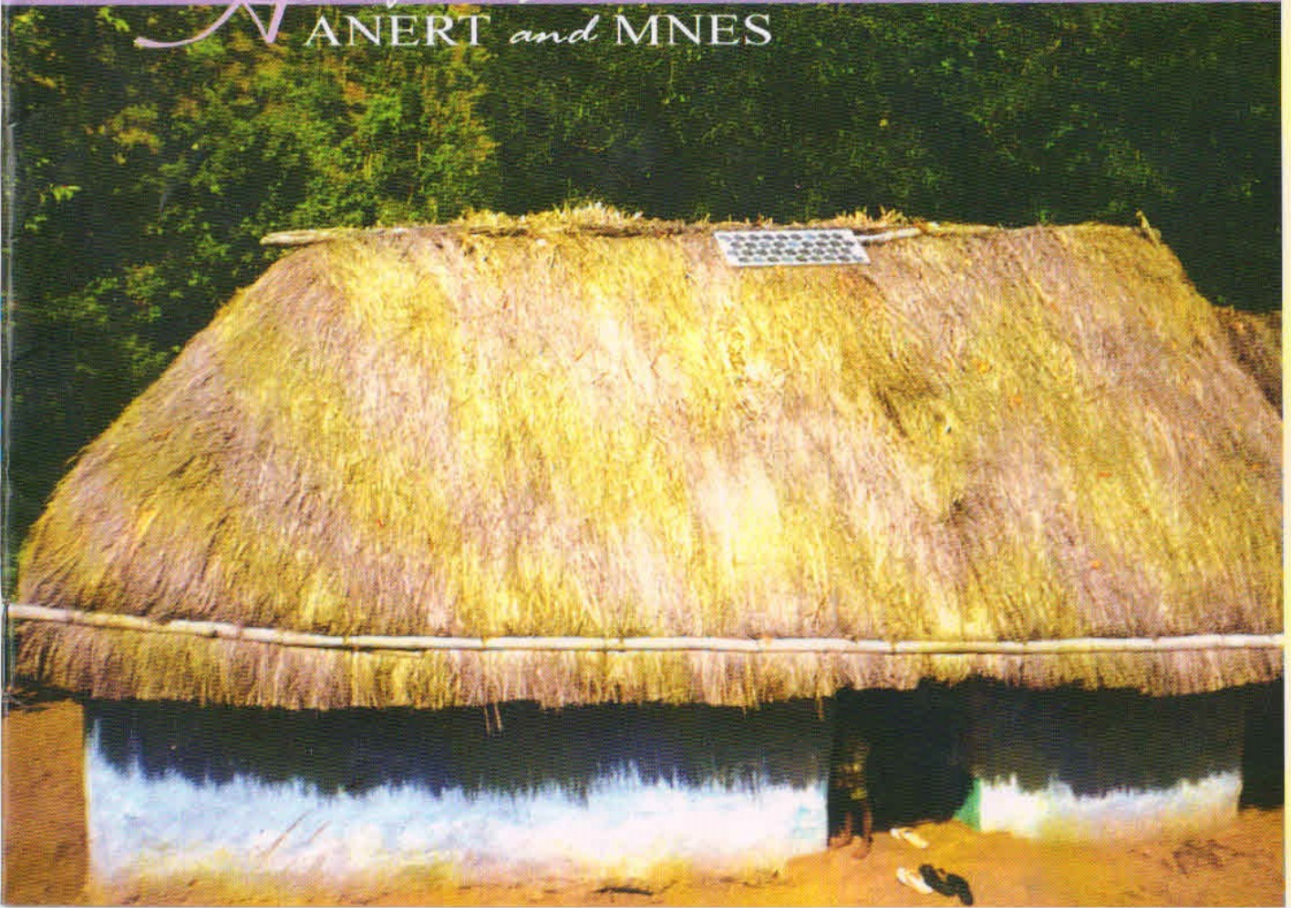
SOLAR VILLAGE ELECTRIFICATION

A project of
ANERT *and* MNES



ANERT

AGENCY FOR
NON-CONVENTIONAL ENERGY
AND RURAL TECHNOLOGY
GOVERNMENT OF KERALA

SOLAR VILLAGE ELECTRIFICATION

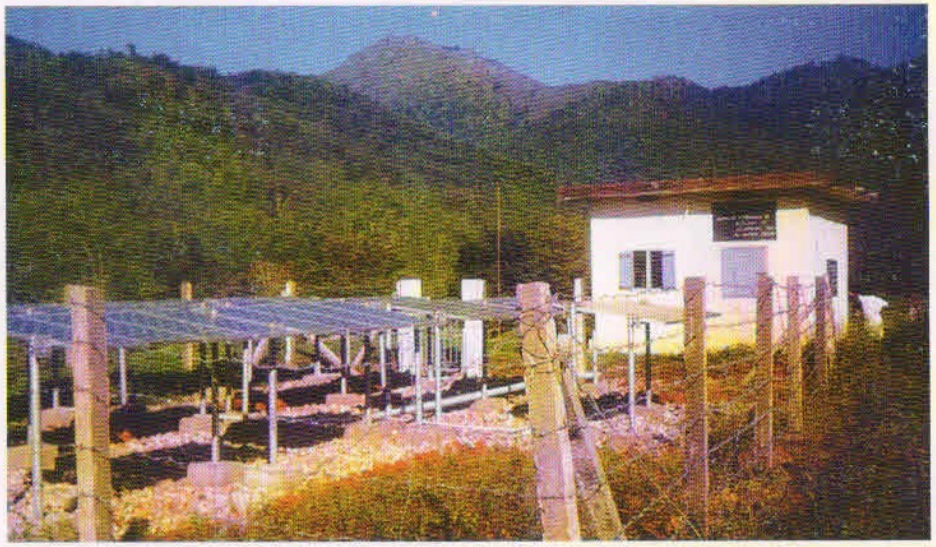
Highlights

- 11 Stand-alone Photovoltaic Power Plants with a total installed capacity of 40.04 kWp
- 5450 numbers of Solar Home Lighting Systems with an installed capacity of 201 kWp
- 100 numbers of Solar Street Lighting Systems
- 5886 families benefited
- Electrification without conventional grid
- Beneficiary committees for system upkeep and maintenance.

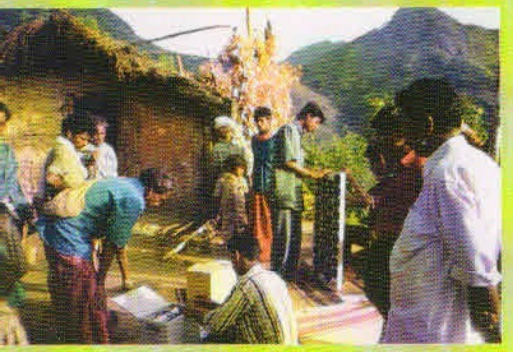
SOLAR VILLAGE ELECTRIFICATION

Agency for Non-conventional Energy and Rural Technology (ANERT) is an autonomous institution under the Science, Technology and Environment Department of Government of Kerala. It is the nodal agency of the Ministry of Non-conventional Energy Sources (MNES), Govt. of India. ANERT is in the field of Non-conventional Energy development from 1986 onwards. ANERT has a mandate to develop, propagate and conduct research in Non-conventional Energy and Energy Conservation. ANERT has been distributing energy saving devices through its 28 IREP Offices functioning in all the districts. Photovoltaic modules are now capable of converting about 13 % of incident solar energy into electricity. To meet night loads, a battery is needed as a storage device. The battery can be charged during the day and drawn down at night. A Solar PV HLS provides electricity to remote hamlets which are far off from grid. The system improves standard of living through better education, improves their income generation activities and provides better access to their needs and communication.

Solar Photovoltaic Power Plant (3.64 kWp) at Moolaganga, Sholayoor Panchayath, Palakkad District.



A Solar Home Lighting System installations at Muthalamada Pt., Palakkad Dt.



Preparing for Solar Home Lighting System installation

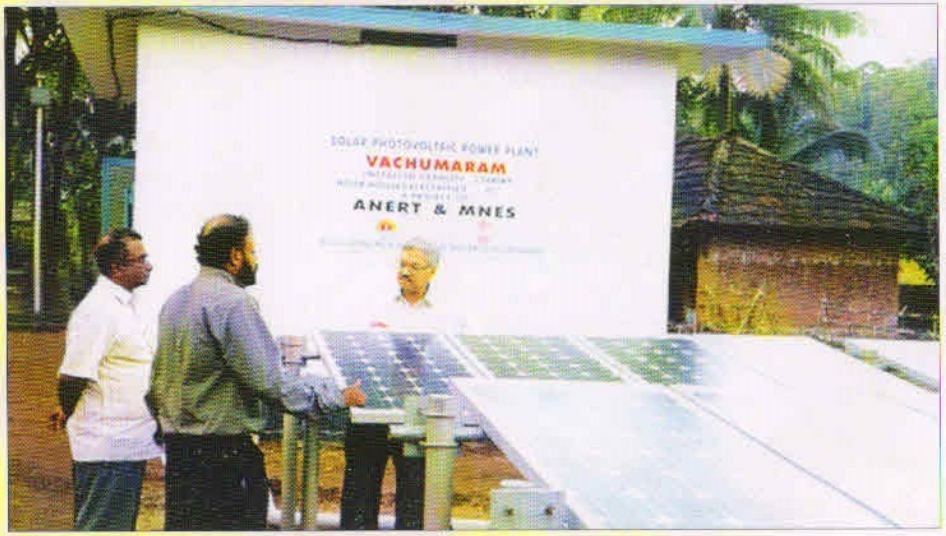
Inside view of the control room of a PV Power Plant

The objective of the Solar Village Electrification is to bring the people who are far away from the electric grid and living in the forest where basic amenities are not available. The State Electricity Board could not extend electricity lines to the remote tribal hamlets, which are deep inside the forest. Giving light to these people who are living in the remote areas will bring further development to the society in all respects. It is a known fact that solar electricity is a right option for electricity generation at these remote hamlets. Solar energy generation will not affect the environment and hence protect the existing bio-diversity.

PRELIMINARY STUDIES

A preliminary study was conducted by ANERT throughout Kerala to identify the remote tribal colonies, which are away from the conventional electricity lines and in the midst of dense forests. The feasibility study for Solar Photovoltaic System installations in each colony includes data on number of families, the location of each colony, category, distance from the conventional electricity lines etc. The sites identified for Central Solar

Dr. E.V.R. Sastri, Advisor (Solar Energy),MNES inspecting the SPV Power Plant at Vachumaram, Thrissur Dt.; along with him Sri. K.S.Vijayan, Director, ANERT and Sri. Ajith Gopi, Project Engineer (Solar Photo Voltaic Programme)



Photovoltaic Power Plants were surveyed in detail and suitable areas were located for the erection of solar array, battery/inverter room etc. According to the load requirements of each Power Plant, system sizing and design were carried out in the form of a Detailed Project Report. Solar Home Lighting Systems (HLS) were proposed for the colonies for which the houses were scattered and Solar stand alone PV-Power Plants (PVPP) were proposed for the colonies for which the houses are clustered in nature.

ANERT's proposal to electrify 129 colonies was approved by MNES with a financial assistance of rupees 401.40 lakhs. ANERT conducted District level workshops with representatives of Local Self Governments, which motivated them to participate in this programme by contributing financially also.

SYSTEMS AND DEVICES

MNES has approved the installation of Solar Home Lighting Systems and Solar Photovoltaic Power Plants as part of the Village Electrification Programme.

Solar Home Lighting Systems (configuration- 1 of MNES specification)

A typical Solar Home Lighting System with MNES configuration-1 includes a solar module (37 Watts), 12 V- 40 Ah battery, charge controller unit, two numbers of 9 W CFL lighting units and other components.

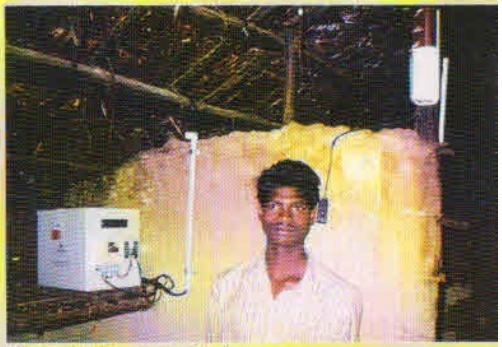
Solar Photovoltaic Power Plants

A typical Solar Photovoltaic Power Plant consists of Solar Array, Charge Controller, Battery Bank, Inverter and AC distribution system. Each house is powered with two 11 W CFLs. 6 numbers of Street Lights are also provided at appropriate locations in every colony. Also a provision is made in the battery/inverter room for placing a television set if needed, which can be powered from the same PowerPlant.

IMPLEMENTATION

ANERT has executed the projects, both power plants and HLS installations by engaging expert manufacturers/ contractors, after undergoing necessary tender formalities. During the installations, the representatives from Local Self Governments and the beneficiaries extended significant help.

The total cost of the project was Rs. 916.93 lakhs (Under MNES Village Electrification Programme and MNES SPV Progamme), out of which Rs.441.63 lakhs is the contribution



HLS Installation- An inside view

A Beneficiary Society meeting in progress

A typical HLS installation, deep inside the forest

from MNES. The balance of Rs.486.59 lakhs is provided as State Share including the contribution from Local Self Governments.

FORMATION OF BENEFICIARY SOCIETIES

To ensure long service life, necessary system maintenance is required. Keeping this in mind, Beneficiary Societies have been constituted under the Charitable Societies Act in all the colonies selected for solar electrification. All beneficiaries in each colony is a member of this Society. The concerned Grama / Block Panchayath President will be the patron(s) of the beneficiary societies. Selected members of the society will be trained both by the contractor and ANERT in topping up the batteries, cleaning the solar modules and timely reporting of faults. These members contribute a certain amount per month to the society which is kept in a separate Bank account. The accumulated amount will be used after expiry of the five years towards system maintenance. Also the concerned Local Self

PROJECT AT A GLANCE

Sl. No.	Name of District	HLS installed	Power plant installed	No. of families
1	Thiruvananthapuram	390	Nil	390
2	Kollam	2424	Nil	2424
3	Pathanamthitta	197	1	242
4	Idukki	1860	4	2029
5	Ernakulam	85	Nil	85
6	Thrissur	46	2	129
7	Palakkad	264	2	332
8	Malappuram	Nil	2	71
9	Kannur	109	Nil	109
10	Kasargode	75	Nil	75
	TOTAL	**5450**	**11**	**5886**

LIST OF STAND-ALONE SOLAR PHOTOVOLTAIC POWER PLANTS INSTALLED BY ANERT

Sl. No	Name of Colony	Name of Grama Panchayat	Name of Block	Name of District	No.of families	Capacity of the Power Plant (kWp)
1.	Plamalakkudy	Adimali	Adimali	Idukki	33	3.36
2.	Chambakkad	Marayoor	Devikulam	Idukki	68	5.6
3.	Mavalikudi	Marayoor	Devikulam	Idukki	20	2.52
4.	Kozhiyilakkudy	Munnar	Devikulam	Idukki	48	4.2
5.	Mundakkadavu	Karulayi	Nilambur	Malappuram	30	3.08
6.	Nedumkayam	Karulayi	Nilambur	Malappuram	41	3.92
7.	Moolaganga	Sholayoor	Attappadi	Palakkad	36	3.64
8.	Vellakkulam	Sholayoor	Attappadi	Palakkad	32	3.36
9.	Vechumaram	Athirappally	Thrissur	Thrissur	33	3.36
10.	Anapandam	Mattathoor	Kodakara	Thrissur	50	4.48
11.	Kokkathode	Aruvappulam	Konny	Pathanamthitta	45	2.52
				TOTAL	436	40.04

Governments may financially help these societies from the Plan Fund allocation.Two representatives from the colony were trained for the operation maintenance of the SPV system by the contractor.

Depending on the necessity solar TV power packs, Solar Deep Well Pumps, Solar Street Lighting Systems, Solar Stills and Improved Chulhas have been installed in all the colonies which have already been provided with Home Lighting Systems.

ANERT has proposed to extend this project to other areas also to electrify remote households during the next year as a second phace.

Solar Photovoltaic Power Plant (3.08 kWp) at Mundakadavu, Malappuram Dt.

A view of the Solar Array of SPV Power Plant (3.36kWp) at Vellakulam, Palakkad Dt.

ABOUT ANERT

ANERT is under the Science, Technology and Environment Department (STED) of Government of Kerala. A Governing Body acts as a high level policymaking body, which is chaired by the Chief Secretary. An Executive Committee chaired by the Chairman, STEC looks after various activities of ANERT. The Director is the Chief Executive of ANERT. ANERT activities are supported by the State Government through its State Plan. Other financial assistance available are from MNES for Centrally sponsored programs and from local panchayats through their programs on Energy.

The four major divisions of ANERT are:

- **Program Implementation**
- **Integrated Rural Energy Program (IREP)**
- **Research & Development**
- **Administration, Finance & Accounts, Purchase and Stores**

PROGRAMME IMPLEMENTATION DIVISION

The Program Implementation Division looks after implementation of various projects / schemes.

1. Solar Photovoltaic Programme (SPV)

- Solar Village Electrification Project
- 25 kW Grid-interactive SPV Power Plant at Vaidyuthi Bhavan, KSEB, Thiruvananthapuram
- Distribution and installation of SPV devices like Solar Lantern, Solar Home Lighting Systems, Solar Street Lighting Systems, Solar TV power packs, Solar Pumps, etc.

2. Wind Energy Programme

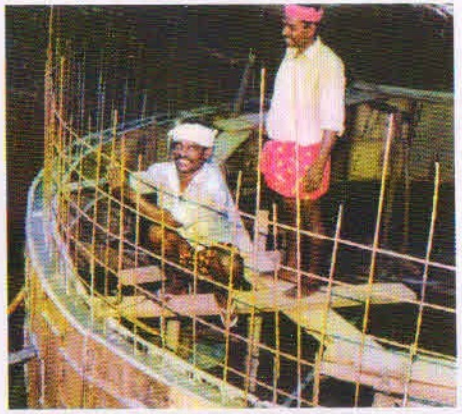
- Wind Monitoring at 29 identified sites in Kerala
- Installation of Wind mill Water pump and Wind Battery Chargers.
- Development of Wind Farm. ANERT is establishing a wind farm of 2 MW capacity at Ramakkalmedu in Idukki District as a demonstration project.

3. Bio-Energy Programme

- 25 numbers of Night soil based Biogas Plants of 25 to 70 m^3 capacity at all Medical College Hospitals, District Hospitals and leading private hospitals inKerala.

A 25m^3 Institutional Bio- gas Plant based on canteen waste installed at Hindustan Latex, Thiruvananthapuram

- Institutional Biogas Plants using canteen waste, Night soil based Biogas Plants (NBP), generating electricity.
- Institutional Bio-gas plants for generation of heat and electricity using canteen waste, poultry droppings and nigh soil.



- State level Agency for implementation of Waste to Energy Programmes in Kerala.
- Assessment of power generation potential using Bio-mass in 13 Talukas of Kerala
- Energy Generation from Coir pith through briquetting-Gasification method
- Gasification ussing various meterials like firewood, coconut shell, cashew shell, etc

4. Micro Hydel Programme

ANERT is engaged in the identification of sites for mini/micro hydel station; preparation of PPR and DPR, and establishment of microhydel power plants.

5. Rural Technology

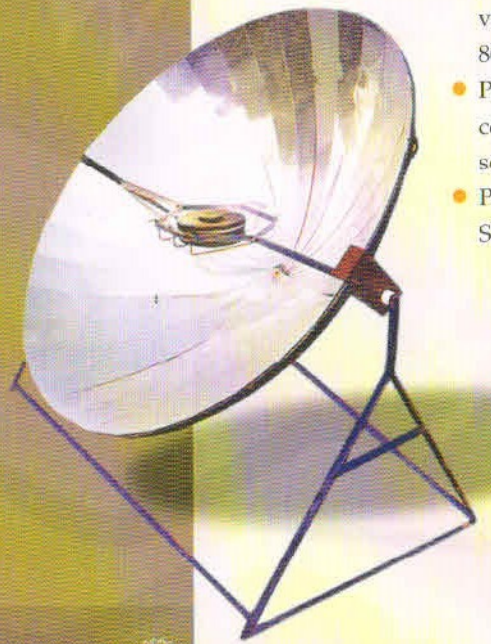
- Training for service and maintenance of devices.
- Training in pottery and improved chulha making

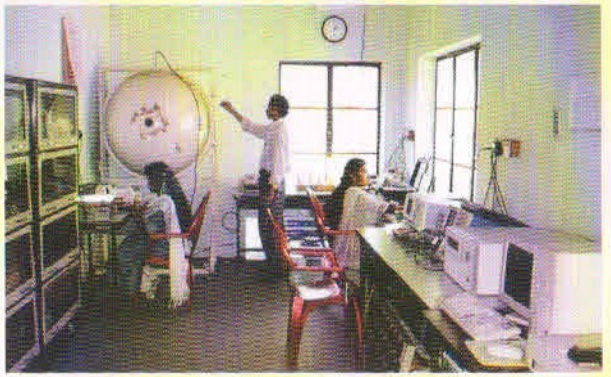
6. **National Programme on Improved Chulha (NPIC)**

   ANERT has installed more than 6 lakhs of fixed, portable and community chulhas, which has better efficiency than commercial chulhas and firewood; reduces pollution and increases household health.

7. **Solar Thermal Programme**

- Installation of Solar domestic hot water system, Solar water heaters in hotels, hostels, hospitals, industries and in Government and private institutions with size varying from 100 LPD to 8000 LPD
- Propagation of solar cookers, solar stills and solar driers
- Propagation of SK-14 and Shefler cookers





INTEGRATED RURAL ENERGY PROGRAMME

Schemes under Integrated Rural Energy Programme (IREP) include propagation of the use of improved chulha; installation/distribution of solar photovoltaic and solar thermal devices; and distribution of energy conserving devices like CFLs, electronic ballast etc.at subsidised rates for the use of rural people in the State. These programmes are being implemented through 28 offices functioning in all the 14 districts of the State.

RESEARCH AND DEVELOPMENT

This division concentrates on R&D in the areas of Renewable Sources of Energy, development of new devices, increasing efficiency of existing devices, consultancy. Energy Audit and executes sponsored research projects and conduct testing and evaluation of device performances.

IREP OFFICES OF ANERT

1. Project officer,
   IREP office OLLUKKARA,
   Panchayath shopping complex,
   Opp.Kottaram temple,
   Kolazhy, Thrissur-680 010
   Tel: 0487-201005

2. Project officer,
   IREP office AREACODE,
   South puthalam, Aeacode.P.O
   Malappuram39,
   Tel: 0493-750056

3. Project officer,
   IREP office TUNERI,
   Ponnarathu house,
   Bldg. No.3/350, Edachery P.O,
   Vadakkara (,Kozhikode.
   Tel : 0496-547341

4. Project officer,
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   Puchira, Olavakot,
   Puthupariyaram,Palakkad-33
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5. Project officer,
   IREP office MANATHAVADY,
   Ambukuthy,
   Mananthavady.p.oWayanad-45
   Tel: 0493-540589

6. Project officer,
   IREP office THALIPARAMBA,
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7. Project officer,
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9. Project Officer
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   Malappuram.
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10. Project Officer,
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11. Project Officer,
    IREP Office MANNARAKKAD,
    Kuruvanna House,
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19. Project Officer,
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20. Project Officer,
    IREP Office IDUKKI,
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21. Project Officer,
    IREP Office, MULANTHURUTHY,
    Chakravelil, Mulanthuruthy P.O,
    Ernakulam -682 314.
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22. Project Officer,
    IREP Office UTHRAD8/69,
    Near Parassala Police Station,
    Parassala,
    Thiruvananthapuram -695 502.
    Tel: 0471-202290

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    Opp. Sadanandapuram P.O,
    Valakam, Kollam
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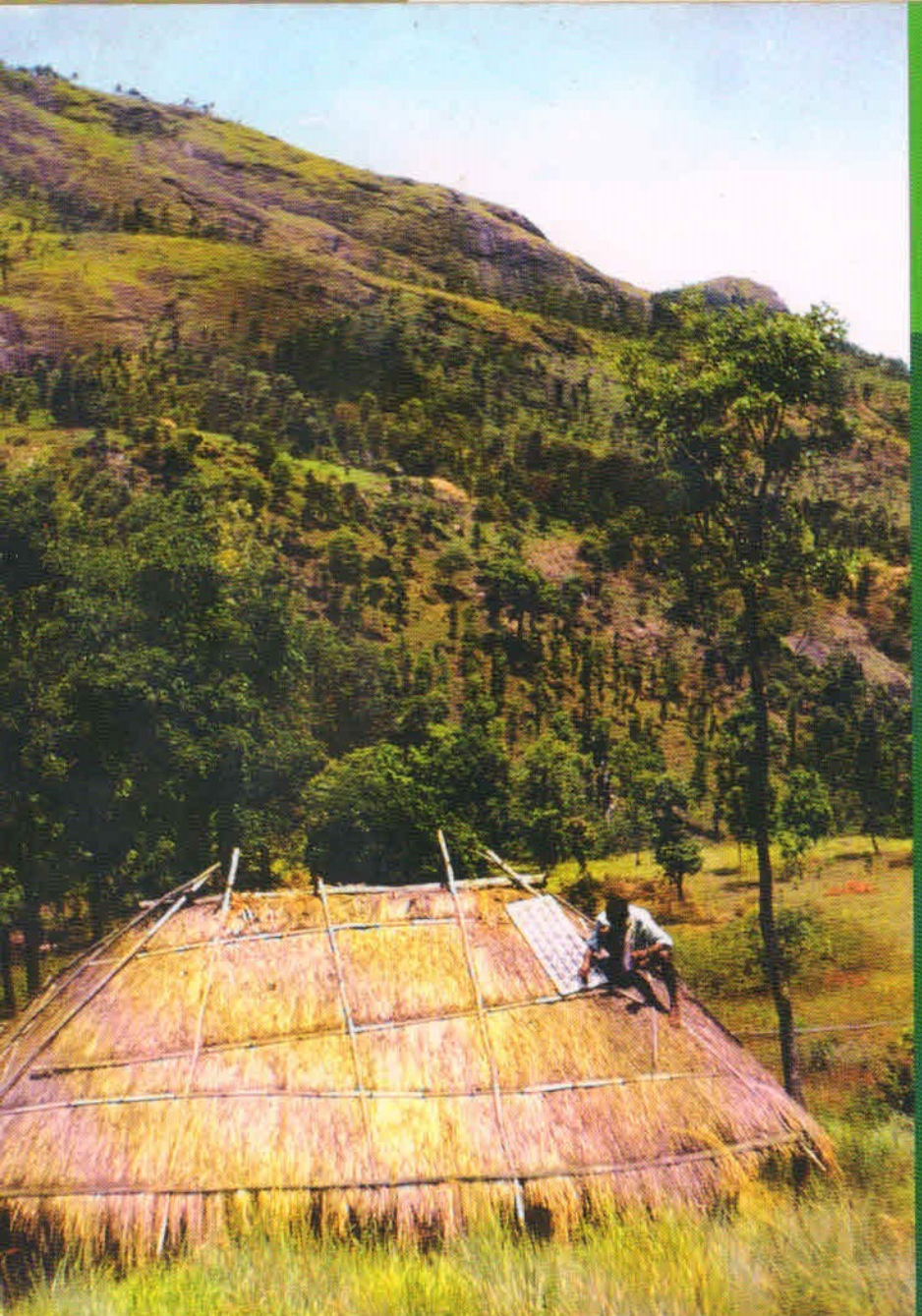

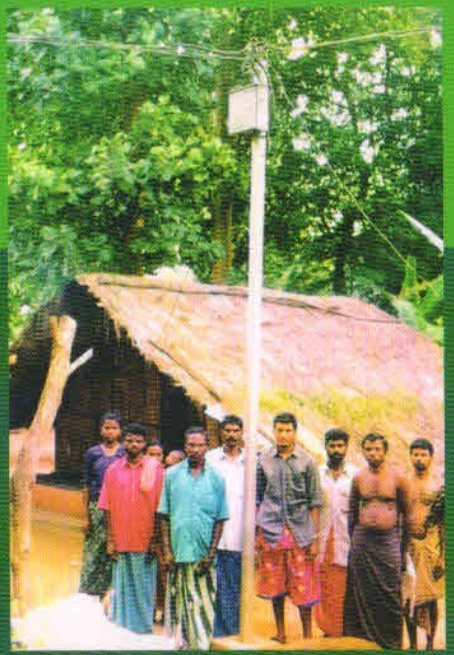

AGENCY FOR NON-CONVENTIONAL ENERGY AND RURAL TECHNOLOGY (ANERT)
(Established by Govt. of Kerala)

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