4.2 NON CONVENTIONAL SOURCES OF ENERGY

Outlay Rs. 1349.00 lac

4.2.1 The major portion of the country's energy requirement is met from conventional energy sources like coal and petroleum. However, the vast majority of our rural population still depends upon the locally available non-conventional sources of energy like animal dung, crop waste and fuel wood. In order to ensure the efficient use of these energy resources in an environmental friendly manner, it is important to promote the programmes of non-conventional sources of energy.

4.2.2 The state government has accorded top priority to the development of new and renewable sources of energy (NRSE). 30 mini hydel plants of 36.90 MW capacity have already been commissioned on different canals in the state. 33 more projects have been allocated to various agencies on BOO basis and are under execution.

4.2.3 32 biomass **co**-generation power projects of 333.50 MW capacity have been commissioned in distilleries/ paper and pulp/ rice shellers/ sugar mills in the Punjab state and another 25 projects of 290.50 MW capacity are under implementation.

4.2.4 Considerable potential for energy conservation exists in the state in industry, agriculture and domestic sectors where energy conservation can be realized to a large extent at the lowest cost. As per the central and state government guidelines, PEDA has made a special programme to undertake the conservation of energy in domestic, commercial, agriculture and industrial sector for effecting saving of about 20% by the end of 12^{th} Plan equivalent generation capacity of 1000 MW. Steps have been taken for introduction of CFL's and energy efficient lighting in the state. The incandescent lamps are being replaced with energy efficient CFL in domestic sector. About 5.50 lac incandescent lamps have been replaced with CFLs. Besides, about 1.60 lac incandescent lamps have been replaced on agriculture tubewell kothas.

4.2.5 Punjab Energy Development Agency has allotted 6 solar power projects of 13.5 MW capacity to private companies on BOO basis and a plan to generate additional 100 MW of solar power is being drawn up. The Punjab State Electricity Regulatory commission has approved tariff of Rs. 7 per KW with 5 % escalation upto 2012 to encourage the developers to set up solar base power projects. 6 solar wind hybrid system of 30 KW capacity has also been commissioned.

4.2.6 Against an expenditure of Rs. 127.88 lac incurred during 11th Five Year Plan, an outlay of Rs. 22665.00 lac is provided for 12th Five Year Plan. An outlay of Rs. 1349.00 lac is provided for Annual Plan 2012-13, for the following schemes:-

On Going Schemes

Centrally Sponsored/Funded Schemes

NC-01 Power Generation from Agro Waste. (CS: State: Beneficiary) (33:33:34)

Outlay Rs. 100.00 lac

4.2.7 The objective of the scheme is to identify & commercialize the technology for the most efficient conversion of agro waste into energy. In order to harness the available potential and to promote technology based demonstration project in this sector during the period (2007-12), PEDA proposes to setup one MW demonstration biomass based power project utilizing the bio-methanation route by up scaling the technology developed by at Sardar Patel Renewable Energy Research Institute (SPRERI). The project proposes to utilize rice straw as a fuel for converting this into biogas and then to generate power.

4.2.8 The proposal is based on the technique developed at Sardar Patel Renewable Energy Research Institute (SPRERI) at Vallabh Vidyanagar to biologically convert rice straw into methane rich gas and semi decomposed organic matter which can be matured into high quality compost or made into briquette fuel.

The estimated project cost is Rs. 9.00 crore, which is proposed to be met as under :

Grant from MNRE, GoI	-	Rs. 3.00 crore
PEDA / PGL share	-	Rs. 3.00 crore
State Government	-	Rs. 3.00 crore

This research & development and technology development project, shall help in utilizing the abundant rice straw in the state in a useful manner for energy recovery. Earlier this project was proposed as externally aided project but the same has been dropped by JBIC and is now converted into centrally sponsored scheme. Against an expenditure of Rs. 14.00 lac incurred during 11th Five Year Plan, an outlay of Rs. 300.00 lac is provided for 12th Five Year Plan. An outlay of Rs. 100.00 lac is provided for Annual Plan 2012-13.

NC- 02 Mini/Micro Hydel Projects

Outlay Rs. 100.00 lac

4.2.9 Mini/Micro Hydel Power generation is now an established technology and very important source of renewable energy. PEDA has taken a lead in the country by setting up eight technology demonstration mini/micro hydel power projects having total capacity of 9.8 MW. After the successful demonstration of this technology, PEDA has attracted private sector participation for such projects.

4.2.10 Against an expenditure of Rs. 18.88 lac incurred during 11th Five Year Plan, an outlay of Rs. 1000.00 lac is provided for 12th Five Year Plan. An outlay of Rs. 100.00 lac is provided for Annual Plan 2012-13.

NC-03 Solar Photovoltaic Demonstration Programme in Punjab(50:15:35) (CS:SS: Beneficiary)

Outlay Rs. 113.00 lac

4.2.11 Solar photovoltaic (SPV) technology converts sunlight directly and instantaneously into DC electricity in an environmentally clean and reliable manner. Under this programme solar lanterns, SPV street lighting systems, domestic lighting systems, SPV power plant for village electrification etc are being installed. Against an expenditure of Rs. 95.00 lac incurred during 11th Five Year Plan, an outlay of Rs. 870.00 lac is provided for 12th Five Year Plan. An outlay of Rs. 113.00 lac is provided for Annual Plan 2012-13.

NC-04 Solar Power Generation (CS: Beneficiary) (50:50)

Outlay Rs. 125.00 lac

4.2.12 PEDA plans to set up a demonstration 1 MW solar photovoltaic power plant in Bathinda district under demonstration programme on tail end grid connected solar power plant of MNRE, GOI for providing village support to strengthen the grid and to provide additional power for day time use . The proposed cost of this project is Rs. 20.00 crore which is proposed to be met as under:

MNRE, GOI grant	:	Rs.10.00 Crore
PEDA	:	Rs.5.00 Crore
PGL	:	Rs.5.00 Crore

An outlay of Rs. 1625.00 lac is provided for 12th Five Year Plan. An outlay of Rs. 125.00 lac is provided for Annual Plan 2012-13.

NC- 05 Energy Recoveries from Urban Municipal Industrial Waste (20:80)(CS:SS) *Outlay Rs. 100.00 lac*

4.2.13 This project aims at promotion, development, demonstration and adoption of conversion technologies for both liquid and solid waste to serve as means of improvement of waste management. State government has directed PEDA to implement such type of projects through public private partnership (PPP) mode. The private developer will claim its capital subsidy admissible under the rules from MNRE, GOI as per their scheme only after commissioning of the projects, depending upon the applicability of the scheme. The private entrepreneurs are approaching PEDA for setting up of such type of projects on BOO basis. 1 MW capacity project at Jamsher Diary Complex, Jalandhar, is under process for allotment to M/s. Shakti Environ Greens Pvt. Ltd., on BOO basis. An investment of Rs. 1650.00 lac will be done by the company for this project, if allotted by the government All Municipal Corporations have been also requested by PEDA to implement such type of projects in the area under their jurisdiction. The private developer will claim its capital subsidy admissible under the rules from MNRE, GoI as per their scheme only after commissioning of the projects, depending upon the applicability of the scheme.

4.2.14 An outlay of Rs. 2000.00 lac is provided for 12th Five Year Plan. An outlay of Rs. 100.00 lac is provided for Annual Plan 2012-13.

NC-06 Implementation of Energy Conservation Act, 2001(50:50) (CS:SS)
Outlay Rs. 200.00 lac

4.2.15 Government of India enacted the Energy Conservation Act, 2001 which came into force from March, 2002. State government has declared PEDA as designated agency to coordinate, monitor and enforce Energy Conservation Act, 2001 in the state. As per requirement of GoI, the state has established "Punjab State Energy Conservation Fund" for promotion of efficient use of energy and its conservation within the state.

4.2.16 An outlay of Rs. 1000.00 lac is provided for 12th Five Year Plan. An outlay of Rs. 200.00 lac is provided for Annual Plan 2012-13.

NC-07 Mass Awareness and Publicity Programme (50:50) (CS:SS)
Outlay Rs. 20.00 lac

4.2.17 The new and renewable sources of energy, being relatively new concepts, are encountering social and psychological barriers in their acceptance on the part of large masses

as a whole. Mass-awareness and publicity programmes can play an important role for promoting NRSE programmes with liberal financial support being provided by the Ministry of New & Renewable Energy, Government of India. In order to create mass-awareness and effectively promote and popularize the use of renewable energy and energy conservation systems in the urban and rural areas of the state, publicity through print, non-print media and other extension work through films, radio and TV programmes, press advertisements and outdoor media need to be strengthened. Under this scheme MNRE, GoI will provide 50% grant. An outlay of Rs. 100.00 lac is provided for 12th Five Year Plan. An outlay of Rs. 20.00 lac is provided for Annual Plan 2012-13.

NC-08 Solar wind Hybrid Programme (75:25)(CS:SS)

Outlay Rs. 50.00 lac

4.2.18 Hybrid system commonly takes the form of photovoltaic systems combined with wind turbines and aero generators running on diesel or bio-fuels. During the day, power generated by the PV array is stored in the battery bank through an energy manager, which controls the complete system. This device maximizes the charging current and prevents excessive discharging/overcharging of the battery bank. The generator starts generating power when wind reaches the cut-in speed of 3 m/s. Output from the wind turbine is also stored in the battery and controlled by the energy manager. The energy stored in the battery is drawn by the electrical loads through the inverter, which converts DC power into AC power.

4.2.19 PEDA plans to install 25 hybrid systems in government institutions and set up the computer labs in schools/colleges/district courts, campus cells and police control rooms etc for which MNRE, Government of India, provides liberal subsidy of 75% maximum upto Rs. 10.00 lac for SPV wind hybrid system. The total cost per system is Rs. 15.00 lac out of which Rs. 10.00 lac will be provided by GOI. An outlay of Rs. 400.00 lac is provided for 12th Five Year Plan. An outlay of Rs. 20.00 lac is provided for Annual Plan 2012-13.

NC- 09 SPV Water Pumping Programme under Jawaharlal Nehru National Solar Mission (JNNSM) (CS:SS: beneficiary) (30:46:24)

Outlay Rs. 276.00 lac

4.2.20 Water is an absolute necessity for human survival.Tapping water with economical and pollution free energy sources has become almost mandatory for rural development and agricultural self reliance. Fossil fuels are fast depleting and therefore, it is essential to develop renewable sources of energy to meet our long term energy requirements. Solar energy can meet the growing requirements of energy effectively.Solar photovoltaic

(SPV) devices, which produce electricity directly from the sunlight, are the ideal source to meet future energy requirements.Solar water pumping systems in particular are totally pollution-free and require very little maintenance as compared to the diesel operated pump sets. The solar water pumping system functions only during the sunshine hours, thereby eliminating the use of costly battery bank. These pumping systems are ideal for small/middle farmers to meet their irrigation requirements.

4.2.21 From the Year 2010-11 the Government of India has launched the scheme of Jawaharlal Nehru National Solar Mission (JNNSM) by providing 30% subsidy unto 5 KWP for SPV water pumps for irrigation and community drinking water for making the system acceptable to the farmers. This scheme will benefit directly the farmers of the state. Since the cost of SPV pumps is still high and out of reach of the small farmers, so financial assistance of 40% of the cost of pumps would be provided to general category farmers 60% subsidy would be provided to Scheduled Castes & 50% to women, by the state government under this scheme.

4.2.22 An outlay of Rs. 1380.00 lac is provided for 12th Five Year Plan. An outlay of Rs. 276.00 lac is provided for Annual Plan 2012-13.