines including in items like quantity of saleable coal produced, and sales realisation.
41.	25	Coal	— Performance of alternative modes of coal transportation like ropeway and conveyor belt have not been satisfactory and should be improved. These modes of transportation largely catering to all the potential consumers

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			near the mine-heads need to be expanded.
42.	25	Coal	— The coal industry has always been heavily dependent on Government's budgetary support for its investments, this support being as high as 98% of the total outlay till 1984-85, though it was subsequently reduced to 80% in the Seventh Plan. As per the new policy, this budgetary support has been further reduced to a mere 19% during 1992-93, and will be totally phased out by the end of the Eighth Plan. Thus it is estimated that a resource gap of about Rs. 5,500 crore would emerge for the development of Eighth Plan project and Ninth Plan new starts. If this amount is not mobilised by the coal industry, the production plans in the Ninth Plan would be adversely affected.
43-46.	25	Coal	— Reclamation of land should be carried out concurrently with mining. Effective institutional arrangements need to be made for ensuring this, preferably through a body with statutory powers. This body could also monitor reclamation of abandoned mines especially in Jharia and Raniganj coalfields ;
		Coal and Power	— A phased approach for establishment of coal beneficiation facilities should be followed and specific time targets established and notified after which

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			non-beneficiated coal washeries at pit-heads would require large investment and for this purpose, the private sector could be brought into operate these washeries in a viable and efficient manner. The introduction of clean coal technologies in general, requires major information dissemination and educational efforts.The economic benefits of improved technologies would not only have to be quantified but the methodologies for such assessment made transparent and convincing the concerned. Coal India Limited has to play a major role in achieving the modernisation and growth plans of the coal industry. It should accordingly shift its emphasis to implementation of long term policies rather than on day-to-day monitoring of subsidiary companies activities.
47-51.	26	Petroleum & Natural Gas	The Committee Recommends : — that the administrative machinery for organising and conducting the bidding process needs to be defined, strengthened and the process made more commercially efficient. — negotiations should be conducted and contracts should be finalized without delay. For this it is important that the

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			decision making body is suitably empowered to take timely and objective decisions on the bids submitted by parties. Inter-ministerial interactions in this regard resulting in inordinate delays in decision making should be avoided.
			— there is need to re-examine the need for continuation of the bidding rounds. Unless additional incentives/ information are provided, future rounds of bidding inviting private sector participation for the same block are likely to evoke only declining interests. The alternative of continuous basis rather than rounds needs to be examined.
			— Indian private companies that have been given exploration rights be encouraged to develop available blocks and should not be placed at any disadvantage *vis-a-vis*, foreign companies. The entire process of awarding blocks must be wholly transparent.
			— the price of crude oil paid to the national companies has remained constant for a long period, thereby leading to declining or unstable profits on account of rising costs. A more remunerative crude oil price paid to the national companies has remained constant for a long period thereby leading to declining or unstable profits

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			on account of rising costs. A more remunerative crude oil price paid to ONGC and OIL could help in the generation of additional internal resources that could be channelized to a properly devised exploration programme. The consequent short-term effect on prices could be taken care of by adjusting taxes and duties. In the long-term, the best insurance against oil price increases would be a greater production of hydrocarbons, which is impossible without greater exploration efforts.
52.	27	Petroleum & Natural Gas	As regards the status of implementation of the recommendations of the P.K. Kaul Committee, the Committee observed that the Government have so far accepted only three recommendations. The Committee urge that the remaining recommendations of the Kaul Committee be considered for an effective implementation. It is also recommended that the Directorate General, Hydro-carbons is strengthened and made more effective.
53.	27	Petroleum & Natural Gas	Available data for ONGC indicates that funds have been earmarked for an additional recovery of a mere 0.82 mt of crude oil during the entire Eighth Plan period. Although, for the Ninth Plan it is proposed to recover

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			an additional 3 mt of crude oil by EOR schemes, detailed plans, including financial commitments, are yet to be made for that. The Committee holds here is a clear case for stepping up the planning and implementation of schemes for EOR.
54.	28	Petroleum & Natural Gas	The Committee holds that the Government should clearly bring out the approach that is sought to be followed, in the medium term, to effect a possible transition from the present system of administered prices. If, on the other hand, the current pricing system with assured returns is to continue, its implications need to be studied carefully in the face of a possible surplus refining capacity. Irrespective of whether the proposed refining capacities materialise or not, the present policy of retention prices for refineries needs to be re-examined.
55.	28	Petroleum & Natural Gas	It is estimated that for every incremental reduction in technical fuel losses in refineries by one percentage point, the additional benefits would be of the order of Rs. 122 crore/annum for the refinery sector as a whole. On the basis of the past data on investments made for, energy management measures, it is estimated that achievement of the above target (of one percentage point reduction) would cost about Rs. 330 crore, with a pay-back period of less than three

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			years. This area needs particular attention.
56.	28	Petroleum & Natural Gas	The Committee are of the view that the implications of a dual pricing for LPG should be properly examined for ensuring a stable price regime that will also take into account the market forces, apart from any other pricing objectives that the Government may lay down.
57.	30	Petroleum & Natural Gas	To increase penetration and thus the market share of these vehicles, active participation from gas companies would be needed on a continuous basis. Also, awareness of the concept and expected fuel cost savings needs to be increased. Inadequate post-conversion follow-up and support in terms of proper servicing of vehicle and refuelling stations would also hamper penetration.
58.	30	Power	On an average there exists 7—10% deficit in energy and 12.20% in peak demand. These being average figures, the power cuts in some regions are as high as 45%. The shortages emanate from a gap of about one percentage point in the growth of supply and demand.While there are heavy shortfalls in capacity creation, there is rapid growth of agricultural and domestic loads leading to shortages.

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59.	30	Power	The efficiency of conversion of coal to electricity in the Indian thermal plants is very low (in the range of 28-30%). With a view to decrease coal burning, which would also entail lower CO_2 emissions, it is necessary that the efficiency of thermal plants is enhanced to 35%, 40% and 47% in stages by adoption of advanced technologies. An improvement in the thermal plant efficiency from 30% to 35% brought about by increasing the existing level of boiler efficiency from 80% to 86% and reducing the turbine heat rate from about 3,000 Kcal/kWh to 2,400 Kcal/kWh, can reduce coal consumption by about 0.04 kg/kWh and of oil by 3 ml/kWh. For a 100 MW thermal capacity, the savings would be Rs. 1.5 crore per year.
60.	32	Power	While over the last 8—10 years, the technical performance of the thermal stations of SEBs has improved, there is still considerable scope for improvement. It is possible to improve considerably the plant load factor, peaking capability and the system load factor.
61.	32	Power	The impact of an R & M programme aimed at improving the PLF by 7 percentage point (from 45% to 52%) for about 201 units with a total installed capacity of 19,980 MW, were worked out. It is estimated that this measure would generate an

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			additional 12,264 GWh of energy, bringing in an addtional revenue of Rs. 1,226 crores in the year 1996-97. Due to improved capacity utilization, the savings in additional capacity from this measure would be of the order of 2,650 MW (Rs. 8,000 crores) against an investment expenditure of Rs. 1,462 crore on the R & M schemes. Apart from undertaking R & M, life extension and uprating of plants should be done on a priority basis by allocating adeqaute funds for this activity, because the life extention schemes for power plants have to be undertaken in totality and not in partial or piecemeal manner.
62.	32	Power	Optimizing the plant operations and maintenance can result in reduced levels of partial outages and the peak load capability of power plants can be raised from 57% to 63%. The cost of such a measure would be about Rs. 100 crore and the benefits would accrue in the form of an increase in installed capacity by 5,543 MW involving investment savings of about Rs. 16,500 crore. This activity will have to be undertaken by the SEBs. The Committee recommends serious consideration of this measure.
63.	32	Power	Although the performance of 210 MW units which form the backbone of the system has improved

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			considerably, the earlier 110 and 120 MW Units which are 60 in number operate at plant load factor of 40—45 per cent. This pulls down the PLF of the States in which these units predominate. The Committee recommends that BHEL should pay urgent attention for rectification of the gener defects in these units.
64.	33	Power	By retrofitting large size electric motors with variable frequency couplings as well as improved housekeeping measures, it is possible to bring down the level of auxiliary power consumption from 10% to 8.5%. The benefits of an improvement of this magnitude would make available an additional 5,743 GWh of electricity every year with an additional revenue of Rs. 574 crores. Against this, the investment cost for this measure is estimated as Rs. 1,000 crores. This too needs to be considered by Government.
65.	33	Power	To achieve an optimal performance of hydro plants, the Committee are of the view that the following two measures could be considered for implementation during the Eighth Plan :
			— a coordinated operation of the hydro-thermal plants, whereby the hydro plants in hydro-dominated States are shut down during the off-peak hours and used for peaking purposes only.

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			— uprating of 49 hydro power stations involving a total installed capacity of 8,839 MW. The cost of the above measures is estimated to be Rs. 854 crores. The benefits would be in the form of an additional availability of 761 MW of installed capacity and 1,590 million units/annum. The incremental revenue generated from the sale of these units would be about Rs. 159 crore per year and savings in capital expenditure would be Rs. 2,280 crore. The Committee recommends that the Government examine these proposals for implementation.
66.	34	Power	The country is endowed with vast hydel resources, large quantities of low grade coal and natural uranium. Natural gas is not available in sufficient quantities and therefore should be utilized judiciously. It is suggested that gas should not be used for power generation except at landfall points and places located far away from the coal bearing areas. Instead, gas is required as a priority for fertilizers, petrochemicals, domestic cooking, industrial heat and for replacement of oil in the transport sector.
67.	34	Power	The Committee find that for a coordinated deployment of hydro-thermal resources a combination of

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			40% hydro and 60% thermal is considered desirable. Presently, the share of hydro capacity is low at 28%. Accelerated hydro development is, therefore, necessary by initiating urgent advance action on a number of fully investigated hydro projects in various regions of the country. The capacity requirements up to 2006-07 will be about 15,000 MW lower if an optimum hydro-thermal mix is achieved. Run-of-river plants should be preferred to storage type plants and pump storage plants should be utilised for peak load.
68.	35	DAE	The Committee note with concern, that the plan to produce 10,000 MW of nuclears power of 2000 AD has, for all practical purposes, been abandoned.
69.	36	Power	The Committee are of the view that the 15 year perspective power generation expansion plan should take into consideration, energy conservation, inter-regional power transfers and a suitable hydro-thermal combination. By doing so it would be possible to reduce the additions to installed capacity by about 50,000 MW out of a projected demand of 1,47,000 MW.
70.	35	Power	The Committee holds that the reduction in technical losses can be achieved by :

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			— installation of additional capacitors ;
			— installation of proper size of transformers ; and
			— augmentation and strengthening of sub-transmission and distribution lines.
			Similarly the non-technical losses can be minimized by :
			— installation of reliable and high quality meters ;
			— improvement in billing and collection procedures ;
			— switching over from "flat rate" tariffs to metered electricity supply to agriculture ; and
			— strengthening of administrative and legal measures for curbing thefts.
			By adopting a suitable mix of the above measures, a reduction in the T & D losses from 23 to 18 percent can be easily achieved during the Eighth Plan period. While the incremental investment costs of these measures is estimated in the range of Rs. 7,000 to 10,000 crore, the benefits would be in the form of an additional 18,870 GWh of energy and 4,420 MW of installed capacity (otherwise costing about Rs. 13,260 crore). The losses need to be eventually brought

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			down to a level of 15% by diverting resources to T & D from those presently directed towards generation.
71-72.	36	Power and DAE	The Committee recommends the following for consideration : — Normative tariffs for consumers satisfaction : It is necessary that tariffs are regulated by an independent authority based on normative performance of plant and equipment and personnel. For this purpose regional tariff commissions were suggested and agreed upon by all the Chief Ministers. These should be established at the earliest. — Interim tariff for agriculture : Till such time that proper agricultural tariffs are levied, a uniform tariff of Rs. 0.50 was recommended and agreed to by all the Chief Ministers. This also should be implemented uniformly.
73.	36	Power	The Committee are of the view that while encouraging privatisation and foreign investments to increase additional resources for this sector, care has to be taken that the long term interests of the country are not jeopardized.
74.	37	Power	The Committee has taken up the case of ENRON only as an illustrative case study. It has neither attempted nor engaged in any independent techno-economic examination of it. Other

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			than a broad examination of the methodology of 'privatisation' the Committee would not wish to comment on one single enterprise in the State of Maharashtra. However, a guaranteed return of 16%, with assurances about a fixed exchange rate combined with the possibility of bonus related to PLF makes the Committee wonder whether the Govt. have taken a wholly judicious step. The Committee feel that a level playing field must be provided to all entrepreneurs, whether foreign or Indian. As regards debt-equity ratio the Committee holds that with private risk capital what must be taken into account is that in India debt tends to be cheaper than equity. This aspect ought to be considered by the Government.
75.	38	Power	Load centre stations, particularly stations located more than 750 k.m. away from coalfields should be supplied beneficiated coal with provision for burning the rejects containing about 67% ash, in captive power plants with fluidised bed boilers. Pit head generation with low grade coal should continue to be preferred to avoid long haulge of coal.
76.	38	Power	The Committee conclude that the power sector has become very unwieldly and requires a separation of generation and EHT transmission

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			functions from the distribution functions. The role of regulatory bodies needs to be properly defined and these bodies suitably structured wherever necessary.
77.	38	Non-Conventional Energy Sources	Efforts need to be devoted to a serious re-assessment of what current technologies are actually able to achieve, and to arrive at a realistic estimate of the potential of these technologies within the context of the overall energy system.
78.	39	Non-Conventional Energy Sources	Grid connected Wind Electric Generators (WEGs) have emerged as a cost competitive option for the power sector. The demonstration programme has built up a significant capacity and the results though mixed, show potential. This resource, of course, is very site specific. In India, Tamil Nadu, Gujarat and Rajasthan seem to hold more promise. Facilities such as wheeling, banking and buy-back of power have helped attract participation from the private sector. This programme is also likely to receive substantial amount of funding from international funding agencies.
79.	39	Non-Conventional Energy Sources	Another significant initiative is likely to be in the area of Small Hydro Projects (SHPs)—of less than 3 MW capacity. The programme is most suitable and well poised to meet the

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			energy needs of rural and remote hilly areas. Such projects can also make use of the existing irrigation infrastructure. The Energy Sector Management Assistance Programme (ESMAP) of the World Bank reviewed many such projects and identified several deficiencies : the unwarranted high costs due to the initial batch of schemes being conceived, designed and executed as a scaled down variations of large conventional hydro installations, high gestation periods due to complex layout of schemes and high manpower requirements causing concerns regarding viability.
80.	39	Non-Conventional Energy Sources and Power	The reliability of the small hydro system can be substantially increased through inter-linked design of small hydro facilities. The hydro power structure should be arranged so that the head-work (or the intake) of one station follows closely the tail-race (Open canal for tail water) of the other. The upstream regulating reservoirs can then be designed so that the cascade process raises the dependable output of the whole basin system.
81.	40	Non-Conventional Energy Sources	Solar Photovoltaics (PVs) are a viable option in remote areas for specialised applications including tele-communications, railway signalling, telemetry (oil exploration), microwave repeater stations and for refrigeration (cold chains). PV

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			systems for lighting are also a viable option in remote non-grid connected and low-load-demand villages where the cost of providing power through conventional means is prohibitive.
82.	40	Non-Conventional Energy Sources	Programmes such as windmills for pumping and gasifiers have not quite lived up to expectation and need more developmental work before they are likely to make an impact on the energy scene.
83.	40	Non-Conventional Energy Sources	The potential of the two biomass based programmes—improved *Chulhas* and Biogas has not been realised though they are possibly the most attractive of the various renewable energy devices.
84.	40	Non-conventional Energy Sources	Ocean Thermal Energy Conservation (OTEC) using the principal of temperature differences between the warm ocean surface waters and the cold water at greater depth can be harnessed to generate electricity. An ambitious project to generate 600 MW of power through this technology is proposed to be set up off the coast of Tamil Nadu. Initially, 100 MW capacity is likely to come up. India's potential of generating energy from this renewable, non-polluting source is estimated at 50,000 MW. Tidal power is another means of tapping ocean technology—the potential in India is estimated at 9,000 MW. Techno-feasibility of tidal energy needs to be established and this Committee recommends action in this regard.

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85.	41	Non-Conventional Energy Sources.	To attract sufficient funding, the level of incentives provided to RETs should be no less than those provided for conventional sources of supply. This is especially true of incentives such as guaranteed rates of return and assured buy-back of power now being offered to power projects using fossil fuels. In fact, considering the positive effects of renewable devices, there is a need to provide additional incentives over and above those meant for conventional sources.
86.	41	Non-Conventional Energy Sources.	There is a need for considerable R & D work in RETs. This is to be in the area of both basic research as well as in applied engineering work. Attention should be focussed on removing technical glitches and adapting technologies to suit local conditions. The latter is especially true of bio-mass based technologies. Hitherto the industry has had a marginal role in such efforts. A more collaborative effort is likely to prove fruitful.
87.	41	Non-Conventional Energy Sources.	There is great scope for innovations and greater dynamism in the field of social engineering. For instance, for programmes such as biogas and improved *chulhas* there is a need to further decentralise the dissemination of these devices. Private entrepreneurs and non-governmental organisations need to be involved in such efforts.

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88.	42	Power and Planning Commission	An additional marginal requirement of about 0.5 MT of diesel fuel can be released by: — increasing the traffic carried by electrical suburban rail systems in metropolitan cities by 50% more than projected by the railways (*i.e.* 26 BIKM more) resulting in a saving of 1,60,000 tonnes of diesel. — improving fuel efficiency of buses from 3.5 km/litre to 4.5 km/litre resulting in a saving of 4,00,000 tonnes of diesel. This could be acheived partly by better maintenance practices, technological improvements in bus design and partly by traffic management measures leading to less congestion and faster flow of traffic. — the Committee regret that there are no comprehensive traffic management schemes (except in metropolitan) cities which are aimed at reducing travel demand and optimising energy use.The Committee urge that suitable efforts in this direction should be initiated.
89.	42	Power and Planning Commission	In the past few decades there has been a steady shift in freight movement to road and away from railways. This has been a result of not only limits on rail capacity but also willingness of consumers to pay for a more reliable and personalized private road transport service. However with limited and diminishing resources of

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			petroleum products and the critical position of balance of payments, it is in the interest of the nation to encourage long distance freight movement by railways keeping in view customers/shippers' requirements. This could be achieved through a domestic container service, matching the shippers' requirements.
90.	43	Power	Constructing a metro system along high density routes in major metropolitan cities provides a promising strategy. What could be considered is the Build-Operate-Transfer (BOT) option, which would not only ensure a quick and efficient implementation of the project but also bring into existence management and operational expertise that is essential for maintaining the system. The Committee recommends that this concept needs to be explored and seriously considered by the Government.
91.	43	Power	If the Eighth Plan targets of energy savings are to be achieved, concrete steps need to be taken urgently. Efforts in this direction have failed to make a headway mainly due to an inadeqaute information base and/or the sporadic and *ad-hoc* nature of activities, alongwith an uncoordinated approach. There is considerable untapped conservation potential (about 25—30%) in a whole range of energy intensive industries within the

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			sector for which energy efficiency norms and targets need to be fixed for successful policy implementation. Current domestic efficiencies could be compared with those of the world's best technologies available and the potential for conservation estimated. The variables considered could be planned, capacity expansions, capacity utilisation, location technology, raw materials used, their substitutability etc. Further the compatibility of the current raw materials available in the country to the current output mix could also be studied. Associated management issues in the industry can be simultaneously investigated. Required policy instruments can be determined keeping in mind both feasibilitty (technical and managerial) of the change as well as the economic consequences of the policy measure. Also, commercially viable energy efficient technologies should be financed at concessional rates and made attractive through fiscal and pricing incentives and selective legislation. This would require a detailed study of the existing legislation and incentives ; reasons for non-acceptance by the industry or slow penetration, requirements of the industry itself ; information dissemination as regards the incentives, database creation on

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			energy efficient technologies, their economics and domestic availability.
92.	44	Power	With a view to acheiving energy efficient lighting in areas releating to commercial, domestic, five-star hotels and street lighting, a task force was constituted in the Ministry of Power. This task force suggested a number of demonstration projects aimed at introduction of white fluorescent lamps, compact fluorescent lamps, triband lamps and accessories such as new design of ballasts, p.f. correction capacitors etc. The Committee is of the view that these projects need to be strengthened.
93.	44	Power	It is every important to monitor the actual effect of retrofits to the utility through feeder level monitoring of the energy consumption. Apart from the replacement of pipelines or pumps, retrofit jobs should take into account a host of other factors. These could be : — development of mobile teams of trained personnel, equiped with requisite instrumentation and tools to undertake site visits, decide on the exact nature of retrofits and execute the job in a professional manner ; — suitable legislation may be formulated to make standard equipment and

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			power capacitors compulsory in rural pumpset connections ;
			— Working out suitable incentives to encourage quality control and adherence to standards by the manufacturers (small scale units) of irrigation pumpsets ;
			— There also exists ample scope for improving the design of centrifugal pumps for agricultural applications ;
94.	45	Coal	The Committee would wish to comment on some disquieting features about coal prices in India.
			— there is no systematic principle adopted for inter-grade price differentials. A rational pricing structure should have an in-built allowance to adequately compensate the consumers for using lower quality coal ;
			— the pithead prices have an in-built in efficiency in that the cost of production (on which they are based) is calculated with total disregard for the low output per manshift (OMS). An analysis carried out for this purpose shows that if the productivity (OMS) in case of all the less efficient mines was to rise to a level of average OMS for the more efficient mines, the cost reduction (on account of lower manpower costs) would be about 30% ;

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			— the pithead prices are determined on the basis of the industry-wide average cost of production with the result that some of the coal mining companies such as BCCL and ECL, which have old and high cost mines under their control, are not able to recover their costs.
95.	46	Petroleum & Natural Gas	The Committee is constrained to observe that the prevailing pricing policy, guided by short term objectives coupled with inadequate administative supervision has led to several distortions in consumption such as adulteration of diesel with kerosene in the transport sector with the target consumers' having to resort to black market purchases (due to shortages of kerosene) at 3—4 times the administered price of kerosene. There is diversion of domestic LPG for commercial and even transportation purposes and a lower substitution of naphtha and FO/LSHS by natural gas in the fertilizer industry owing to the concessional prices of the former.
96.	46	Power	Pricing of electricity by the SEBs has generally been based on the principle of recovering the average cost of supply. In practice, however, the Boards have been unable to recover their overall cost of generation and supply with the unit deficit rising overtime. At the national level, per

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			unit revenue loss has increased from 4.13 paise/kwh in 1974-75 to 8.67 paise/kwh in 1980-81 and further, to 24.7 paise/kwh in 1990-91. All the SEBs follow a policy of differential pricing for the supply of power to different from consumer categories. Tariffs are more often set by social and political considerations than by financial and economic efficiency criterion, with revision made usually in an adhoc manner. With escalations in costs, the additional costs to be recovered are calculated first, based on which the extent to which the tariffs for high tension consumers can be raised is decided. The balance cost is then adjusted to the extent possible from the low tension industrial commercial and domestic consumers.
97.	47	Power	Electricity continues to be supplied to the agriculture sector at high rates of subsidy and mostly on the basis of flat rate tariffs. This inturn encourages a misuse of electricity for non-agricultural purposes, thus further adversely contributing to the financial health of the SEBs. Simultaneously, there is gross inefficiency in the supply of electricity to the agricultural sector. It is seldom made available for the required number of hours, with the required continuity or at such hours,

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			as are convenient for its gainful use. It is a common complaint of the agriculture sector that they are treated as the poor relatives, electricity is supplied to them on lower priority to industry, and almost always during inconvenient hours of the night. The SEBs are thus caught in the pincers of high subsidy, gross misuse and low consumer satisfaction.
98.	47	Power	Energy prices, as they currently stand in India, do not reflect the true cost of supply to the consumers, nor do they take into account the impact of such a price structure in one energy sub-sector on the other energy sub-sectors. A comparison of the real resource cost of supply of coal, oil and electricity with the prevailing market prices reveals significant divergencies.
99-108.	50	Power, Coal, Petroleum & Natural Gas, Planning Commission	The Committee recommends the following for consideration of the Government for achieving an appropriate structure :— — the price paid to SEBs and coal/oil companies should be based on the normative efficient cost ; — in the coal sector, price of coking coal must be linked to the border price and for non-coking coal while in the short to medium term the inter grades coal price differentials need to be rationalized, in the long run there is a

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			need to move away from the present system of linking of non-coking coal producers and consumers to mutually negotiated deals between the producers and the consumers ;
			— inter-grade price differentials of coal must be rationalised ;
			— in the oil sector, diesel and kerosene prices, mindful of their utilisation, have to be rationalised ;
			— Kerosene distribution system needs to be strengthened ;
			— subsidy on LPG should be gradually reduced ;
			— natural gas prices should be linked to the replacement values in various en-duses ;
			— all electricity consumption should be necessarily metered ;
			— time-of-day electricity tariffs for some HT industries could be implemented;
			— Cross subsidisation should be within the consuming sectors (amongst consumption blocks), and not across sectors.
109.	52	Power	Coal is the predominant fuel used in thermal power plants. Indian coal has a high ash (35%) and low sulphur

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			(0.5% or less) content. This implies that the major environmental problem pertains to disposal of ash. Emission of gases is a relatively insignificant problem (unlike in Europe where for instance, acid rain become a major concern) except in areas with concentration of power units, as at pitheads or in ecologically sensitive areas.
			— Ash generated from coal based plants technically simple, and relatively inexpensive to control. However, the lack of installations of suitable devices (especially in older power plants) and the lack of proper maintenance and operation has led to air pollution from thermal power stations being a major problem in many parts of the country. The levels of air pollution in many regions have far exceeded permissible concentrations resulting in increased health risks. Further, the conventional method of disposing ash collected required large tracts of land and also results in air and water pollution.
110.	52	Power	While non-polluting and renewable, large hydro power projects have faced increasing protest and resistance (even leading to their abandonment in some cases) form local people and environmentalists. Large scale

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			displacement of people has led to serious social dislocation. The Construction of reservoirs and the associated loss of forests and agricultural land, and safety issues, relating to dams too, have come to the fore.
111.	53	DAE	During normal operations, radiation from atomic power stations poses few safety problems. The major fear is from accidential release of large amounts of radioactive material. No such accident has taken place in India. The long-term considerations relate to the satisfactory disposal of waste and the decommissioning of the plants after their useful life is over. Given the small scale and the recent nature of the nucler energy programme, these have not become important concerns. They, however, need consideration.
112-117.	54	Power, Coal, Petroleum & Natural Gas, Non-Conventional Energy Sources, DAE, Planning Commission	The Committee, wishes to make the following recommendations for considerations of the Government : — Incorporate costs of environmental damage/mitigation measures into project appraisals. Adeqaute and comprehensive incorporation of environmental costs and benefits of using a particular technology or resource should form part of project analysis. This, the Committee, believes would lead to more rational choices in the energy sector.

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			— Device a comprehensive and humane policy for the rehabilitation of families affected by developmental projects. Such rehabilitation ought to precede, not follow the launching of projects involving displacement of people.
			— Ensure that land management becomes an integral component of coal projects. Care should be taken to minimize adverse effects of mining operations, and reclamation measures should be undertaken to restore degraded land. Afforestation of degraded land and compensatory aforestation where forest land is diverted need special attention. Sufficient provision for these should be made at the planning stage.
			— Ensure that adeqaute pollution control measures are undertaken and suitable devices installed, and more importantly, operated and maintained in power plants and refineries.
			— Promote the use of more efficient devices—biogas plants and improved chulhas-in respect of biomass-based devices to mitigate environmental problems in this sector.
			— Examine and promote the use of effluents as raw materials, as in the use of ash for the manufacture of cement or bricks. The Committee,

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			wishes to emphasize R & D, and demonstration projects in this regard. Suitable incentives to entrepreneurs need to be provided to promote such alternative use of effluent.
118-121.	54	Power, Petroleum & Natural Gas, Coal	The Committee recommends : — Integrating the functioning of sectoral ministries, State Governments, local bodies and agencies responsible for planning implementation of development projects. Integrating environmental concerns more effectively in all policy areas and strengthening governmental and institutional structures dealing with environmental management, especially within the ministries concerned. — Strengthen administrative arrangements for monitoring and enforcing of environmental standards; decentralise environment impact assessments and environmental law enforcement based on cooperation with local authorities. — To provide funds, qualified staff and other facilities like laboratories, equipment to implementing organisations. — To provide professional training in operation and maintenance of pollution control treatment devices and laboratories, in setting standards; in management of hazardous waste;

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			and in modelling, data processing legel aspects to the staff concerned.
122.	57	Coal and Planning Commission	The major recommendations (Coal sector) of the Committee are : — Improve the productivity of labour by upgrading their skills and by rationalising rehabilitating or resettling the deployment of surplus manpower; — Improve the productivity of capital by better capacity utilization of existing equipment; further mechanise the mining and loading operations; and adapt (to local conditions), rather than transplant the technology acquired from other countries; — ensure satisfactory quality of coal supplied by installing coal handling plants; promote beneficiation and improved washing technology; — promote the use of coal as a domestic fuel; — ensure adeqaute inter-grade price differentials to reflect quality differences; — provide greater thrust on R & D efforts for clean coal technologies including for gasification and IGCC. It is important that this be an area for continual work ; demonstration projects should be undertaken and

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			adequate incentives be provided to investors to encourage wider dissemination of such technologies;
			— incorporate environmental considerations in planning for coal production as well as its utilisation.
			— avoid over-exploitation of mines at the cost of human safety.
123-128.	57	Petroleum & Natural Gas and Planning Commission	The Major recommendations of the Committee are :
			— Steps be undertaken to encourage exploratory and drilling activities. The price of crude oil should be so fixed as to allow for adequate internal resources generation for undertaking such activities. As for mobilizing private Indian or foreign capital participation, timely decisons should be taken keeping in view the national interest;
			— Indian Private Companies that have been given exploration rights be encouraged to develop available blocks and should not be placed at any disadvantage *vis-a-vis*, foreign companies. The entire process of awarding blocks must be wholly transparent;
			— steps be undertaken to achieve enhanced oil recovery from existing wells and to reduce refinery losses;

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			— prices of products should reflect the economic cost of supply. This is particularly important if private sector marketing of products is to be promoted;
			— immediate steps be taken to first reduce and subsequently eliminate flaring of natural gas. It is also important to determine the role of natural gas in the competing sectors of power production, fertilizer and petrochemicals. While regional gas grids already exist, techno-economic suitability and advisability of establishing a national gas grid in the sub-continental country like India needs to be closely examined. The advisability of gas imports from the Gulf or from neighbouring countries also needs serious consideration ;
			— encourage the use of CNG as a replacement for conventional fuels in the transport sector.
129-131.	58	Power, DAE and Planning Commission	The major recommendations of the Committee are :
			— improve the efficiency of operations of thermal power plants in respect of thermal efficiency, plant load factor, peaking capacity, reduction in forced outages and in auxiliary consumption of power. The impact of the ongoing R & M programmes need to be monitored and reviewed on a regular basis;

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			— a shift in emphasis from additions to generation capacity to the performance of T & D network so as to reduce the transmission and distribution losses by 5% by 1996-97. — rationalise the supply mix so as to restore an optimal thermal-hydro mix; — rationalize tariffs to ensure adequate resource generation for utilities and to promote efficient use of electricity ; in particular, for the agricultural sector the tariffs should be pro-rata and not a flat rate. While tariffs must be based on normative costs of supply this must be done by ensuring that consumers do not have to pay for the high cost, low efficiency operations of power plants; — adequate and all needed budgetary support be provided to meet the target of 10,000 MW in respect of nuclear power by 2000 A.D.
132.	58	Non-Conventional Energy Sources	The major recommendations of the Committee are : — provide incentives to renewable energy technologies that are at least on par with those provided for conventional sources of supply; give R & D efforts a renewed thrust and a focus; and involve the industry in such efforts.

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			— involve non-governmental organisations in dissemination programmes especially in respect of devices used in rural areas.
133.	59	Power	As identified in this report the savings on account of demand side management run into thousands of crores of rupees. Not only are they low cost, they have a short gestation period implying a quick pay-back. The most prominent of these are :
			— a shift from road to rail in freight movement;
			— a shift from private to public means of transport;
			— need for comprehensive traffic management schemes;
			— enhanced efficiency in lighting by the use of more efficient lamps and fixtures. Improving the efficiency of motors and pump-sets in the agricultural sector;
			conservation measures in the industrial sector.
			A majority of the measures outlined above, can be implemented in a relatively short period of time. Steps should be taken to ensure that conservation measures identified are

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			implemented and they do not remain on paper. Over the long term, it is important to ensure that institutions are strengthened and capabilities built-up to deal with the challenges and realities emerging in the energy sector.
134.	59	Power	It is the opinion of the Committee that to meet future energy demands, additional resources for expansion and upgradation of the energy supply system would have to be ensured by means of : — internal resource generation by the supply companies; and — inviting investment capital from the private sector.
135.	60	Power and Petroleum & Natural Gas	Resources would have to be mobilized from the private sector, both from within and outside the country. This would require : — identification of areas, the development of which could be completely entrusted to the private sector, such as service activities related to production of crude oil and natural gas, washeries for non-coking coal, SF/coal briquette units, and T & D operations in the power sector; — in view of the lukewarm response from the private sector there is a need to continuously review the incentive package for encouraging private sector participation.

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			— privatisation, though inescapable, ought not to become an indiscriminate free for all.
136-137.	60	Power	The Committee suggest as follows:
			— An Energy Commission headed by the Prime Minister for evolving an integrated energy policy and to ensure balanced development in an environmentally and socially sustainable fashion. The Commission should draw participation from various Ministries (Power, Coal, Petroleum and Natural Gas, Environment and Forests, Non-Conventional Energy Sources), the Planning Commission and State Governments.
			— An autonomous regulatory body may be established which could draw participation from the producers, consumers, government, industry and other experts to discharge the following functions :
			(i) assist in drawing up medium to plans of energy supply by boards/ companies;
			(ii) set prices based on the normative efficient costs so that the cost of inefficiencies in the supply system are not passed on to the consumers;

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			(iii) ensure an integrated approach to energy pricing to achieve an optimal energy consumption and desired inter-fuel substitution.
138.	60	Petroleum & Natural Gas, Power	This autonomous body be in the form of an Energy Pricing Commission with statutory powers to set and regulate energy prices for the producers and consumers, while ensured transparency in its operations.
139.	60	Power	— An empowered Committee should be set up to expedite decision making on the proposals submitted by the private sector for oil and gas exploration and production marketing of petroleum products, transportation and supply of natural gas, power generation and its T & D etc.
140.	61	Non-Conventional Energy Sources	An autonomous non-governmental body with representatives from industry, consumers and other interest groups should be constituted to draw up a National Energy Conservation Plan, for each of the intensive industries.
			In the rural areas, specific institutional requirements could include :
			(i) strengthening panchayats or creation of village cooperatives for energy management :

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			(ii) forwarding fiscal incentives and soft loans to rural entrepreneurs to disseminate renewable energy technologies (biogas, gasifiers, briquettes) on a commercial basis;
			(iii) creation of training infrastructure at the district level for better implementation and monitoring of the energy programmes ;
			(iv) supporting R & D infrastructure at the state level to develop location,
141.	61	Non-Conventional Energy Sources	specific suitable technologies.
			With particular reference to the renewables sector. It is felt that CASE (Commission for Additional Sources of Energy) needs to be revived and strengthened. The revitalised CASE enlarged to include representative from the industry and the R & D community, should focus on :
			(i) developing detailed programmes of research in different technologies ;
			(ii) fixing specific technology development goals and finite time frames ;
			(iii) determining the scope of R & D institutions and industry involvement in achieving the set goals, and

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142.	61	Non-Conventional Energy Sources	(iv) recommending structural changes within the RET sector to the EPAC. The role of Ministry of Non-Conventional Energy Sources also has to evolve further as facilitator of rapid commercialisation. Emphasis should lie on creating a demand-pull approach and avoiding the technology-push approach since the visualised scale of use of renewables cannot be fulfilled without a market driven demand, which in turn requires the involvement of industry. The need to take the industry into confidence by those formulating plans for technology development cannot be over-emphasised The process of initiating and encouraging industry would require venture and risk capital Strengthening and creating risk capital financing institutions for financing the commercialisation of RETs will have to be one of the strategies.
143.	62	Planning Commission, Power	There is a need for a comprehensive document which brings out information and statistics on various aspects of energy including resource availability, supply, consumption, pricing and the environment. Several Government and Non-

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			Governmental organisations do bring out such information on a regular basis. However, the Committee believes that there is a need for a document which would at one place provide relevant information on all issues of energy. Hence, the Committee recommends that the Government bring out every year a comprehensive Report on energy and lay it in Parliament of the benefit of members and the public.

APPENDIX II

Vide **Reply of Ministry of Power to Recommendation Serial No. 58**

State-wise Energy Shortage from 1988-89 to 1993-94

(figures in %)

Name of the State/System	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94
Chandigarh	0	0	0	0	0.0	0.0
Delhi	0.6	1.5	0.7	1.0	1.0	1.5
Haryana	3.9	5.0	2.9	2.0	2.3	9.4
Himachal Pradesh	0.5	0	1.1	0.7	0.0	0.0
Jammu & Kashmir	20.8	11.4	10.8	10.8	19.5	19.7
Punjab Incl. NFF	1.5	1.4	1.1	6.2	3.6	3.2
Rajasthan	2.2	2.8	2.1	1.4	1.6	6.1
Uttar Pradesh	10.6	10.6	10.6	10.3	10.2	9.7
Gujarat	1.5	3.4	4.1	4.3	3.0	4.5
Madhya Pradesh	3.4	1.4	2.5	5.6	7.9	4.8
Maharashtra	3.0	2.7	3.9	4.5	5.9	3.1
Goa	0	0	0	0	0.0	0.3
Andhra Pradesh	9.7	9.8	7.9	6.7	6.9	4.5
Karnataka	26.9	23.6	22.9	23.6	25.9	21.9
Kerala	12.8	8.6	0.5	3.3	3.7	1.9
Tamil Nadu	6.7	9.1	6.4	4.8	1.8	3.9
Bihar	8.0	13.2	28.7	29.7	36.2	35.4
DVC	13.0	17.8	18.1	18.4	23.1	9.7
Orissa	18.7	22.3	22.0	7.0	12.8	10.5
West Bangal	7.0	7.9	9.2	9.0	5.4	5.0
North-Eastern Region	3.2	3.0	4.6	8.8	15.1	10.2
All India	7.7	7.9	7.9	7.8	8.3	7.3

APPENDIX III

Vide **Reply of Ministry of Power to Recommendation Serial No. 72**

Name of the States/UTs who have revised their agricultural tariff to 50 paise/ Kwh.

1. Gujarat
2. Haryana
3. Karnataka
4. Madhya Pradesh
5. Maharashtra
6. Orissa
7. Punjab
8. Rajasthan
9. Himachal Pradesh
10. Uttar Pradesh
11. West Bengal
12. Assam
13. Meghalaya
14. Goa
15. Manipur
16. Nagaland
17. Sikkim
18. Mizoram
19. Tripura
20. DESU
21. Dadra Nagar Havyeli

[Ministry of power : O.M. No. 3/1/94-Coord. Dt. October, 1994]

APPENDIX IV

Vide **Reply of Ministry of Power to Recommendation Serial No. 90**

Government of India
Ministry of Environment & Forests
I.A. III Divsion

COMMENTS ON THE NOTE FOR THE CABINET

ON MASS RAPID TRANSIT SYSTEM FOR DELHI

The note circulated by Ministry of Urban Development seeks approval of the Cabinet for the following :

a. In principle approval of multi-model Mass Rapid Transit System (MRTS) for Delhi .

b. To take up preparation of detailed project Report along with Environmental Assessment Studies for MRTS by the Government of National Capital Territory (NCT) of Delhi,

c. Financial package totalling Rs. 3401 crores in the first phase,

d. Institutional arrangements, and

e. Establishment of special cell in Delhi Administration.

2. The Ministry welcomes the proposal to have Mass Rapid Transit System as it will be enviromentally friendly.

(i) However, the propsosal to decongest Delhi would be achieved only if the phasing is judiciouly planned and is implemented. It would be preferable to connect Suburban District Centres in the first instance so that load is taken away from the Central Business District (CBD). There is no proposal for increasing the FST, neither is it desirable in view of the effect it will cause on congestion.

(ii) the decongestion is proposed to be achieved partly by shiftitng public sector offices away from the Union Territory. However, it may be noted that no control can be exercised on the private sector offices who could shift to the areas vacated by the public sector thus negating the whole idea of decongestion.

(iii) In the note for Cabinet there is nothing to guarantee that green area/ridge will be safeguarded. This is necessary.

(iv) The High power Committee also considered the draft Bill on MRTS. A number of suggestions were made by this Ministry, in respect of MRTS Bill which *inter-alia* included incorporation of conservation aspects, professional approach to management, Public participation in decision making, and penalty clauses, etc.

Besides this, illustrative list of issues to be considered in EIA/EMP of MRTS are as below :

- Implications of acquiring agricultural farm land of ICAR for converting into a Terminus.
- How the space likely to be vacated by public sector/offices is to be prevented by being used by private sector for residential construction.
- Incorporation of isssues like loss of privacy, noise pollution and aesthetics especially in the MRTS segment with elevated railways.
- Compensatory afforestation where cutting of trees is inevitable and plan for conservation of the standing trees.
- Earmarking the Delhi Ridge Area exclusively as a Protection Zone.
- An analysis of how decongestion is to be effected especially of the Central Business District (CBD) which is likely to get more congested than before. It is necessary, therefore, that MRTS be connected to CBD only in the second phase as otherwise the objective of decongestion will not be achieved.

APPENDIX V

Vide **Reply of Ministry of Power to Recommendation Serial No. 137**

No. 32027 / 9/ 92 - PFC
Goverment of India
Ministry of Power

New Delhi, the 20th July, 1992

RESOLUTION

The Government of India has been considering the question of setting up of Power Tariff Boards for rationalisation of power tariffs to make SEBs' operations commercially viable and help them in achieving the statutory minimum of 3% return.

2. It has now been decided by the Central Government, in consultation with the State Governments and in concurrence with State Electricity Boards, Power utilities both in the Public and Private Sector to set up a National Power Tariff Board with all - India jurisdiction and five Regional Power Tariff Boards to be located at Delhi, Bombay, Bangalore, Calcutta and Shillong. The Main functions of the National Power Tarriff Board will be to evolve broad principles and guidelines to ensure uniform approach by all Regional Boards in the matter of fixation of tariff, and work out tariff for inter-state and inter-regional exchanges of power. The Regional Power Tariff Boards will evolve the specific principles based on financial and economic factors, and make recommendations to the State Governmnts concerned, for fixation of tariff based on such factors, for the power supplied by SEBs/Power Utilities to different sectors of power consumption. The Power Tariff Boards will also present an annual assessment report on the tariff-related performance of the SEBs/Power Utilities every year to the Governments concerned.

3. The recommendations made by the Tariff Boards will be useful to the policy and decision-makers, and serve the objectives of social equity, apart from ensuring proper fixation of tariff from the financial and economic angles. Another advantage will be that the tariff structure will have the much needed transparency. Since an

element of cross-subsidisation in respect of power tariff is inescapable, the rationale for the fixation of tariff will be available to the consumers, through the reports of the Tariff Boards.

4. Each Tariff Board will comprise of a Chairman and two Merbers who will be expets with technical, administrative and financial background and experience in the power sector. They will be full time functionaries. The National Tariff Board shall determine the strength of the staff required for the National Tariff Board as well as the Regional Tariff Boards, with the approval of Department of Power. Chairman of each Board shall make recruitment of staff to the respective Board by deputation, foreign service, direct recruitment from the open market, etc. The salaries, allowances and other entitlements of the Chairmen, Members and other staff of the Power Tariff Boards will be payable from the funds created by contribution from the SEBs/Power Utilities. During the deputation, foreign service or appointment in the Board, the service conditions of the staff working in the Boards will be regulated by means of Standing Instructions to be issued by each Board.

5. The cost of establishing and managing the Power Tariff Boards will be met by the State Electricity Boards/Power Utilities, both in Private and Public Sectors. The initial expenses will be met by contribution of participating Electricity Boards/Utilities in the ratio of their installed capacity and allocation of power from the Central Utilities.The subsequent recurring expenses including that of National Tariff Board would be met by recoveries from the State Electricity Boards and other participating Utilities, in the ratio of the quantum of energy sold by them in their respective territories.

6. In the discharge of their functions, the Power Tariff Boards will have powers to call for notes, memoranda, information, or any other relevant materials from any official or private institutions, and take evidence from members of public.

Sd/-
(J.P. Singh)
Special Secretary to the Govt. of India.

Order

Ordered that the Resolution be published in the Gazette of India for gneral information.

Ordered that a copy of the resolution be communicated to all the Ministries/ Departments of the Govt. of India, Chief Secretaries of the State Governments, Chairman of the SEBs/Power Utilities, Chairman, CEa and CDs of all the Central Power, Corporations.

Sd/-
(J. P. Singh)
Special Secretary to the Govt. of India.

To

The Manager,
Government of India Press,
FARIDABAD.

Appendix VI

MINUTES OF THE SEVENTH SITTING OF STANDING COMMITTEE ON ENERGY HELD ON 24TH MARCH, 1995

The Committee sat from 15.30 hrs. to 16.30 hrs.

PRESENT

Shri Jaswant Singh — *Chairman*

Members

2. Smt. Dil Kumari Bhandari
3. Dr. Krupasindhu Bhoi
4. Shri K.P. Reddaiah Yadav
5. Shri Laxminarain Tripathi
6. Shri Bhawani Lal Verma
7. Shri Virender Singh
8. Shri Arjun Singh Yadav
9. Shri Parmeshwar Kumar Agarwalla
10. Shri M.M. Hashim
11. Shri Dipankar Mukherjee
12. Smt. Ila Panda
13. Shri J.S. Raju
14. Shri Rajni Ranjan Sahu

SECRETARIAT

1. Smt. Roli Srivastava — *Joint Secretary*
2. Shri G.R. Juneja — *Deputy Secretary*
3. Shri A. Louis Martin — *Under Secretary*

1. xxxx xxxx xxxx xxxx xxxx

2. The Committee next considered the Draft Report on Action Taken by the Government on the recommendations contained in the 3rd Report of Standing Committee on Energy (1993-94) on "Energy for 90's and beyond : Prospects, Reality and Challenges." The reply of the Ministry of Coal to recommendation No. 94 regarding coal prices had been categorised in the draft report as "satisfactory". The Committee decided that this may be categorised as "Not satisfactory" and commented upon suitably in Chapter-I of the Report. The Committee, thereafter, adopted the report with a few minor additions/correction of typographical errors in the draft.

3. xxxx xxxxx xxxx xxxx xxxx

4. The Committee also authorised the Chairman to finalise the Reports mentioned in paras 2 & 3 above on the basis of factual verification by the Ministry concerned and to present the same to Parliament.

The Committee then adjourned.

Appendix VII

(*Vide* para 3 of the introduction)

Analysis of the Action Taken by Government on the recommendation contained in the 3rd Report of the Standing Committee on Energy (Tenth Lok Sabha) on Energy for 90's and Beyond : Prospects, Reality and Challenges.

I.	Total number of recommendations	143
II.	Recommendations that have been accepted by the Government (*vide* recommendations at Sl. Nos. 1 to 7, 9 to 14, 16 to 23, 25 to 37, 39 to 53, 56 to 58, 60, 61, 63 to 67, 70 to 89, 91,92, 95 to 100, 102 to 107, 109 to 111, 114 to 120, 122 to 125, 127 to 130, 132 to 135, 138, 140 and 141.	118
	Percentage to total	82.51%
III.	Recommendations which the Committee do not desire to pursue in view of Governments replies (*vide* recommendations at Sl Nos. 38, 55, 59, 62, 69, 101 and 108	7
	Percentage to total	4.89%
IV	Recommendations in respect of which replies of Government have not been accepted by the Committee (*Vide* recommendations at Sl. Nos. 8, 15, 24, 94, 112, 113, and 137	7
	Percentage to total	4.89%
V.	Recommendations in respect of which final replies of Government are still awaited (*vide* recommendations at Sl. Nos. 54, 68, 90, 93, 121, 126, 131, 136, 139, 142 and 143.	11
	Percentage to total	7.69%