

11.2 NON- CONVENTIONAL ENERGY SOURCES

The demand for power has been growing rapidly in view of the galloping economic development and steep population growth. It has, therefore, become indispensable in an economy to supplement the Conventional Energy Sources by Renewable Energy Sources (RESs) in as much as they offer clean and green Sources of energy and are available abundantly in nature. As a matter of fact, India and Tamil Nadu State is endowed with abundant potential of natural renewable energy sources such as, Wind Energy, Solar Energy, Biomass and other forms of bio energy, Tidal Energy, Ocean-Thermal Energy, Geo-thermal etc., which are the most important among RESs. Though the first three of the above renewable energy sources are being harnessed in a big way in India as well as in Tamil Nadu, the other sources have not yet reached a stage of commercial exploitation due to high overhead/capital cost involvement. Renewable Energy Sources are inexhaustible in nature and can be replenished with human effort at a lesser cost on a large scale basis. Hence, during the Tenth Five Year Plan Period, it was felt that, the RESs is the best option available in the State, in view of fact that, the potential for harnessing additional Hydel/Thermal Power Generation have been exhausted over the Plan periods in the State.

Though the importance of Renewable Energy Sources has gained momentum in the Country in the early 1970s, India now has one of the largest programmes in harnessing the RESs. The Ministry of Non-conventional Energy Sources (MNES), which was established in the year 1992, has been functioning as the Nodal Agency for all matters relating to New/RESs. The National Programme on RESs covers the entire gamut of technologies which is inclusive of improved chulhas, biogas plants, short rotation fuelwood tree species, biomass gasifiers, solar thermal, solar photovoltaic systems, wind farms, wind mills, biomass based cogeneration plants, small and micro hydel systems, power generation from the urban- municipal and industrial wastes, hydrogen energy, ocean energy etc. In each of these areas, numerous programmes for the RESs such as assessment surveys, R&D works, prototype development, technology transformation and commercialisation have been taken up at all India level including Tamil Nadu State.

Tenth Five Year Plan Perspectives of Tamil Nadu Government

The Vision for the NCES sector envisaged during the Tenth Plan are as indicated below:

- Provide and promote 'clean and green energy' on much wider scale covering villages and towns to meet the decentralized energy requirements in agriculture, small scale industries, commercial establishments and households with priority for remote habitations, which do not enjoy grid power.
- Enhance the generation of grid quality power through private investment for harnessing various renewable energy sources.
- Encourage energy efficient buildings, which will conserve energy to meet energy requirements from naturally available resources.
- Promote energy efficiency and energy conservation in industries, domestic use etc.

The main objectives of the RESs sector is as indicated below:

The National goal of achieving 10 per cent of the grid capacity from RESs by 2010 has already been achieved by Tamil Nadu State well in advance, which is 12.5 per cent as on 31.3.2002. The Tenth Plan goal is to consolidate/stabilize the share of grid connected power with an additional capacity of 550 MW and to decentralise power generation to meet the local energy needs in agriculture, agro- processing, households etc., especially in remote areas and expand the use of renewable energy sources/promote energy efficiency and thereby energy saving.

Strategies formulated /implemented during Tenth Plan for the development of NCES in the State:

- Encourage and promote private investments in renewable energy through suitable policy initiatives at State level.
- Involve Local bodies in developing decentralized power and its use in agriculture, household sectors etc.
- Establish field units to promote renewable energy at local levels by integrating existing programme staff.
- Enable suitable revision of power purchase rate for grid connected power to make it attractive for the investors.
- Encourage research and development to improve efficiency of the devices and bring down the cost.
- Undertake awareness campaigns in Districts through seminars, exhibitions etc.

Initiatives taken up under RESs sector:

- Undertaken micro survey studies for setting up of Wind Mills in Tamil Nadu by identifying proper and suitable locations,
- Undertaken Biomass potential assessment studies at Taluk level and make database on Biomass potential available for prospective investors,
- Merge the staff under Centrally sponsored schemes like IREP and National Biogas Development programme and create field outfits to provide guidance and support to local bodies in tapping renewable energy sources,
- Popularise and propagate renewable energy use among industries and households in rural and urban areas,
- Secure proper and reasonable price for grid connected power through State Electricity Regulatory Commission (SERC),
- Arrange for suitable adjustments in wheeling and banking facilities, and third party sale to attract further investment in renewable energy sector, and
- Designate TEDA as 'single window agency', to facilitate smooth clearance for projects upto certain capacity (say 25 Mw).

Tamil Nadu Energy Development Agency (TEDA)

The Tamil Nadu Energy Development Agency (TEDA) since its establishment in 1985 has been functioning as a promotional agency for developing renewable energy sources in the State. TEDA is also functioning as the State's Nodal Agency to the Ministry of Non Conventional Energy Sources (MNES), Government of India for implementing the Centrally funded/sponsored/State Government schemes. TEDA had conducted sustained public awareness campaigns in the State to promote and harness renewable energy sources in the State with the active support from the MNES, Government of India and State Government.

The salient physical achievements made by the TEDA are as follows:

- The Total Installed capacity under Renewable Energy Sources (excluding Hydro) in Tamil Nadu State has reached 2316 Mw (Total grid capacity of EB is 11400 Mw), which is 20.32 percent of the total TNEB grid capacity, while the All India average is about 5 percent.
- The Harnessing of Wind Energy is the highest in Tamil Nadu State with an installed capacity of 2040 MW (as on 31.03.2005) as against the total installed capacity at All India level of 3600 Mw (as on 31.03.2005), which is 56.6 % of the total installed capacity in India. It has been estimated that the gross available potential of Wind Power in the State is of the order of 5200 MW.
- So far, three small wind generators called Aero generator have been set up (upto 10 KW) in industries, local bodies, institutions, farm houses, etc., located in windy sites as demonstration projects.
- Under biomass based power generation projects too Tamilnadu occupies first place in the country with an installed capacity of 12 MW. In addition, 6 projects are under implementation with a total capacity of 64.5 MW. The Bio-mass assessment studies have been completed in all the districts. So far, 37 new projects have been recommended with a total capacity of 249 MW in the State.
- Under Bagasse based power generation too Tamil Nadu stands first due to Private Sector Investment/Policy Initiatives of the Government.
- Electrification of remote habitations (phase I&II): A new project proposal of TEDA which was approved by the State Government, under phase-I during 2003-2004 for electrification of 152 remote habitations in 11 districts in Tamil Nadu State was subsequently approved and sanctioned by the Ministry of Non-Conventional Energy Sources (MNES) with 90 % Central Financial Assistance from Government of India. In addition, TEDA took up detailed survey on the balance of un-electrified habitations in the State and had submitted proposals to MNES, G.O.I., to cover 106 additional habitations under Phase II and sanction is awaited from MNES.
- So far, 3503 numbers of domestic Solar Water Heating Systems (SWHS) and 355 numbers for industries/ institutions have been installed in the State.

11.2 Non- Conventional Energy Sources

TEDA is taking persistent action in promoting R & D activities by formulating, implementing and monitoring various plan programmes in the State under various heads with the assistance of MNES, Government of India and State Government.

Physical Achievements made during the first three years of the Tenth Plan Period

The physical achievements made by the Tamil Nadu Energy Development Agency (TEDA) over the years are shown below:

Total Installed capacity under N.C.E.S. - Tamil Nadu State

Source	1990	1995	2000	2004	2005
Grid Power (MW)	5473	6693	7758	10950	11400
Renewable Power (MW)	4	285	939	1648	2316

Source: TEDA

Wind Power Potential in Tamil Nadu State

Location	Tentative Gross Potential MW	Harnessed upto 31.3.2005 MW
Aralvaimozhi Pass (Muppandal) Kanyakumari, Tirunelveli Districts	2000	1030
Sengottah (Kayathar) Tirunelveli, Thoothukudi Districts	1100	241
Palghat Pass (Kethanur) Coimbatore, Erode Districts	1500	753
Coastal Area Ennore near Chennai and Rameshwaram in Ramanathapuram Districts	600	16
TOTAL	5200	2040

Source: Energy Department/ TEDA

No. of sites surveyed	69
Potential sites identified	41
Micro surveys conducted	22
Sites exploited	20

Source: TEDA

Growth of Windmills in Tamilnadu

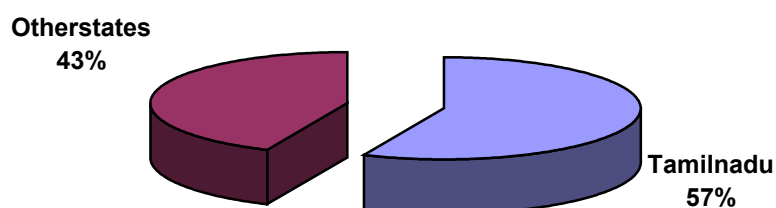
Period	Wind Monitoring Stations installed (Nos.)	Demo Wind Farms Installed (MW)	Micro survey carried out. (Nos.)	Total installed capacity (MW)
1985 – 90	15	4	--	4
1990– 95	19	15	--	266
1995 – 2000	27	--	--	501
2000 – 04	7	--	21	590
2004-05	1	--	1	679
Total	69	19	22	2040

11.2 Non- Conventional Energy Sources

Wind Power Harnessed - Tamil Nadu vs. India

Wind Power	As on 31.03.2005	Addition 2004-05
Total installed capacity (All India)	3600 MW	1111 MW
Share of Tamil Nadu	2040 MW	679 MW

Source: TEDA

Wind Energy - Tamil Nadu Vs other States**Biomass Power Potential**

	All India	Tamil Nadu
Total Potential	10,000 MW	695 MW
Installed capacity	234 MW	12 MW
Projects under implementation	300 MW	15 Nos. (145.5 MW)
Biomass assessment studies		All districts
Target proposed in 10 th Five Year Plan (2002-2007)		250 MW
New projects recommended		37 Nos./ 259 MW

Biomass Power Potential in Tamil Nadu (Districtwise)

No.	District	Tentative Potential	Power Plant Capacity allotted	No.	District	Tentative Potential	Power Plant Capacity allotted
1	Chennai	0	0	16	Pudukkottai	16	0
2	Kancheepuram	9	18	17	Thanjavur	10	7.5
3	Thiruvallur	12	18.5	18	Thiruvarur	2	0
4	Cuddalore	29	5	19	Nagapattinam	4	6
5	Villupuram	51	24.5	20	Madurai	-10	2.5
6	Vellore	17	1.5	21	Theni	9	4.5
7	Thiruvannamalai	176	13.5	22	Dindigul	13	15
8	Salem	27	20	23	Ramanathapuram	27	16
9	Namakkal	22	7.5	24	Virudhunagar	32	18
10	Dharmapuri	40	14	25	Sivagangai	46	27
11	Coimbatore	-17	7.5	26	Thirunelveli	28	15
12	Erode	30	17	27	Thoothukudi	48	14.5
13	Tiruchirapalli	11	6	28	The Nilgiris	-16	0
14	Karur	0	0	29	Kanniyakumari	23	0
15	Perambalur	5	0		Total	644	279

Source: TEDA

Achievement under Bio Mass - Co Generation (As on 31.3.2005)

	India	Tamil Nadu
Total Potential	3600 MW	450 MW
Commissioned capacity (Surplus)	380 MW	165 MW (installed capacity 275 MW)
Target proposed in 10 th Five Year Plan (2002- 2007) - 300 MW		

Source : TEDA

The Ongoing schemes TEDA are as described below:

A) Wind Energy*1. Wind Power Generation*

Wind monitoring studies were conducted to identify places having wind speed of more than 18 Kmph. Based on the study, Demonstration Wind farms for a total capacity of 19 MW were set up by the TNEB in stages from among the 41 identified places. Following this, starting from the first Private Sector Wind Farm in Tamil Nadu during 1990, large numbers are being installed. of which 20 sites have been developed mostly through private sector investment with an installed capacity of 2040 MW as on 31.3.2005. This constitutes more than 57 per cent of the installed capacity in the country. Though the target fixed for Tenth Five Year Plan (2002-2007) is 500 MW, total additional capacity made in the first three years (April 2002 to Dec.2004) is 807 MW. This achievement is possible because of consistent and investor friendly policies followed by the Government. The investors who generate electricity from these wind farms can sell the power so produced to TNEB at Rs.2.70 per unit or use the same for captive consumption in their industries for which TNEB

levies 5% as wheeling charges towards transmission losses and the investors can avail of banking facilities for their power generated during a few months for using it throughout the financial year on payment of additional charges at 5% to TNEB.

2. Wind Mill Water Pumping

Small windmills are installed in places with wind speed of less than 18 Kmph and used for lifting water from open wells/ borewells. 875 Windmills have been installed so are with financial assistance from State Government and Government of India. For installing new wind mill water pumping system of 1 HP capacity, central assistance is available up to 50% of the costing in the form of subsidy.

3. Aero- generators

As a pilot project, aero-generators have been installed in 3 places in Kancheepuram, Tirunelveli and Kanyakumari districts with Central subsidy. For those who come forward to install new systems, subsidy is being provided from Government of India @ 50 to 75%, subject to eligibility.

B) Solar Energy

There are two ways in which solar energy is being harnessed in the State. Firstly, by producing electricity for lighting/other electrical requirements and secondly, for hot water requirements/ drying agricultural produce and processing industrial products and for cooking purposes using solar thermal energy.

Solar Photovoltaic System

1. SPV lighting devices

Solar lighting devices of various types have been developed and are used in the State to meet the needs of home lighting, street lighting office lighting etc. 12398 solar lanterns, 1470 Home lights and 1578 street lights have been installed upto 31.3.2003 with financial assistance from Government of India and State Government, of which, 4500 solar lanterns, 1400 home lights, and 350 street lights were provided in the last two years alone. Government of India provides subsidy upto 50% ranging from Rs.3000 to Rs.11000/- for the devices depending upon the capacity and type. Action is also being taken by TEDA to provide solar street lights in rural local bodies and reduce the current consumption charges. The entire allotment of 3387 SPV street lighting systems sanctioned by MNES are being installed in 508 Panchayats in 28 districts in the State and 6 Municipal Corporations. The entire 500 Nos. SPV home lighting systems were also allotted for installation in Group houses under construction by Rural Development Department in 10 districts and individual users. Completion reports have been received for 3124 SPV Street lights and 355 of SPV home lights till 31.1.2005. MNES has extended the time upto 31.03.2005 for completion of balance works. Sanction is awaited from MNES regarding the special project proposals for 7500 nos. SPV street lights and 7950 nos. SPV Home Lights prepared by TEDA.

2. SPV Water pumps

Electricity is produced from solar energy to run motor pumps. In Tamil Nadu, 195 pumps have so far been installed with subsidy from Government of Tamil Nadu and the Government of India. Further, water pumps have been installed under private arrangement also taking the total number to 750 SPV pumps. The cost of installing these pumps is Rs.2.24 lakhs for 1 HP with a Central subsidy of 44%. The Government of Tamil Nadu has decided to allot Rs.1.95 lakhs towards additional

subsidy for this scheme during 2003-04. This will also enable the beneficiaries to get higher subsidy from Government of India.

Solar Thermal Energy

3. Solar Water Heating System (SWHS)

The scheme for installation of Solar Water Heating System using Solar thermal energy for purposes of bathing in houses, lodges and hospitals and washing of utensils/ equipment has been implemented in Tamil Nadu, with 3522 domestic Solar water heating systems, 345 systems in lodges and institutions and 26 systems in Government buildings. For the year 2004-05, Government of Tamil Nadu has sanctioned Rs.15 lakhs for installation of 24 nos. of 1000 LPD systems under subsidy and 12 nos. of 500 LPD systems in Government institutions with full cost. The scheme is under implementation.

4. Solar Air Heating System / Solar Cooker

A new technology for using solar thermal energy for drying grains, tea, fruits, leather, etc., was first developed and used in Tamil Nadu. To encourage its use further, the Government of Tamil Nadu have decided to provide subsidy for drying of various products for a total capacity of 440 M square during the year 2003-04. Two systems for a total capacity of 168 M square have been installed. The balance of work is under implementation. Box and Dish type Solar cookers have been developed using Solar thermal energy and 402 solar cookers have been distributed so far. Central Assistance is available upto 50% of the cost in the form of subsidy..

C) Biomass and other Bio Energy Systems

The scheme of producing gas and electricity from Biomass and other bio wastes to meet the energy requirements for export to grid is also being implemented in recent years in Tamil Nadu as detailed below:

1. Biomass Power generation

The Government of Tamil Nadu is encouraging the scheme for generation of power from wood and other agro wastes and residues. A power plant of 12 MW capacity is in operation at Pazhayaseevaram in Kancheepuram district. In addition, TNEB has issued consent for fifteen new biomass based power plants for a total capacity of 145.5 MW. One project of 20 Mw. near Paramakudi has started functioning from 2004-05. The other projects will be commissioned in stages.

2. Co-generation

The scheme of producing steam from bagasse high pressure boilers in sugar mills and generating electricity using the same and sale of surplus power to TNEB has been successfully implemented in Tamil Nadu. With a total installed capacity of 275 MW as on 31.12.2004 (with exportable surplus of 165 mw.) Tamil Nadu is leading in the country. It represents about 40% of total installed capacity in the country. The capacity addition of 80.5 MW during last two years is impressive as compared to 74 MW added during the previous five years.

3. Gasifier

The Central Government has introduced a scheme for installation of Gasifier systems to produce thermal and electrical power required for the industries. Action is being taken to motivate industries to instal gasifier systems taking advantage of the scheme. Besides the 7 projects already sanctioned by Government of India,

efforts are being taken to develop new projects and expand this scheme further. The Government of India provides subsidy from 10 to 50% of the cost of gasifiers depending upon the type of systems.

4. Nightsoil based biogas plant

Biogas plants have been installed in large numbers in Tamil Nadu and the scheme continues to be implemented in various districts. Based on the pilot schemes implemented in Kolathur (Salem), Perundurai (Erode) and Periyakulam (Theni), a scheme to assist Government and private institutions for installing one Nightsoil based biogas plant in each district has been proposed. The Government of Tamil Nadu has allotted Rs.20 lakhs for grant of subsidy for this scheme for the year 2004 - 2005. The gas produced thus can be used for cooking in canteens, hostels and for producing electricity for lighting, etc.

D) Other Schemes

1. Power Generation-Waste to Energy

The schemes for producing gas and electricity from sago industry liquid effluent, poultry litter and vegetable wastes are under implementation in Tamil Nadu. The project for producing gas and electricity from Sago industry liquid effluent in Pappireddipatty (Dharmapuri district) has been completed and taken on trial. The scheme for power generation from poultry waste in Namakkal district is under implementation. Further, the Government of India has agreed to extend financial assistance for the project to generate electricity from the vegetable wastes available in Koyambedu wholesale vegetable market (Chennai) which will be taken up for implementation in the current year. The scheme is implemented for Chennai Metropolitan Development Authority. Action is also being taken to get financial assistance from Government of India for the scheme to produce gas from the sago industry liquid effluent in small sago industries.

2. Battery Operated Vehicles

For eligible institutions/ organisations using transport vehicles running on batteries which prevent pollution caused by obnoxious emissions from the petrol and diesel vehicles, subsidy is provided by Government of India up to 33% of the cost of vehicles. These vehicles can be used in wild life sanctuaries, tourist centres, hospitals, etc., to avoid pollution. In Tamil Nadu subsidy has been provided so far to 27 vans and 2 autorickshaws.

3. Sustainable energy security systems

A sum of Rs.4.00 lakhs has also been sanctioned for the preparation of detailed project reports for sustainable energy security systems in Salem and Coimbatore districts and the work has been entrusted to Anna university.

4. Ethanol as transport fuel

The rectified spirit obtained from the molasses produced in sugar mills can be converted as ethanol and blended with petrol upto 5% and used as fuel in transport vehicles. The Government of India has decided to implement the scheme in 9 States including Tamil Nadu. Efforts are being taken to implement the scheme in Tamil Nadu so as to reduce pollution and improve the financial position of the Sugar mills.

For the programmes / schemes under NCES, an outlay of 278.91 lakhs has been proposed for the year 2005-2006 which is inclusive of TEDA staff cost, modified IREP scheme cost, maintenance of Wind Monitoring Stations, State contribution for maintenance of Wind Monitoring Stations, publicity and advertisements etc.

5. Providing Renewable energy devices for tsunami victims

As a solace to the tsunami affected people in the districts of Nagapattinam, Cuddalore, Kanyakumari, Tirunelveli, Thoothukudi, Villupuram, Tiruvellore, Kancheepuram and Chennai 4000 Solar lanterns have been sanctioned and are under distribution. 500 nos. Dish solar cookers and 4000 nos. Box type solar cookers have been proposed to be distributed by MNES, Government of India and sanction is awaited soon.

E) Hill Area Development Programme (HADP)

1. Assistance to Rural Energy Conservation Scheme in HADP

For the Rural Energy Conservation Scheme in Hill Area Development Programme, the Government has sanctioned five schemes with an outlay of Rs.54.00 lakhs for 2004-2005. These schemes are under implementation through the Project Director, HADP with technical assistance from TEDA. As against the Budget Estimate 2004-05 of Rs.34.13 lakhs, the expenditure anticipated for the year 2004-05 is Rs.88.13 lakhs. An outlay of Rs.54.00 lakhs has been proposed for this scheme for the year 2005-06.

2. Assistance to Non-conventional Energy Sector under HADP

The Budget Estimate 2004-'05 for the scheme of giving assistance to Non-conventional Energy Sector under HADP was Rs.270.00 lakhs. Against this, the expenditure anticipated for the year 2004-05 is Rs.270.00 lakhs and the same level has been proposed for continuing the scheme under HADP for the year 2005-'06.

In all, a sum of Rs.324.00 lakhs has been proposed for the above two schemes for the year 2005-'06 for installing renewable energy devices / equipments.

F) Western Ghat Development Programme (WGDP)

Under the Western Ghat Development Programme (WGDP), for the year 2004-2005, biomass gasifier, SPV Pumps, SPV street Lights have been sanctioned for Coimbatore, Tirunelveli and Kanniya Kumari Districts at an outlay of Rs. 30.00 lakhs. They are under implementation through the Project Officer, District Rural Development Agencies. Further, an allocation of Rs.50.00 lakhs has been sought under WGDP for 2005-2006 to implement the RESs. schemes.

Annual Plan 2005-2006- Part II (New) Schemes

The list of Part II (new) schemes sanctioned for implementation during 2005-2006 are as shown below:

The Part-II (new schemes) for the year 2005-06

Sl. No.	Name of the Scheme	Total (Rs. in lakhs)
	(A) Non- Plan	
1.	Implementation of e-governance project in the Chief Electrical Inspectorate #	15.00
	(B) Plan Schemes	
2.	Wind Monitoring Station & micro surveys	10.50
3.	Solar Water Heating System in Government and other institutions	13.00
4.	Solar Air heating / drying system for fish food processing/ Industrial applications	6.20
5.	Solar Traffic signal system display for Chennai city State subsidy @ Rs.1.50 lakhs (5 nos.)	7.50
6.	Solar PV battery system for Police wireless communication full cost	12.50
7.	Solar Educational kits to Government Higher Secondary Schools. Government subsidy and other charges @ Rs.3700/- (250 Nos.)	9.25
8.	Assistance to R & D Projects through Anna University (5 Nos.) State Grant for 50% of the Cost.	20.00
9.	State Level Energy Park (50% cost of civil works)	10.00
10.	Village Energy Security System @ Rs.2.00 lakhs each per habitations. State share 10% (Centrally Sponsored Scheme) (10 Nos.)	20.00
11.	Bio-mass classifier for Water Pumping / Street light etc. in weaker local bodies - State share of 50% CCSS MNES. 29 Village Panchayats 1 each district)	46.40
12.	Electrification of Remote Habitations	50.59
	Total plan scheme	205.94
	Grand Total	220.94

Related to TNEB

The details of Part-II (new) schemes for the year 2005-06 are described below:

1) Wind Monitoring Stations and Micro Surveys : (Rs.10.50 lakhs).

A sum of Rs.6 lakhs has been proposed for conducting Micro Survey Studies in 3 Wind Monitoring Stations in the State through C-WET Chennai with an Rs.4.50 lakhs which is inclusive of 20 percent State share for installing 3 new wind monitoring stations in the State subject to sanction of 80% cost by MNES.

2) Solar Water Heating System in Government Institutions and other Institutions (Rs.13.00 lakhs)

It has been proposed to install SWHS in (a) Government Institutions at full cost (5000 LPD) and (b) Institutions/ subsidy and other charges @ 25000/ per unit.

For the year 2005-06, an outlay of Rs.5.50 lakhs has been proposed towards subsidy for institutions to install 20 Nos. of Solar Water Heaters of 1000 litres capacity each and Rs.7.50 lakhs for Government institutions for a total capacity of 5000 litres at full cost.

3) *Solar Air Heating/ Drying System for fish food processing/ Industrial application - (Rs.6.20 lakhs)*

It is proposed to install Solar Air Heating Systems (SAHS) for a total capacity of 400 Sq. m. for drying of fish and other agricultural products such as spices, dhall, gram, fruits, vegetables etc., at a cost of Rs.6.20 lakhs during 2005-'06.

4) *Solar Traffic Signal System display for Chennai City - (Rs.7.50 lakhs)*

It is proposed to install 5 Solar Traffic Signal systems for demonstration purpose in 5 important junctions in Chennai city in consultation with City Traffic Police and provide subsidy towards the cost of SPV modules and battery, @ Rs.1.50 lakhs involving an outlay of Rs.7.50 lakhs during 2005-'06.

5) *Solar PV battery System for Police Wireless Communication - (Rs.12.50 lakhs)*

It is proposed to provide with SPV panels for 5 Nos. (existing) batteries along with charge controllers for charging them @ Rs.2.50 lakhs involving an outlay of Rs.12.50 lakhs during 2005-'06.

6) *Supply of Solar Educational kits to Government Higher Secondary Schools (Rs.9.25 lakhs)*

It is proposed to supply Solar Educational Kits to Government Higher Secondary Schools (50%) subsidy @ Rs.3700 for 250 numbers at a total cost of Rs.9.25 lakhs during 2005-06.

7) *Assistance to R & D projects – (Rs.20.00 lakhs) through Anna University*

A sum of Rs.20.00 lakhs has been proposed for undertaking R & D projects (3 nos.) through Anna University, subject to the condition of 50% of the cost is shared by the Anna University during the year 2005-'06. The outlay sanctioned for the year 2005-2006 is towards TEDA's share for undertaking the following 3 projects through Anna University, to be completed in 2 years, viz.,-

- i. To develop a Solar cooker based on thermal storage system for cooking night/ early morning (Cost: Rs.10 lakhs);
- ii. To design and develop energy efficient buildings using solar passive architecture (cost: Rs.10 lakhs); and
- iii. To develop and fabricate a small scale proto type drying chamber using indirect method for baggage drying using waste heat (cost: Rs.10 lakhs).

8) *State Level Energy Park (Rs. 10 lakhs):*

The Ministry of Non-conventional Energy Sources (MNES), G.O.I. provides financial assistance for setting up Energy Parks in Universities, Engineering Colleges etc., for creation of awareness on the uses of renewable energy devices. MNES also provides special financial assistance upto Rs.100.00 lakhs to the State Nodal Agency towards cost of equipments for State Level Energy Park. In view of this, TEDA has proposed to set up a State Level Energy Park in co-ordination with Tamil Nadu S & T, Kotturpuram, Chennai. The total project cost of the Energy Park is estimated at Rs.100 lakhs including Rs.35.00 lakhs towards civil works for installing various devices which will be borne by the State Government. The State Government sanctioned Rs. 25 lakhs towards cost of civil works in the first year and the detailed proposal has been sent to MNES for sanction.

Hence, an outlay of Rs.10 lakhs has been proposed for the year 2005-'06 towards additional cost of civil works.

9) *Village Energy Security System – (Rs.20.00 lakhs)*

An outlay of Rs.20 lakhs has been proposed for Village Level Energy Security System. MNES is expected to provide 90 % of the cost estimated @ Rs.20 lakhs for a typical village with 100 households. Balance 10% will have to be borne by the State Government. Hence, Rs.20 lakhs has been provided for 2005-2006 towards State's share of cost for 10 habitations @ Rs 2 lakhs each, subject to sanction of Central Financial Assistance by MNES.

10) Bio-mass gasifier for water pumping/ street light etc. in weaker Local Bodies – (Rs.46.40 lakhs)

MNES, Government of India have decided to launch the Village Energy Security Plan (VESP) to meet the energy needs of remote villages/ hamlets through renewables like Bio-mass.

An outlay of Rs.46.40 lakhs has been provided to the weaker local bodies to install 29 numbers of (9 kw) Bio-mass gasifier for water pumping/Street Lights etc. This will reduce the expenditure on power consumption for the Local Bodies. The MNES provides subsidy @ Rs.1.50 lakhs /gasifier.

(11) *Electrification of Remote Habitation – (50.59 lakhs)*

MNES, GOI provides 90% of cost as Central Financial Assistance (CFA) MNES sanctioned for electrification of 152 habitations under phase-I. State share (10%) i.e. Rs.100 lakhs for phase-I scheme.

Sanction is awaited from MNES (90%) for the balance 106 remote habitations. An outlay of Rs.50.59 lakhs has been proposed for the year 2005-06 towards State share of cost pending sanction by MNES for electrification of 106 Nos. remote habitations under Phase-II.

Centrally Sponsored Scheme

Modified Integrated Rural Energy Programme (IREP)

The Government of India (MNES) has modified the Integrated Rural Energy Programme (IREP) to cover all rural areas, excluding notified Municipal areas. The scheme provides for setting up State level cell at Tamil Nadu Energy Development Agency and one at each District under the District Rural Development Agency (DRDA). The programme will focus on select clusters of villages with 100% coverage to promote efficient use of traditional energy sources there and supplement the same by suitable Non-conventional energy devices.

Local Panchayats will be involved in the preparation of village energy plans, implementation, repair and maintenance of energy systems and devices, etc. Training facilities will also be arranged for the nominees of Panchayats. The Government of India provides Rs.5 lakh for the State cell and Rs.10 lakhs for each district cell subject to matching grant by the State Government towards the cost of implementing the scheme. The scheme was approved by State Government for implementation.

An outlay of Rs.78 lakhs has been proposed for the Modified IREP for the year 2005- '06.

Annual Plan Outlay for 2005- '06

An outlay of Rs.602.92 lakhs is proposed for NCES for the year 2005-06. The details of outlays are as follows:-

**Non Conventional Energy Sources-Annual Plan 2005-2006
Abstract**

(Rs. in lakhs)

Sl. No.	Head of Development/ Schemes	Actual Exp. 2002-03	Actual Exp. 2003-04	B.E. 2004-05	Anti. Expen. 2004-05	Proposed Outlay for 2005-06
I)	Non-conventional Energy Sources	67.51	185.41	204.32	221.77	278.91
II)	H.A.D.P.					
a)	Assistance to Rural Energy Conservation Scheme in H.A.D.P.	10.00	--	34.13	88.13	54.00
b)	Assistance to Non-conventional Energy Sector – HADP	221.07	246.35	270.00	270.00	270.00
	Sub- Total	222.07	246.35	304.13	358.13	324.00
III	W.G.D.P.					
	Assistance to TEDA towards NCES under W.G.D.P.		--	--	30.00	0.01
	Total-NCES	289.58	431.76	508.45	609.90	602.92

Financial Performance

The Tenth Five Year plan (2002-2007) outlay for the Non Conventional Energy Sources sector for the Tamil Nadu State is Rs.2965.00 lakhs. As against this, the overall financial performance of the sector anticipated during the first four years of the Tenth Plan (2002-2003 to 2005-06) would be of the order of 65.23 percent which is inclusive of the following three components viz.,- The plan programmes implemented by the TEDA's financial achievement would be 25.42 percent; the programmes implemented under HADP-NCES would be 38.30 percent; and the programmes implemented under WGDP-NCES would be 1.01 percent.