TWENTY -FOURTH REPORT

STANDING COMMITTEE ON ENERGY (1995-96)

(TENTH LOK SABHA)

NON-CONVENTIONAL ENERGY SOURCES SCHEMES AND THE CONSUMER

MINISTRY OF NON-CONVENTIONAL ENERGY SOURCES

Presented to Lok Sabha on
Laid in Rajya Sabha on

LOK SABHA SECRETARIAT
NEW DELHI

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* Ceased to be a Member of the Committee consequent upon his appointment as Minister in the Union Council of Ministers w.e.f. 10-2-95.

** Nominated with effect from 16-11-94

INTRODUCTION

I, the Chairman, Standing Committee on Energy having been authorised by the Committee (1995-96) to present the Report on their behalf, present this Twenty Fourth Report on the subject, "Non-Conventional Energy Sources Schemes and the Consumer." The task of examining the subject, "Non-Conventional Energy Sources Schemes and the Consumer" and preparing a report on it was entrusted to a Sub-Committee of Standing Committee on Energy (1994-95).

2. The Sub-Committee held 9 sittings in all out of which 3 sittings were devoted to personal hearing of experts/evidence of official witnesses and six sittings for in-house deliberations.

3. The Committee wish to express their thanks to the following experts/organisations for placing before them the requisite material/ Memorandum in connection with examination of the subject :

(a) The Ministry of Non-Conventional Energy Sources

(b) Dr. E.S. R.Ramamurthy, Ex. G.M., BHEL

(c) Dr. R. Vasudevan, Director, Bharthidasan University, Tiruchirappalli, Tamil Nadu

(d) Shivsadan Renewable Energy Research Institute, Sangli, Maharashtra

(e) Sulabh International, New Delhi

(f) Agakhan Rural Support Institute, Vallabh Vidyanagar, Gujarat

(g) BAIF Development Research Foundation, Pune

(h) Bhagavatula Charitable Trust, Visakhapatnam, A.P.

(i) Development Alternatives, New Delhi

(j) The Social Work & Research Centre, Tailonia, Rajasthan

(k) Ankur Energy & Development Alternatives, Vadodara, Gujarat

(l) Nb Institute for Rural Technology, Tripura

(m) Rural Energy Deptt., All India Women Conference, New Delhi

(n) Deccan Development Society, Hyderabad

(o) Indian Association for the Cultivation of Science, Jadavpur, Calcutta

4. The Committee also wish to thank, in particular, the representatives of the Ministry of Non-Conventional Energy Sources and the following experts who appeared before the Sub-Committee for oral evidence/personal hearing and placed their considered views before them :

(a) Dr. B.C. Jain, President, Ankur Energy & Development Alternatives, Vadodara, Gujarat

(b) Shri S.P. Gon Chaudhuri, Adviser, Nb Institute for Rural Technology, Tripura

(c) Smt. Lalita Balakrishnan, Vice-President & Chairperson, Rural Energy Department, All India Women Conference, New Delhi

(d) Dr. Vitthal Rajan, Diretor, Deccan Development Society, Hyderabad

(e) Prof. A.K. Barua, Indian Association for the Cultivation of Science, Jadavpur, Calcutta

5. The report was considered and approved by the Sub-Committee at their sitting held on 10th April, 1995 and adopted by the full Committee on 5th May, 1995.

6. The Committee place on record their appreciation for the work done by the Sub-Committee on Non-Conventional Energy Sources (1994-95) of the Standing Committee on Energy.

NEW DELHI ;
9th May, 1995
Vaisakha 19 1917 (Saka)

JASWANT SINGH,
Chairman,
Standing Committee on Energy.

PART I

PART A.

BACKGROUND ANALYSIS

I. GENERAL

1.1 The Ministry of Non-Conventional Energy Sources is implementing a wide ranging set of programme which cover the entire gamut of renewable energy sources and technologies including improved chulha, biogas, biomass, solar energy, wind energy, small hydel, co-generation, hydrogen energy, ocean energy, among others. In addition the Integrated Rural Energy Programme, earlier implemented by Planning Commission has been transferred to MNES w.e.f 1st April, 1994.

1.2 After taking into account the efforts and experiences during the last 15 years in this field, the Ministry has now moved to liberalized policy regime and bringing market forces into play. The opening up of the market especially for solar photovoltaices has reportedly resulted in greater competition, modernization and cost reduction and in overcoming programme infirmities and encouraging genuine entrepreneurs. Other policy initiatives taken up by the Ministry pertain to rationalization of customs and excise duties, exemption/minimal environmental and forestry clearances, extension of the limit for exemption from CEA clearance and clearances for land procurement for NRSE based power projects.

1.3 A threefold strategy has been pursued by the Ministry for the promotion of NRSE. This includes :

(a) providing budgetary resources of Government for demonstration projects.

(b) extending institutional finance from IREDA and other financial institutions, for commercially viable project, with private sector participation and external assistance from World Bank, GEF, DANIDA etc.

(c) promoting private investment through fiscal incentives, tax holiday, depreciation allowance, facilities for wheeling and

banking power for the grid and remunerative price for the power provided for the grid.

1.4 The non-conventional energy sources programmes may be classified into two groups viz. (i) Consumer based non-conventional energy sources programmes and (ii) Non-conventional energy sources programmes for power generation. The present scope of examination is confined to consumer based non-conventional energy programmes which cover biogas plants, improved chulhas, solar cooker, solar lantern, domestic solar lighting system and water heating system which are popular and used by individual consumers.

1.5 Pointing out that the subject is about the consumers and performance of systems, technical specification, standards, guarantees, warranties, after sales service and such other issues, the Secretary, MNES drew distinctive between three types of programmes implemented by the Ministry as below :

"There is a distinction between a programme in which MNES is fully involved and is also involved with the procurement and distribution of the system. Then there is another category of programme where MNES is funding the programme but it is being implemented by the nodal agencies. So, to that extent these issues have to be taken care of by the nodal agencies with some guidelines and some instructions from the Ministry. We have a third category of programme, which is growing very fast these days and that is the market-oriented programme. In the market-oriented programme, it is entirely taken care of by market forces. We are supporting indirectly, may be through fiscal incentives or soft loans. Mostly it is the market forces that play and therefore, in these programmes, guarantees, warranties, after sales service are matters between the manufactures, the suppliers and the purchasers."

1.6 To a query whether the Ministry invites and received complaints and suggestions from consumers in respect of various non-conventional energy schemes devices/equipments the MNES stated in a note as follows : —

"Ministry's extension programmes are implemented through the State Governments Departments and Nodal Agencies who in turn also involve NGOs and entrepreneurs, inter-alia, to attend to the

consumer's complaints at block and district levels, Ministry receives suggestions for changes in the content of the project and procedure for disbursement of funds, monitoring, etc. and accordingly the project is modified in consultation with the implementing departments and agencies, Ministry receives complaints from user only when his call is not attended by the manufacturer and or nodal implementing agencies. The feedback received directly by MNES is communicated to the State Implementing Agencies for necessary action. MNES/State nodal agencies also sanction feedback/evaluation studies through independent agencies."

1.7 Enquired whether there is any mechanism to attend to complaints and suggestion and also to monitor opinions/suggestions of consumers that appear in the columns of newspapers, the MNES stated that the complains/suggestions appearing in the columns of newspapers were invariably attended and if required, referred to the State Government Agency/Manufacturer concerned for action and sending of compliance reports.

1.8 When asked whether there is any inbuilt mechanism in the Ministry to know the problems of consumers contemporaneously and to initiate remedial action, MNES stated in a note as under :

"Offices of the Ministry including its Regional Offices are conducting field inspection on sample basis. During these inspections, problems faced by consumers are taken note of and State Nodal Agencies/Manufacturers are advised to initiate remedial actions."

1.9 Asked how frequently were these inspections conducted, a representative of the Ministry stated during evidence :

"There are eight regional offices under the charge of the Ministry which are located at Chandigarh, Lucknow, Guwahati, Bhopal, Hyderabad, Bangalore, Ahmedabad and Madras. These eight offices are conducting inspections. Targets have been prescribed for the scientific staff available at these places. About 500 biogas plants per scientific staff and 1,000 improved chulhas per year per scientific staff are allotted. The targets are prescribed at the beginning of the year. During 1993-94, 9,453 improved chulhas were inspected in 19 districts of 16 States. In the case of biogas 5,982 units were

inspected. As far as monitoring is concerned, the monitoring by our staff is very limited. I would like to explain that monitoring is taken care of by a three-tier system. One is self-assessment and giving of quarterly reports by the State Govts., NGOs etc. and the second is monitoring by our staff and thirdly once in 3-4 years we get monitoring by independent agencies."

1.10 Asked about the percentage of inspection, a representative of the MNES stated :

"It is 1-2 percent of the biogas plants and improved chulhas at State headquarters and about 5 per cent of biogas and improved chulhas at district level."

1.11 To a query as to how often does the MNES inspect each plant during a year, a representative of the Ministry stated :

"The system has not been prescribed. Each chulha or each plant is not required to be inspected. So, 1 to 5 per cent of the biogas plants are to be inspected."

1.12 Asked whether surprise checks are done, a representative of the Ministry stated :

"Yes ; in selected area we carried out the inspections. We have found some lapses in the report of the nodal agencies and we have set them right."

1.13 Asked what were the major problems of consumers noticed during these field inspections and how satisfactorly these have been resolved, a representative of, MNES stated :

"I would put the problems into two categories. The first one is structural problems and the other is operational problems. About 15 per cent of the problems relate to operational and 80 to 85 per cent units are in working order at a given time. We train the users to take care of the operational problems like cleaning of Chimney and proper mixing of dung. So far as the structural problems are concerned, they are to be attended under the guarantee scheme."

1.14 The Sub-Committee desired to know how the administrative machinery at the State level attend to the complaints and suggestions.

In reply MNES stated in a note as under :

> "Each State/UT has designated a Nodal Department/Agency for implementation of NRSE programmes. Most of the Nodal Department/Agency have established cells with core staff at the State Headquarters and also in districts which inter-alia attend to the complaints and suggestions of consumers under selected programmes. The Ministry is also providing funds towards this organisational support. Besides this manufacturers also frequently conduct routine maintenance survey to the user site."

1.15 It, however, appeared that most of the NGOs/experts were not aware of existence of such a cell. To a query whether the MNES did not think that it was necessary to have effective interaction with consumers of New and Renewable Sources of Energy (NRSE) to come to know of their problems and to be responsive to their needs, a representative of the Ministry stated during evidence :

> "Under the biogas programme and the improved chulha programme, the Government of India is providing financial assistance to State Governments and nodal agencies like Khadi & Village Industries Commission, the National Dairy Development Board etc. for setting up of nucleus staff cell at the headquarters and also at the district headquarters. Initially the staff's pay scales etc. were used to be sanctioned by us. But from 1985 onwards this was converted into lumpsum grant called service charges which is based on targets. It varies according to different targets. All the State Governments have designated some Department or the other for this purpose. The nomenclature varies from State to State—such as Rural Development Department, Agriculture Department or Agro Industries Corporation etc. Accordingly whichever nodal agency in a given State is given this task, they have set up these cells at the district headquarters. The technical knowhow is provided and they are helping in disbursing the Central subsidy and also in the maintenance and repair aspects."

1.16 It was pointed out by one expert (Shri S.P. Gon Chaudhuri) that price structure of non-conventional energy items vary widely with different manufacturers and that this aspect should be carefully looked into to protect the consumers interest. Reacting to this observation the

Secretary, MNES stated during evidence :

"As far as the tender system is concerned, that is where we are subsidising and the nodal agencies are procuring through tenders. So, this is taken care of because the manufacturer will have to quote their best prices for their products. As a result of that the nodal agencies will get it at the best price. As far as the variation in the quality the market should be able to take care of this aspect. There have been some variations here and there, but many of these are more or less, because of the tender system and also because of the competition the prices are being stabilised."

1.17 To a query whether the Ministry has taken steps to protect the interest of consumers, the witness stated :

"Now-a-days there is not much scope for the manufacturers to deceive the consumers and they cannot take the consumer for a ride as we have opened the whole sector. The private units have come up, foreign companies have come in and there are joint ventures also. Practically, every day some new unit is coming up. Due to the competition amongst manufacturers, the consumer will naturally get a good product at a competitive price."

1.18 Enquired whether the MNES considered the introduction of hire purchase system for consumers to purchase non-conventional energy devices/systems, the Secretary, MNES stated during evidence :

"Sir, already these hire purchase companies and leasing companies have come into the picture. They are willing to lease out the system to the farmers rather than to sell it out. The Department of Telecommunication is also considering such a scheme with regard to rural telephones, that is, instead of the DOT procuring and purchasing the system they are willing to lease out the system and also give a guarantee for after sales service. There is some very interesting development taking place with regard to hot water system. In some countries there are people who come and instal—at their own cost—hot water system to the consumers mainly for industries, commercial hotels, hostels, etc. The consumers who are not interested, in spending huge sums are attracted to such a programme as they are not required to put the entire investment. Another point is about the urban municipal waste and industrial waste. There is one company which has been able to sell the concept to three or four distillary and other industries that they would put in the investment and set up a plant for treatment of the waste at their cost and they will sell the energy to the industry. Of course the industries are also forced by the environment and pollution laws to go in for the treatment of industrial waste."

II. BIOGAS AND IMPROVED CHULHA

2.1 The National Project on Biogas development was started in the year 1981-82 for promotion of family type bio-gas plants with the main objectives of (i) providing clean and unpolluting source of energy in rural areas, (ii) producing enriched manure for supplementing the use of chemical fertilisers for increasing crop production, (iii) improving the quality of life of rural women folk and children, and (iv) improving sanitation and hygiene by linking sanitary toilets with biogas plants. A total of 18.52 lakh bio-gas plants have been installed upto 31.12.1993.

2.2 Central subsidy is given as a fixed amount according to the category and size of the plant. Besides this, turn-key job fee, promotional incentive and incentive for saving diesel etc. are being given as indicated below :

— Turn-key job fee : Rs. 500 is given per biogas plant set-up on turn-key basis with three years' warranty for trouble free functioning. Turn-key fee is payable to corporate bodies, registered societies, non-governmental voluntary organisations and approved trained entrepreneurs.

— An additional turn-key job fee is also payable for biogas plants linked with sanitary toilets. Implementing agencies have been given the option to claim this amount for providing additional subsidies to beneficiaries linking their plants with toilets.

— Promotional incentive : An incentive of Rs. 50/- is payablee to village level functionaries for each plant actually supervised.

— Incentive for saving of diesel : The incentive scheme was initiated in December, 1991 for promoting saving of diesel oil by using biogas. The subsidy for installation of biogas plant of 6 to 10 cum capacity for this purpose has been fixed at Rs. 2500 in addition to an assistance of 50% of the cost limited to Rs. 2500 for purchase of conversion kit and gas storage balloons etc.

2.3 National Programme on Improved Chulhas, started in the year 1983, has the following objectives :

(a) Fuel conservation ; (b) Removal/reduction of smoke (c) check on de-forestation and environmental upgradation ; (d) reduction in durdgery of women and children from cooking in smoky kitchens and collection of fuel wood; (e) reduction in health hazards and cooking time ; (f) employment opportunities to the rural people.

2.4 The improved chulha programme covers beneficiaries of rural, semi-urban and areas with a preference to the beneficiaries belonging to SC/ST categories, people living in hilly areas, experiencing serious de-forestation, North-East and far-flung areas etc. The programme also covers community kitchens, hostels, hospitals, religious and charitable institutions, dhabas etc. The following pattern of subsidy is available:

(a) Fixed chulha : Maximum assistance of Rs. 50 with a minimum contribution of 50% of cost of chulhas ;

(b) (i) Portable chulha : General category is allowed 33% of cost of chulha, subject to a maximum of Rs. 50 (ii) SC/ST are allowed a maximum of 50% of cost of chulha subject to maximum of Rs. 75.

(c) Payment to Self Employed Workers (SEWs) for motivation, transportation, installation and management for a priod of one year is applicable at the rate of Rs. 20/- per chulha for fixed chulha ; Rs. 5 for portable chulha and Rs. 25 for community chulha. An incentive of Rs. 5 is also applicable on portable chulha for co-operatives, FPS, PDS etc. under the market orientation scheme.

2.5 The Programme is being implemented through State Govts., UTs, Non-Conventional Energy Development Agencies, State Agro Industries Corporations, AIWC, NDDB, and other NGOs through SEWs at grass root levels. SEWs are responsible for installation, repair and maintenance follow-up and feedback for a period of one year. Implementing agencies are provided Rs. 4 per chulha as organisational support, Rs. 2 per chulha for users education and publicity and Rs. 2 per chulha as organisational support to the Technical Backup Unit (TBU). This support is provided to the Implementing Agencies, State

Deptts. etc. wherever it is not provided by the respective states.These SEWs are engaged by the Implementing Agencies on contract basis assigning remuneraive and economic targets depending upon local conditions. Upto 31-12-1993, 1, 55 lakh improved chulhas have been installed.

2.6 Pointing out delay in disbursement of subsidies to National Programmes on Biogas Development and Improved Chulhas, the All India Women's Conference stated in a Memorandum furnished to the Committee as follows :

"As is the practice Ministry of Non-conventional Energy Sources releases the grant very late with hardly 5-6 months time for executing the entire financial year target that too only with 50% of the fund, hence the NGOs face a lot of difficulties.The crucial period of April-September, is wasted since they are not sure of the target allocation and the funds, the programme loses its tempo.

(b) To have successful implementation of the programmes we have to involve the community-especially women and in this we have to take into consideration the various factors like harvesting time, sowing and festival time etc.

(c) Alternatively the Government should permit the NGOs, the period of 12 months to execute the programmes from the date of the release of the funds and not insist on the completion on the target latest by the end of financial year i.e. 31st March.

(d) The NRSE programmes must be made 'sustainable' by giving a minimum core organisation support for at least five years to agnecies such as AIWC for successful planning and implementation, through their branches/other grass roots NGOs all over India, without a break or discontinuity owing to late sanction and release of funds as is often the case now."

2.7 Regarding delay in disbursement of subsidy, MNES had informed that it had initiated steps to release central assistance in advance to the State Government and nodal agencies to enable them to disburse subsidy immediately, on commissioning of plants. Enquired how the Ministry ensured that there was no delay on the part of the State Government or nodal agencies in releasing subsidy grants to

NGOS and to the intended beneficiaries, a representative of the MNES stated :

"About subsidy, from the Central Government to the State Government there is no delay. Payments are made in advance and settlements are done in the subsequent year. Of course, the period varies from State to State. When there was over-achievement of target, we were not in a position to envisage in the beginning what would have been the expenditure for over-achievement. Accordingly, we were not in a position to make out in the Budget outlay. Therefore, over-achievement of target is taken care of in the subsequent year and it take four to six months to reach the NGOs when the releases are made to the State Government and the nodal agencies. But with regard to normal programme, whenever problems are noticed, they are attended to."

2.8 In this connection, the Secretary, MNES added :

"There could be a number of instances where delays have taken place after we have released funds from implementing agency to the district agency and from the district agency to the block. Particularly, the NGOs are often suffering because it has to be routed through the agencies. Wherever we receive complaints, we try to take action."

2.9 In a post evidence reply, the MNES furnished information on typical instances received from a few major states and nodal agencies regarding disbursement of subsidy with reference to National Project on Biogas Development catering to family type biogas plants and National Programme on Improved Chulha :

1. National Project on Biogas Development :

(i) *Punjab* : State Directorate of Agriculture has stated that financial sanction for first instalment of advance funds for the year 1993-94 was received in the State Nodal Department on 24.9.1993 and funds were released to different Districts on the same day. In turn authorities of the district Roper released central subsidy for biogas plants to the beneficiaries in village Rajemajra on 18.11.1993. It means that within the month of receipt of funds from the Government of India subsidy has been disbursed.

(ii) *Andhra Pradesh* : The State Nodal Agency, namely Non-conventional Energy Development Corporation of Andhra Pradesh (NEDCAP) has informed that the first instalment of advance funds was received on 14.11.1994, but they had started releasing central subsidy from their own resources in the months of July/August, 1994.

2. National Programme on Improved Chulha :

(i) *Gujarat* : Gujart Energy Development Agency (GEDA), Vadodara received the first instalment of advance subsidy on 6.7.1993 and released advance subsidy on 4.8.1993 to an NGO namely Sarvodaya, Khadi Gramodyog Pragati Mandal, Mahsana for distribution to 750 beneficiaries.

(ii) *Haryana* : Department of Women and Child Welfare, Govt. of Haryana has released subsidy to District Ambala on 15.12.1993 out of the funds received from MNES in two instalments in July, 1993 and February, 1994. Subsidy amount was disbursed to beneficiaries in village Hangila and Sahazadpur (District Ambala) on 29.3.1994.

2.10 An evaluation survey of household biogas plants set up during Seventh Five Year Plan conducted by an independent agency namely. National Council of Applied Research, New Delhi in 20 States and Union Territories covering a sample of 27,000 biogas plants owning households has summarised the distribution of beneficiaries by time taken to get the subsidy released as follows :

Time (days)	% households
Upto 15	16
16-30	27.2
31–45	10.3
46-60	10.9
Over 60	16.8
Before completion of plants	12.9
Not taken	5.9
Total	100.00

Thus by the large the households have reported to have received Central Subsidy in time. It has also been confirmed in the above mentioned survey that as many as 60% of the beneficiaries had no complaints regarding subsidy payments.

2.11 Pointing out that Ministry of Non-conventional Energy Sources releases only 50% of the funds, AIWC pleaded that the consumers can be benefitted only when 100% of the funds is released as NGOs do not have their own funds and that NGOs can protect the interests of their staff and also finish the targets assigned only when 100% grant is released.

2.12 To a query whether the Ministry has any difficulty in releasing the grants in advance and in one go and how it is proposed to strengthen and NGOs unless necessary support is provided to them, a representative of MNES stated during evidence :

"About the advance release of funds in biogas and improved chulha programme, we are giving 50 per cent advance. Because of our past experience with the State Governments which has been that for getting utilisation certificate and audited statement of account used to take many year, we release balance 50 per cent on receipt of them. Therefore, I would submit to the Committee to consider that 50 per cent is good enough a percentage. If we extend it to 100 per cent, we will fail to get the utilisation certificates. In fact, the Comptroller and Auditor General of India in its report for the year 1994 has clearly brought out this fact. We feel that 50 per cent is a good enough advance."

2.13 It was pointed out by AIWC that usually the NGOs are treated as competitors and not as partners. It was suggested by AIWC that various energy committees at local and state level should include the members from the implementing agencies at grass roots level.

2.14 Asked about the Minsitry's comments on the above observation and enquired whether it is not desirable to include representatives of NGOs and implementing agencies in such committees, the Secretary, Ministry of Non-conventional Energy Sources stated during evidence:

"I would like to mention that we work very closely with NGOs and as a proof of that the main Advisory Committee of the Ministry

which was instituted last year has got NGOs. Then in our Ministry, we have a special Advisory Committee of NGOs presided over by the Minister of State. Then in our Coordination Committees which are there in the States, we have recommended to the State Governments to include NGOs. We are working very closely with them."

2.15 The Sub-Committee desired the MNES to specify broadly the nature of complaints and suggestions received by it and action taken there on during the last three years. In reply, the MNES indicated the following :

Biogas : Action taken on the feedback reports by the Ministry during the last three years relates to : improving the quality construction and maintenance of plants through training for masons, fabricators, entrepreneurs as well as government functionaries ; providing maintenance manuals to functionaries ; increasing awareness by wider publicity ; enhancing the financial stake of beneficiaries. Efforts have also been made to improve availability of institutional financing by involving NABARD & RBI.

Improved Chulha : The problems related mainly to unsuitability of models, lack of maintenance support and inadequate awareness. The Ministry have directed the technical back-up units to develop models suitable to different purposes and areas, enforce maintenance warranty to be given by SEWs and organise larger number of training programmes.

2.16 With regard to quality standard for bio-gas plants, the MNES informed in a note that :

"Bureau of Indian Standards (BIS) has formulated a standard code of practices for construction of biogas plants and also specifications for biogas stoves and that implementing agencies are required to ensure following of these standard specifications."

2.17 On improved chulhas Bureau of Indian Standard has reportedly developed specification on "Solid Biomass Chulha Portable metallic" IS 13152 (Part 1) 1991 and chulha manufacturers are to get BIS certification. In case of fixed chulhas the implementing agencies are required to ensure standard specifications through Technical Back-Up

Units. The MNES has stated that refresher training courses are being organised for self-employed workers (SEWs), who construct fixed models of improved chulhas at the houses. The implementing agencies are required to adhere to standard specification and giving of one year free warranty by SEWs.

2.18 Pointing out that quality standards for bio-gas should be given by the manufacturers, Dr. Vitthal Rajan, Director, Deccan Development Society, Hyderabad stated during evidence :—

> "I think, if the manufacturers follow these standards then it would be an excellent practice. Today what is happening, there are small manufacturing units.There is wide variation in everything not only in the gas but in the quality. In fact, I do not blame the manufacturers because there is no real commercial offtake in all these things."

2.19 The Ministry of Non-conventional Energy Sources informed in a note furnished to the Sub-Committee that as suggested by MNES, many state nodal departments and implementing agencies had developed a guarantee card system for bio-gas plant to enforce quality control and provide free maintenance services at least for the first three years. According to some NGOs/experts the guarantees are given only on paper and there is no follow up ; the complaints are not attended to promptly, if at all the service is available.

2.20 Asked about the Ministry's comments on this observation, a representative of the Ministry stated during evidence :

> "We had reommended that a minimum of four visits are required to be undertaken every year within three years by those who are giving guarantee. But it has been reported that in a year on an average two visits are undertaken. Nodal agencies and corporate bodies like Khadi and Village Industries Commission have stipulated two visits to be made in a year."

2.21 Enquired whether consumers are satisfied with the

arrangement for after-sales-service regarding biogas plants, the MNES stated :

"MNES have been making efforts for arranging post installation services. However, with rapid expansion of the programme, there is a need to strengthen the arrangements particularly in the private sector."

2.22 It was pleaded by AIWC that NGOs should be involved in the monitoring and inspection of bio-gas plants. Asked about the present position regarding involvement of NGOs in this task, a representative of MNEs stated :

"Wherever NGOs are implementing bio-gas programme, they themselves are monitoring and reporting. But NGOs are not involved in reporting on work done under the aegis of the State Bodies."

2.23 Making a suggestion for integration of different schemes for success of bio-gas units, Dr. Vitthal Rajan, stated in a post evidence reply as below :

"Bio-gas units work easily in this country provided badly chaffed agricultural waste is not mixed up with gobar. However, the major problem is that the poor who can benefit from gobar-gas do not individually possess enough head of cattle. Cooperative bio-gas units should either be set up on a commercial basis with the buying of gobar and selling of slurry with free supply of gas for lighting and cooking during the initial extension stages, or it should be made part and parcel of Joint Forestry regeneration of degraded forest land, where bio-gas schemes and stall-fed cattle are integrated into forest management scheme. It is only through such integration of different schemes that the benefits of each can be made available to the poor."

2.24 With regard to improved chulha, MNES has reportedly suggested to the implementing agencies to develop a guarantee card system and enforce quality control measures. According to MNES consumer are reported to be generally satisfied, but with rapid expansion of the programme there is a need to further strengthen after-sales arrangement under private sector.

2.25 Another problem with regard to biogas plants was inadequate support from financial institutions. On the question of availability of

institutional financing to the consumers of non-conventional energy devices/systems, MNES stated that the matter was taken up with RBI and NABARD in arranging loan for both co-operative and Commercial Banks.

2.26 Asked whether the Ministry is satisfied with the present position regarding availability of loan for NCES devices/systems, a representative of the Ministry stated during evidence :

> "During the last two years, the problem of bio-gas plants was reviewed and it was learnt that over a period of time, the contribution of banks has come down and, therefore, the matter was taken up with the Finance Ministry and the Reserve Bank of India and they, in turn, have issued directions during last year to scheduled commercial banks.The State Bank of India had confirmed in writing that the applications referred to their Branches would be taken care of and within three months, they would ensure that they are either accepted or rejected. It came to our notice that if a beneficiary has availed a subsidy, he will be debarred from getting loan from any other subsidy programme. With regard to bio-gas, that condition has been waived off. Now the banks' contribution to bio-gas plants would increase."

2.27 In a memorandum furnished to the Sub-Committee, Prof. A.K. Barua, Head, Energy Research Unit, Indian Association for the cultivation of Science, Jadavpur, Calcutta felt that "it would be better if improved chulha programme is shifted to the Department of Rural Development as it is implementation strategy and financial resources which are standing in the way." Reacting to this suggestion, the MNES stated in a note as follows :

> "It was MNES which formulated and launched a National Programme on Improved Chulhas in 1985-86, even though many other departments including Rural Development has made sporadic efforts in this regard in the past. Since then the rate of installation of improved chulhas has increased from 5 lakhs to 25 lakhs per annum. The MNES is giving a sharper focus and making concerted efforts in developing new models and popularising them. About 10% of the annual budget of the Ministry is earmarked for this programme. MNES has given a new direction to this programme in 1993-94 by adopting a market orientation strategy. Seventeen

technical back-up units have already been established to provide R & D and technical support. As a result of the continuous S & T inputs, about 100 models of improved chulhas have been developed. The programme is reviewed annually by a high powered body namely Commission for Additional Sources of Energy (CASE). Further, MNES has created a separate improved chulha division headed by a technical director for co-ordination and over-seeing the programme. The MNES feels that Department of Rural Development may not be in a position to provide similar focussed attention and priority as being given by a smaller Ministry i.e. MNES."

2.28 Regarding the question of shifting the Bio-gas programme to the Ministry of Rural Development, the MNES stated as under :—

"In the past the biogas programme was looked after by the Ministry of Agriculture but with creation of Department of Non-conventional Energy Resources (Now Ministry of Non-conventional Energy Sources), in September, 1982 and transfer of programme, the pace of implementation has grown to a level of 2.00 lakh biogas plants per annum instead of about 10,000 plants in 1980-81. This quantum jump has been possible only due to desired focus provided by this Minitry. It is note-worthy that biogas technology *prima-facie* appears to be simple but it requires a multi-disciplinary high level scientific input involving microbiological, bio-chemical, engineering, agricultural, etc., expertise. As a result of concented efforts made by MNES four new models have been developed and extended. Seventeen Regional Biogas Development & Training Centres (RBDTCs) have been established to provide training and technical support.

The Minsitry is providing about 30% of its annual budget for biogas programme and new initiatives have been taken in 1993-94 by adopting a market oriented strategy. The programme is reviewed by a high powered body, namely, Commission for Additional Sources of Energy (CASE). Further, MNEs has created a separate Biogas Division headed by a technical director. Therefore, the Department of Rural Development may not be in a position to provide similar focussed attention and priority as given by a smaller Ministry i.e. MNES."

III. SOLAR PHOTOVOLTAIC SYSTEMS

3.1 Solar Photovoltaic Technology covers sunlight directly into electricity in an environmentally clean and reliable manner.The photovoltaic technology has emerged not only as a power source for small application such as lighting water pumping, telecommunication etc. but also as a medium size power source for centralise applications at village level. The solar photovoltaic programme has been major technological development and widespread field demonstration of various applications in India. The country has developed a strong research base as well as indigenous production and manpower capabilities in the entire area, starting from silicon material to solar cells, photovoltaic modules and complete system for various applications.

3.2 The Ministry of Non-Conventional Energy Sources has been implementing solar photovoltaic programme for the demonstration and utilisation of photovoltaic systems for various applications.The most common system being deployed under this programme are portable solar lanterns, domestic lighting systems, street lighting system and community lighting/television system. The number of PV lanterns/ domestic lighting systems/PV street lights installed upto December, 1992 exceed 57,000.

3.3 In July 1993, MNES gave a market orientation to the implementation strategy of the its SPV programme with the aim of achieving rapid commercialisation of the SPV technology. Separate schemes i.e. market oriented scheme and socially oriented scheme were introduced. Under the socially oriented scheme, subsidy is provided for meeting 50% of ex-works costs of SPV systems. In case of solar lenters, however, the subsidy is fixed at Rs. 2,000/- each. The socially oriented scheme covers all categories of beneficiaries in the special category States/UTs, desert areas, islands, hilly regions and certain categories of beneficiaries in other regions. The market oriented scheme is implemented through IREDA by providing soft loan assistance for various types of SPV systems.

3.4 Under the new strategy and action plan, one lakh number of solar lanterns initiated for both socially oriented and market oriented schemes. 30,000 solar lanterns have been distributed so far under the

programme. Over 60,000 solar photovoltaic systems with total capacity of 4 MW have been installed in the country. The socially oriented programme specially meant for designated areas and provide subsidy of 50% of the cost. SPV systems with total capacity of 25 MW are proposed to be installed during the VIII plan period.

3.5 The earlier practice of direct procurement of solar photovoltaic modules by MNES and their subsequent allocation to the States for completing the systems for installation in the field has been discontinued from 1993-94. The new method of procurement of complete SPV Systems directly by the State implementing agencies/ NGOs would eliminate the problems encountered earlier in coordination for procurement of Balance of Systems (BOS) components.This measure would thus help in controlling large inventories and overstocking. Also the suppliers warranties against manufacturing deficiencies can be better enforced through the new method of procurement. However, the SPV modules from subsisting MNES orders are being utilised mainly for small village level power plants.

3.6 According to MNES the high capital costs of SPV systems, high replacemnt costs of certain components like batteries, lamps etc. and inadequate after-sales service and maintenance infrastructure for the SPV systems are the major problems/difficulties faced by the consumers in the use of the solar photovoltaic systems.

3.7 During 1994-95, the Solar Lantern Programme, which is now the major component of the SPV lighting programme, has been further expanded and modified. The scheme for 1994-95 reportedly lays emphasis on ensuring after sales service by manufacturers, training to the beneficiaries, preference to the samples tested and certified by the Solar Energy Centre, involvement of the NGOs and monitoring and evaluation of filed performance.

3.8 Pointing out the high cost (Rs. 4500-5000) of solar lanterns under the market oriented schemes, Prof. A.K. Barua, stated in a Memorandum as follows :

"It is difficult to imagine that a poor man in a village will purchase lantern at such a high cost. The programme has virtually no future unless there is very substantial subsidy so that it is within the purchasing capacity of the villager. To bring down module cost

there has to be intensive R & D. Selling a few lanterns to rich farmers in villages or to people in urban areas is not the real purpose of this programme."

3.9 Prof. A.K. Barua stated in this connection during evidence :

"All the advanced countries are doing intensive R & D For the last one or two years, there is no R & D. MNES thinks privatisation is the answer to all problem which is the basic problem."

3.10 Asked to indicate the comparative picture of performance in terms of installation of SPV systems prior to and after commercialisation, the Secretary, MNES stated during evidence :

"With regard to the SPVs, during the financial year 1992-93, if we take the domestic lights which include solar lanterns, 3043 were installed as per the information we received from the nodal agencies. In 1993-94, 17,647 were installed. In 1994-95, as per the reports received by us, till the end of December, 15,309 were installed and our expectation is that by the end of March, 30,000 domestic lights and solar lanterns would have been installed."

3.11 In a post-evidence reply, the MNES furnished a comparative table for the PSV systems installed during 1992-93, 93-94 and 94-95 as given below :

S. No.	SPV Systems	1992-93	1993-94	1994-95 (as on 31.1.95)
1.	Street Lighting Systems	788	1,240	1,000
2.	Domestic Lighting Systems & Solar Lanterns	3,043	17,647	18,384
3.	SPV Power Plants (Kwp)	143	122	39

3.12 According to BAIF Development Research Foundation, Pune, till recently all programmes were controlled either by the Ministry of Non-conventional Energy Sources or by State Nodal Agencies. There are very little interaction with private sector. As a result, technology development has been slow and there has been very little or no competition in the market. It has also resulted in limited supply of products, that too in urban market.

3.13 Regarding development of cost effective SPV technology, Dr. Vithal Rajan stated in a post-evidence reply :

"An active search must be maintained to identify promising PV technologies, and indigenise the same, to prevent foreign monopolies from graining control of such technologies. The most recent development pioneered by Prof. Martin Green, New South Wales Univeristy, Australia where he uses metallurgical grade silicon to combine the benefits of amorphous and crystalline silicon technology is a case in point. The Government should consider establishment of an independent PV Unit in collaboration with interested leading Indian business houses, already possessing relevant expertise, to take advantage of such state of the art technologies. It may not be possible to capture commercial benefits through State controlled enterprises such as CEL.

3.14 Enquired about present position regarding development of cost effective technology in the field of solar photovoltaic, the Secretary MNES stated during evidence :

"With the larger programme, with the larger production and open market system, new technologies are coming in. The cost is also coming down. During the last year or so, the cost of SPV has come down from 225 peak Watts to 175. During the last year and a half, the cost of solar lantern has come down from Rs. 5500 to Rs. 4200 and the recent quotations received by us show that it has come to as low as Rs. 3900. But I must also inform the hon. members that the thin-film technology in SPV has been talked about for many years. It is our feeling that very soon, within the next year or so, there would be a breakthrough in the thin-film technology which will bring the cost considerably. Already we have received information about this. Some of the big manufacturers and persons have developed this technology. They had discussions with us. So, we do think that there would be a breakthrough. The dreams of large-scale units in the rural areas would definitely come true with this new technology. This is our expection."

3.15 In the opinion of Dr. Vithal Rajan to familiarise the rural community with solar lanterns it is important that the lanters could first be used as light traps in integrated pest management. The value of crop saved in tens of crores reduces to insignificance the cost of the solar

lanterns. Such lanterns can then have multi-purpose use in rural areas; crop protection, literacy and adult education, credit management etc. Explaining this in details the expert stated in a Memorandum furnished to the Sub-Committee as follows :

"Recently a group of NGOs, and the State Department of Agriculture, Government of Andhra Pradesh, have carried out very successfully a pest control programme without using any pesticides to control the voracious polyphagous pest, the red-headed hairy caterpillar (Amsacts albistriga) which destroys several crores worth of agricultural crops during the kharif season in the Telangana region. Experiments over the last four years using light traps have shown that a proper use of electrical light traps can bring down the area under crop damage to around 3.5% of sown area, whereas on untreated areas, 38% of cropped lands have to be resown. These results form a key study of the National Workshop on the Non-Pesticidal Management of Pests, held at National Academy of Agricultural Research and Management, Hyderabad, September 20-22, 1994. A key problem encountered is the uncertainty. If electrical supply, since current failure during heavy showers. It is at such times, that moths have to be trapped. Secondly, light traps cannot be used in villages without electric current.Thirdly, cables stretching even for a kilometer have to be taken from plug-points to open fields. The moths are particularly attracted to the blue wave-lengths of light and hence trials with portable, safe, solar lanterns should be extremely successful in controlling pest populations. If this is proved to be so, then widespread use of the Kuteer Deepam Scheme becomes extremely viable since hundreds of crores of worth of crops will be saved through the use of this technology for such productive purposes."

3.16 Emphasing the need for securing metal hybride batteries for solar lantern, Dr. Vithal Rajan stated in a post evidence reply :

"Indian PV lanterns do not as yet have metal hydride batteries which last from 1000 to 1500 cycles. This technology must be secured in the country. Metal Hydride batteries required minimum maintenance and will not lead to the kind of management problems faced by wet batteries."

3.17 Regarding constraints faced by consumers of solar lantern, Shri S.P. Gon Chaudhuri, Advisor, Nb Institute of Rural Technology, Tripura stated during evidence :

"Solar lantern is a hi-tech area. The manufacturers do not have a network for maintenance of the system. At least 5,000 solar lanterns have been sold to Arunachal Pradesh from Delhi. Unless there is a strategy of the Government regarding replacement of the battery or something like that, the customer will suffer. And the entire programme, particularly photovoltaic, will suffer. It is an abmitious programme. The manufacturers are interested in the subsidy part. They take the subsidy portion immediately. After that, they forget about the consumer portion of maintenance of the system. A system of Rs. 2,000–3,000 is never maintained."

3.18 Making specific recommendations for protecting consumer interests, Dr. B.C. Jain, President, Ankur Energy & Development Alternative, Baroda stated in a post evidence reply as follows :

(i) Whenever Government of India provides certain cost sharing/ subsidy for systems based on new and renewable sources of energy the beneficiaries (i.e. consumers) may be clearly informed of their privileges as also the obligations of the suppliers so that they could ensure that appropriate support is provided by the suppliers. Information about specific mechanisms that could be used by the consumers for redressal of their problems could also be given to them in vernacular languages (in writing).

(ii) Whenever the orders are placed by any State/Central agencies or purchases are made by them under such schemes, the manufacturers may be required to clearly define product capabilities as well as warranties and guarantees applicable to such supplies.

3.19 Shri S.P. Gon Chaudhari stated in a Memorandum furnished to the Sub-Committee that it is a wrong idea that non-conventional energy systems do not require operational and maintenance cost. There is a need to remove this mis-understanding. He pleaded that declared life with operational cost of non-conventional energy gadgets should be indicated in the catalogue of the item so that consumer can take decisions on merit basis.

3.20 Enquired whther the Ministry agreed with this suggestion and how the Ministry proposed to implement the same, the Secretary, Ministry of Non-conventional Energy Sources stated during evidence:—

"The Ministry is very grateful for the suggestions made by the Committee in respect of this particular issue. It is a fact that generally in our market the manufacturers generally do not give all the specifications. So, we have decided that we are going to now recommend to the nodal agencies that whenever they procure they should put in these things and through nodal agnecies and through manufacturers we are going to recommend to them that they should clearly state alongwith their operational instructions, the expected life, the performance limitations, the requirement of replacement and the other instructions with regard to operation and installation. So, we are definitely going to do this and in future we hope that the manufacturers will bring out these things very clearly. We do agree that there is a misunderstanding that there is no need for maintenance. But some maintenance is there and replacement is there. The battery has to be replaced after two or three years."

3.21 The Ministry of Non-conventional Energy Sources issues specifications in respect of systems which are to be supported under SPV Programme. Efforts have been initiated to test and certify the SPV systems for verification of their claims, meet the MNES specification.

3.22 Asked about the reasons for not laying down standards regarding SPV systems, the Secretary, Ministry of Non-Conventional Energy Sources stated during evidence :

"With regard to the standardization, there are certain countries where the PV system has been standardized. We are yet to develop our own standards. Once these standards are developed and approved by the BIS, we will encourage the industry and the consumers to go in for the sytems to the extent. Our involvement is there in the programme. This depends to a certain extent on subsidy. If it is that we are giving subsidy, to some extent, we would definitely insist that there should be standards. We will insist that standards should be followed. This is the only way we can encourage the standard to come in. We cannot make it madatory across the board."

3.23 Enquired how much time the Ministry of Non-Conventional Energy Sources needs to standardise SPV system, a representative of the Ministry stated :—

"There has been, perhaps, a decade of experience with regard to the PV modules and the systems. Actually, the effort to improve the product by laying down some standards of performance has been there right from the initial stages. For instance, when in 1985-86 itself when the first batch of street lights were being installed, the PV modules were required to meet some minimum performance in terms of power output and also maintenance. At that time, when the new technology had been brought in, we were asking to give guarantee for three years. Now the three year period has been increased. Today, we are asking guarantee for five years on the PV modules. If I can just mention in a different manner, the module basically is a component which does not normally fail because it is a fully encapsuled steel product. Most of our modules made in India meet the requirements.The failures that arise in the field are actually on account of other components which go in the system. It could be the battery or the land or other electrical components. And, of course, there are institutional problems of maintenance and lack of trained manpower. In many places, such issues are also there. Sir, but the exercise for establishing standards is continuing. For solar lanterns, there is no BIS standard.....Basically, standardisation is done by the Bureau of Indian Standards. They prepare draft standards and circulate them to all the concerned people. I expect that in another two years' time there will be Indian standards available for photovoltaic modules".

3.24 Regarding standardisation of solar lanterns, an expert pointed out that performance parameters of solar lanterns is based on Delhi climate and that its performance is bound to vary in other regions having different climatic conditions like North-Eastern States. This results in dissatisfaction among the consumers of these states.

3.25 To a query whether it is not desirable to define performance parameters with reference to climatic conditions, a representative of the Ministry stated during evidence :

"It is a well-known problem with regard to the photovoltaic system. This has been brought to our notice by the State agencies which

have been implementing the Solar Lantern Programme. There are two kinds of performance parameters that need to be laid down. Performance parameters for testing and standardisation are required to be done by industry as well as by the testing Institution. We have to define the performance parameters. That is already being incorporated in the solar lantern specifications. The other thing is for the consumer. It depends on the condition of the area where he actually uses the system. Partly, some information is provided by the manufacturer. We do request the manufacturers to inform the consumers how the system will perform in different geographical regions in the country."

3.26 Asked whether Ministry of Non-Conventional Energy Sources plays any role to see that after-sales services are provided by the manufacturers/suppliers of SPV devices/equipment in regard to subsidy driven schemes as well as commercial schemes, the Ministry of Non-Conventional Energy Sources stated in a note as under :

"The state implementing agencies have been directed to ensure that the responsibility for providing the required after-sales-service are taken up by suppliers and adequately covered under the Agreement/Contracts."

3.27 To a query whether the consumers of SPV systems are satisfied with the arrangement for after-sales-services, the Ministry of Non-Conventional Energy Sources stated in a note that feedback on the after-sales-service provided by the manufacturers is awaited after introduction of the new policy during 1993-94.

3.28 Enquired whether there is no system in the Ministry to get regular feed back, the Secretary, Ministry of Non-Conventional Energy Sources stated during evidnece :

"As far as the SPV Programme is concerned, we are getting feed back from the nodal agencies mainly in respect of schemes which are being subsidised by us and implemented by them. We are asking the nodal agencies and the manufacturers to supply us information with regard to their installed capacity, production and sales so that we could get some idea as to how much is being sold by the manufacturers in the free market and also to other agencies like DOT etc. We are gathering this information."

IV SOLAR COOKER AND SOLAR WATER HEATERS

4.1 Solar cooker is a device which cooks food with the help of solar energy, and can save substantial amount of LPG, kerosene and electricity in semi-urban and urban areas. It also acts as an oven-cum-cooker. Apart from daily meals being prepared by the housewife, it can be used for baking and rosting etc. such as preparation of ghee from butter, kheer, cakes, rosting of ground-nut, basin and sujee etc. Out of the various types of solar cookers developed in past, box type has been quite popular among the people (especially in urban and semi-urban area). It can cook four items at a time within 2-3 hours depending upon the availability of sunshine and the type of recipe being prepared. The programme on solar cooker was launched during 1982-83. There are about 3.4 lakh solar cookers used in the country.

4.2 A new strategy with regard to solar cooker has been evolved aiming at adoption and speedy commercialisation w.e.f. 1.4.1994. Under this programme, it was planned to give a free hand to manufacturers & market intermediaries to promote it among the public. The financial incentives to buyers and manufacturers will be provided in terms of soft loan and tax benefits apart from sale tax and excise duty exemptions on the product manufactured. Publicity through newspapers and other media have been initited by the Ministry at large scale. Demonstration and training programmes for users and artisans are being organised by state nodal agencies.

4.3 Heating of water by utilising solar energy is a well known established technology in many parts of the world including India. In India, several types of solar water heating systems have been developed by various research institutions as well as private industries. These systems have become popular not only for domestic use but also for large establishments like hotels, hostels, hospitals, Governmeent buildings, industries such as textiles, papers, food processing, dairies etc. During the year 1993-94 a new strategy has been evolved to promote the marketing of solar thermal devices. Under this strategy the cash subsidy for solar hot water system has been withdrawn and financial assistance to users and manufacturers is being provided through IREDA on soft terms. Instituional users can also avail of 100% depreciation tax benefit. About 2.54 lakh M^2 Collector area has been

installed in the country for various domestic and industrial applications. A provision in municipal law is being made for mandatory installation of solar water heating systems in functional buildings. All State Governments have been requested to issue directives to local bodies under their control to extend this decision to buildings in private sector by making suitable provision in building bye-laws.

4.4 Till the withdrawal of subsidy on solar water heating system the programme was being implemented by MNES through State Nodal Agencies. This programme has now been commercialised w.e.f. 1.7.1993 and the systems are being installed in the country directly through market forces. Any problem and actual difficulties faced by consumers/ promoters of solar thermal systems were directly dealt by the state agencies till the subsidy was available on such systems in consultation with MNES if necessary. Under the commercialisation strategy of MNES on SWHS the manufacturers are directly responsible for after sale services and thus all the consumer problems related to the systems are being handled by respective manufacturers. As per the experience, some of the problems which are generally faced by consumers/promoters are listed below :

— Lack of beneficiaries awareness in operation & maintenance ;

— System designing & installation problems of promoters in case of solar thermal systems ;

— After sale service ;

— Insufficient sales outlets of solar cookers ; and

— Installation/sale of sub-standard systems.

4.5 Emphasising the need for reintroduction of subsidy to solar cookers, Prof. A.K. Barua stated in a Memorandum furnished to the Sub-Committee as follows :

"This device has a very huge potential in rural India where enough time is available for cooking. This will also help in preserving trees and reduce use of kerosene. However, before this could have large scale use in rural India the subsidies have been withdrawn. A villager will/can not pay Rs. 1000–1200/- for a cooker. He would rather go for firewood, dry leaves or kerosene. Most probably the

sale of cookers will go down with withdrawal of subsidy. Selling solar cookers in urban areas is actually meaningless although some people are purchasing them for curiosity, status symbol and also due to advertisement by MNES. The subsidies must be reintroduced for the rural population. Their problems with the existing cooker (e.g. small size of bowls) must be attended to and consumer resistance eliminated."

4.6 Another expert Dr. Vitthal Rajan, stressing the need for redesigning solar cookers stated in a post evidence reply :

"Solar cookers must be redesigned taking into consideration the needs and conveniences of women who might use these cookers. Cookers may have to be designed specifically for different areas depending on local recipes and food needs. The design team must visit villages, and try out several models with local women before putting them on the market."

4.7 Regarding water heaters, the expert stated that system of rules must be created to enforce the maximum installation of black-body water heaters for urban application.

4.8 Making a suggestion that a system of awards/incentives must be established for engineers and building contractors for successful implementation of solar hot water system, Dr. Vitthal Rajan stated in evidence :

"It is my practial experience that by the time a person constructs his house the contractor or the architect will build the hosue in such a way that it is impossible for him to establish a solar panel without demolishing a part of what he has already constructed. In the process, he has to incur an extra Rs. 75,000/- or so. The simple thing is that you have to have water above six feet above the roof. The hot water should be separate. Even when the owner says that he wants solar heater, the contractor or architect will say that whatever is going on is all right. It is such a simple thing that the Government has not been able to take the contractors or architects into confidence or given them any award etc., who have installed more solar heaters in the city. So, I think, some sort of incentive should be given. However, that has not been done so far. As far as solar water heater is concerned, it is basically a question of

awareness. It is awareness for contractors, architects and house-builders which will help in its development."

4.9 Standard specifications have already been laid down by MNES for solar water heating systems and solar cookers which are approved by BIS. test facilities are also available at Regional Test Centres developed in the country. The subsidy driven programmes are being implemented through state nodal agencies which in turn ensure the quality of the product.

4.10 Regarding standards for solar cookers and solar water heaters, a representative of MNES stated during evidence :

"During the last few years, the MNES has been working closely with the Bureau of Indian Standards to establish standards and specifications for some commonly used products. These are parts which have been developed in the country through research efforts or by industries themselves and have been in use for some time. So, based on the experience that has been gathered and also on the basis of technical inputs that have been received from various quarters, standards have now been established in respect of solar cookers and solar collectors which are used in hot water system. These are already having BIS number. The test procedures are also laid down as a part of the standards. In order to carry out the tests, the MNES has established test facilities at the Solar Energy Centre and also in a few other places."

4.11 Regarding after-sale servies provided by manufacturers, Prof. A.K. Barua stated during evidnece :

"There is virtually no after-sales-service. Even in respect of a very good Company like BHEL for their Solar Thermal Systems, I do not think they give any guarantee. In our country, that culture is not there. The consumers are left on their own. Although the Solar Thermal System is a very old technology, a lot of things remain to be done. Further, we have to consider the life-time of the system. For example, if an equipment will serve for one or two years only, why will the consumers purchase such a system ? Because of this uncertainty, apart from the cost factor, people are not assured of what they are getting."

4.12 Enquired whether any system of gurantee cards has been introduced for items like solar cooker, solar lantern and P.V. system

batteries and solar water heting system, the Secretary, MNES stated during evidence :

"Most of these are market oriented. We have been giving some support from the Ministry through nodal agencies to the manufacturers to establish after sale centres."

4.13 Regarding solar thermal system, the MNES admitted in a note that after-sales services needed to be improved.

4.14 According to Dr. Vitthal Rajan, schemes involving non-conventional energy sources suffer more or less from the same problems encountered by other development schemes, in the sense, each of these schemes whether they deal with literacy, or with energy, or with afforestation, are mostly implemented in isolation from other schemes. Perhaps, the only way new technologies, such as those involved with non-conventional energy sources, can be introduced for use by poor communities, would be if such schemes are integrated into other development programmes, so that the target population can reap cumulative benefits of each programme impacting on the other.

4.15 Asked about the position regarding adoption of integrated approach to propagate renewable energy systems alongwith rural development programme and energy conservation programme, the Secretary, MNES stated during oral evidence :

"We appreciate very much the fact renewable energy system in the rural areas cannot be something distinct and something that stands on its own. It has to be fully integrated into the rural programmes and into a number of other programmes that are going on in the rural areas. I would like to give two or three examples in which we are trying to integrate it. If we do not integrate, then our programmes will not succeed. In regard to the Integrated Rural Energy Programme, we are trying to integrate it with the district plans. This has to integrate the bio-gas from human waste. This dialogue is going on. In respect of Indira Awas Yojana, we are having a dialogue. Work has already been started in respect of the Improved Chulha Programme and Solar Lantern Programme. In regard to the SPV programme, we have advanced quite a lot with the Rural Electrification Project. There are a large number of homes which are yet to get connections. Wherever it is possible for SPV lighting, they would go in for it particularly under the Kutir Jyoti Programme. The SPV pumping programme is being integrated with rural irrigation programme."

V. MASS AWARENESS

5.1 One of the major problems faced by consumers on non-conventional energy devices is stated to be lack of awareness.

5.2 According to BAIF Development Research Foundation, Pune even though there has been considerable achievements of renewable energy programmes from the point of view of awareness generation particularly in urban and semi-urban areas, there are remote villages where people are still unaware about technologies, their availability, availability of loan from banks etc. This indicates lack of enough awareness generation in existing non-conventional energy sources schemes.

5.3 Pointing out that mass awareness is a weak area, Dr. B.C. Jain, President, Ankur Energy and Development Alternative, Baroda, stated during evidence :

> "As far as awareness goes, I personally believe that, that is definitely a weak area. That has been one of the areas why the service had not been upto the mark by manufacturers. This inadequacy of service of manufacturers has partly come from the fact that the end users was not knowing enough as to his rights and his privileges. This particularly happened when there was an extensive support from the public exchequer."

5.4 Regarding training to the consumer or motivation for use of non-conventional energy system, Dr. Vitthal Rajan, Director, Deccan Development Society, Hyderabad stated during evidence :

> "There is no training of the people or motivation to use non-conventional energy system. They do not know how to keep their battery going. There was a total neglect on this front. All the training programmes organised by the Government have gone as a tamasha rather than as something that is going to be integrated into the community."

5.5 Asked about the type of publicity given and awareness raising compaigns conducted at various levels to propogate the non-conventional energy devices/systems, a representative of the Ministry stated during evidence :

> "The Ministry has taken up a planned and sustained publicity compaign to create awareness about renewable energy sources

among the people. One of the steps that we have taken is that we have produced some programmes which are being broadcast regularly on All India Radio and other regional stations. Secondly, we have produced some short duration video films which we are showing on Doordarshan. Thirdly, we are providing these quickies and short duration films to State nodal agencies and the State Governments which they can show in exhibitions and through closed-circuit TVs, etc.

We have also taken up publicity campaign through print media. From time to time we have been taking out publicity campaigns in the National Newspapers and the regional newspapers. The Ministry is also participating in a large number of exhibitions that are being held in different States. In addition, we are also supporting the state nodal agency for their participation in the local exhibitions which are being held at the state level or district level.

We are also providing mobile exhibition vans which have all the energy systems on a 50 : 50 ccost sharing basis. The Minsitry also take out from time to time some printed publications on different renewable energy technologies and programmes which we distribute through our state nodal agency.

We are also supporting state nodal agencies and state nodal departments by providing them some funds for publicising the energy system. The state nodal agencies in turn take out some pamphlets, provide material for publicity in the rural areas.

These are some of the steps that we have taken for publicising the energy system."

5.6 On the question of awareness raising campaigns in the rural areas, the Secretary, MNES stated during evidence :

"I agree much more needs to be done as far as awareness and publicity education are concerned. It is a fact that in the rural areas much more needs to be done with regard to biogas, chulha, lantern and some of the biomass system. We will definitely keep this in mind."

5.7 In this context, the Secretary, MNES further stated :

".....For a long time, there was a perception that this (Non-conventional Energy) was a programme of the Central Government because we took it on ourselves to say that we would like to do it as national progrmme and we would subsidise it. Now the subsidy elemnet has come down. For villagers, biogas is nothing new. A large number of plants have been set by the farmers on their own because they thought, it was a good thing. We have to come back to the situation where farmers and others can have some of these things on their own, of course, with some sort of assitance, may be bank loan. I would envisage that when subsidy is phased out and we are able to get self-employed workers and rural entrepreneurs to take up some of these things as profession and to provide some of the services and some of these products like any other product in the market. It would be a sustainable programme. Rural areas have gone for so many other items which have been pushed by individuals. It is high time that in a year or two, the State Governments should take full responsibility for it. We are moving towards that. In the last meeting wherein the Prime Minister also attended, the State Ministers for Renewable Energy also admitted, as soon as possible, there should be greater participation of the State Governments in these programmes."

5.8 Prof. A.K. Barua, Head, Energy Research Unit, Indian Assocaition for the Cultivation of Science, Jadavpur, Calcutta stated in a post-evidence reply furnished to the Sub-Committee that the panchayats must be very actively involved in the propagation of NRSE in village. It should be similar to the Literacy Mission.

PART B

RECOMMENDATIONS AND CONCLUSIONS OF THE COMMITTEE

1. The scope of examination of the subject "Non-conventional Energy Sources Schemes and the Consumer" is limited to those non-conventional energy schemes which are popular and applicable to individual consumers. The devices/systems covered under these schemes include bio-gas plants, improved chulhas, solar lanterns, solar photovoltaic systems, solar cookers and water heating systems. The Committee find that under the commercialisation strategy introduced in July 1993, any problem and actual difficulties faced by consumers in respect of systems installed under market oriented programmes are entirely left to be taken care of by market forces. The Committee feel that this is not a satisfactory situation. The market for non-conventional energy products is still at nascent stage and is supported by the Government through fiscal incentives/soft loans. Lack of awareness and information gap also constrain free play of market forces. The Committee, therefore, feel that the Government ought to play a positive role in protecting the interests of consumers. The Committee recommend that a study must be undertaken to ascertain problems of consumers an on the basis of outcome of the study, suitable remedial measures should be initiated to safeguard consumers' interests. The Committee also desire that Consumer Assistance Cell should entertain complaints during the guarantee period after the purchase of equipment and ensure that the suppliers attend to the complaints expeditiously and to the satisfaction of the consumers.

2. The National Project on Bio gas Development was started in the year 1981-82. One of the major problems faced with regard to implementation of biogas and improved chulha programmes is stated to be the delay in disbursement of subsidy. According to the All India Women's Conference (AIWC) the Ministry of Non-conventional Energy Sources releases grant with hardly 5-6 months time left for executing the entire financial year's target and that too only 50 percent of the funds. The Committee find from the information furnished by the MNES that there has been considerable delay by MNES as well as by some nodal agencies in release of

advance funds to implementing agencies. AIWC has explained its difficulties on this count. The Committee hope that the Ministry would look into this matter and ensure timely release of advance funds to NGOs and other implementing agencies to enable their smooth performance. The Committee recommend that an application for grant must be disposed of with the release of the 50% of grant within two months of the receipt of application.

3. The Committee observe that Bureau of Indian Standards has formulated a standard code of practice for construction of biogas plants and also specifications for biogas stoves. Many nodal departments and implementing agencies have reportedly developed a guarantee card system for biogas plants to enforce quality control and provide free maintenance services at least for the first three years. The Committee have, however, been informed by some NGOs/experts that the guarantees are given only on paper and complaints are not attended to promptly. The Committee recommend that efforts should be made to strengthen the arrangements for post installation services. AIWC has suggested in this connection that NGOs should also be involved in monitoring and inspection of biogas plants. The Committee agree with this sugestion and recommend the Government to take necessary steps to involve NGOs in this task. BIS may be asked to play an active role in ensuring that the standards laid down by it are observed faithfully. A task force comprising the representatives of the Government, NGO concerned and BIS may be formed in each States/UTs to monitor post-installation services during the guarantee period.

4. National Programme on Improved Chulhas started in 1983 is being implemented through State Govts./nodal agencie, AIWC, National Dairy Development Board and other NGOs through self-employed workers (SEWs) at grass root levels. Over 15.5 million improved chulhas have been installed till the end of 1993. Bureau of Indian Standard (BIS) has developed speficiation on "Solid Biomass Chulha-portable metallic." in case of fixed chulhas the implementing agencies are requried to ensure standard specifications through technical back-up units. The implementing agencies have reportedly been advised to develop a guarantee card system and ensure quality control measures. The Committee find that the problems faced by consumers relate mainly to unsuitability of models and lack of

maintenance support. The Committee desire that implementing agencies should be directed to promote the models suitable to different purposes and areas and give preference to user's choice while selecting a model for promotion in a given area. It should also be ensured that maintenance warranty given by SEWs is enforced. The task force suggested above may also play a decisive role in selection of models of improved chulha best suited for a consumer.

5. The Solar Photovoltaic (SPV) programme restructured in July, 1993 is implemented under two different schemes *viz.* Socially Oriented Scheme and Market Oriented Scheme. The Socially Oriented Scheme specially meant for designated areas provides subsidy of Rs. 2000 in the case of solar lantern and 50% of the cost in case of other systems. The market oriented scheme aims at rapid commercialisation of SPV technology and is implemented through Indian Renwable Energy Development Agency (IREDA) by providing soft loan assistance. The main problem faced by consumes under this scheme is high capital cost of SPV systems. Though, the cost of solar lantern is stated to have come down from Rs. 5550 to Rs. 3900 during the last one and half years, the Committee feel that the cost is still beyond the reach of consumers. The Secretary, MNES expressed optimism that with the reported development of thin-film technology by some big manufacturers the cost will further come down considerably. One expert has cited the most recent development pioneered by Prof. Martin Green, New South Wales University, where he uses metallurgical grade silicon to combine the benefits of amorphous and crystalline silicon technology. The Committee urge that appropriate measures should be initiated for exploitation of state-of-the-art technologies which aim at cost reduction and to ensure large scale use of SPV systems.

6. In rural areas, solar lanterns can have multi-purpose use such as lighting, crop protection and literacy and adult education. In Andhra Pradesh, a successful pest control programme is stated to have been carried out using electrical light traps. According to one expert, solar lanterns should be extremely successful in controlling pest population. If this is proved to be so, the cost of solar lanterns in relation to the value of crop saved will be insignificant. The Committee desire that experiments of this type should be intensified and results,

if found positive should help to propagate solar lanterns for multi-purpose use.

7. The other major deterrent in the popularisation of solar lantern /SPV systems is stated to be high replacement costs of certain components like batteries, lamps etc. Indian PV lanterns reportedly do not, as yet, have metal hydride batteries. One expert who deposed before the Committee has opined that metal hydride batteries last from 1000 to 1500 cycles, require minimum maintenance and will not lead to the kind of management problems faced by wet batteries. The Committee hope that Governmentwill consider this matter and initiate suitable steps which will result in bringing down the maintenance cost of SPV systems.

8. There is a general impression that non-conventional energy items do not involve operational and maintenance cost. In actual use, these devices do require maintenance and replacement of certain parts. The Committee feel that this misunderstanding ought to be removed. Conceding this fact, the Secretary, MNES assured during evidence that suitable instructions will be issued and manufacturers will be required to clearly state alongwith operational instructions, the expected life, the performance limitations, the requirement of replacement and maintenance. The Committee would like to be informed of the action taken in this regard.

9. The Committee also desire that with regard to systems/ devices for which subsidy is provided by the Government, the beneficiaries should be clearly informed of their privileges as also the obligations of the suppliers so that they may ensure that after-sales service is provided by the manufacturer/ supplier. The Committee also recommend that information about specific mechanism that could be used by the consumers for redressal of their problems must also be given to them in vernacular languages. The Consumer Assistance Cell established by nodal agencies should also take steps to educate consumers through pamphlets and demonstrations.

10. According to Secretary, MNES there are certain countries where PV system has been standardized. In our country standard for PV system is yet to be developed. Standards for PV modules in our country is expected to be available in another

two years' time. The Committee trust that the MNES will take up the matter with the Bureau of Indian Standards and ensure that standards for PV systems are developed soon.

11. Inadequate after sales service and maintenance infrastructure for SPV systems are the other major difficulties faced by the consumers in the use of SPV systems. The Committee observe that in respect of subsidised programmes, the state implementing agencies have been directed to ensure that the responsibility of providing the required after sales service is taken up by suppliers and adequately covered under the agreement/contracts. In respect of market oriented programme, the question of after sales service is entirely left to the market forces. The Committee regret to learn that the MNES as yet has not received any feed back with regard to manufacturers' installed capacity, production, sales, after sales service, etc. It appears that only after the matter has been taken up by the Committee, the MNES is trying to collect information in this regard. The Committee urge that there must be an inbuilt mechanism in the Ministry to come to know of the problems of consumers contemporaneously and get regular feed back to enable timely remedial action.

12. This Committee find that though standards have been established by BIS for solar sookers and solar collectors used in hot water system, installation/sale of sub-standard systems is admittedly prevalent. There is also reportedly no system of warranties for solar cooker, solar water heating systems and solar lanterns and batteries. Having given market orientation to these devices, the MNES seem to remain unconcerned about the problems of consumers. The Committee are not happy with this situation. The Committee stress that the Government should look into the problems indicated above and take immediate corrective measures.

13. One of the major problems faced by consumers of non-conventional energy devices particularly in rural areas is lack of awareness. According to one NGO, even though there has been considerable achievements of renewable energy programmes from the point of view of awareness generation particularly in urban and semi-urban areas, there are remote villages where people are still unaware about technologies, their availability, availability of loan from banks, etc. The Committee

feel that much more needs to be done for mass awareness and training of users in the operation and maintenance of non-conventional energy devices/systems. The Committee, therefore, recommend that users' education, awareness and training programme must be intensified in rural areas. The Panchayats must also be actively involved in propagation of renewable energy sources in villages. Mass awareness will need setting up of Consumer Assistance Cell at district/sub-division/ taluka/tehsil levels.

NEW DELHI
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Vaisakha 19, 1917 (Saka)

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