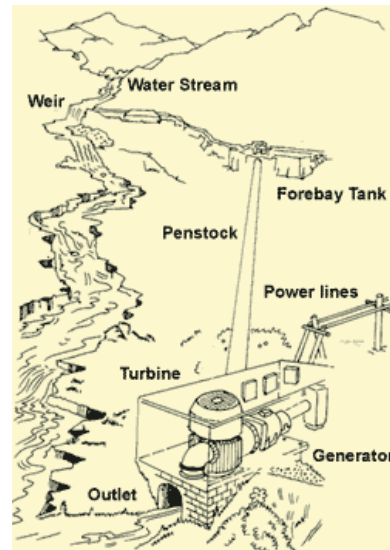


## Village Hydro Power Development in Sri Lanka

In Sri Lanka, 65% of households have access to the national electricity grid. Majority of the rest use kerosene for lighting. Within the next 10 years, the total electrified may reach 75% of households. The government has implemented the renewable energy for rural economic development project (RERED) with the support of the World Bank and UNDP (GEF). This programme is implemented to promote the use of micro hydro, photovoltaic or biomass in households not serviced by the national grid. The RERED Project is funded by a US\$75 million line of credit from the International Development Association (IDA) of the World Bank and a US\$8 million grant from the GEF. The project runs from 2002 to 2007. The main component of this project is a credit programme to provide medium and long-term financing for private project developers, NGOs and community cooperatives, so that the household electricity can be provided by renewable energy options.



Under this programme it is planned to install 90 schemes with a total capacity of 3762 kW ranging from individual capacities of 2.6kW to 40 kW to provide electricity to 3762 households. At end of Dec 2004, 31 micro hydro schemes were completed providing electricity to 1979 houses. The rest of the projects are in progress. At present it is estimated that nearly 250 off grid village hydro schemes are in operation in Sri Lanka.

### Profile of a village hydro electricity scheme.

The village named "Waturawa" is a small village with a population of 250 people living in 45 houses situated in the Ratnapura District famous for gems in Sri Lanka. It is 10 km from the closest town and accessible by public transport. The main occupation of the villagers is agriculture. The national electricity grid is 4 km away and it is unlikely that the grid will be extended within the next two decades. The main energy sources in the village are firewood for cooking, kerosene for lighting and few using car batteries to watch TV. Each household spends about Rs 500/month to meet the energy needs. The village receives an annual rainfall of 4000 mm. The terrain of the village is hilly and a perennial stream runs through the village. This stream was exploited to provide electricity to the village. Since the houses are scattered, only 25 houses could be electrified. The electrification was carried out by IDEA as the project developer under the RERED programme.

Site measurements and power potential	Electro mechanical equipment
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<b>Gross Head:</b> 87m <b>Flow rate:</b> 17.6 lts/sec <b>Length of penstock:</b> 330 m <b>Power Potential:</b> 7.5 kw <b>Total length of distribution line :</b> 4.5 km	<b>Turbine:</b> Vertical shaft 2 jet, direct couple pelton wheel <b>Drive System:</b> Direct couple to induction motor <b>Generator:</b> Induction Motor 11 kw 1500 rpm 50 Hz, 0.8 pf <b>Load Controller and Ballast load:</b> 7.5 kW IGC, 9 kW ballast <b>Distribution Board:</b> O/L and earth Fault relay, MCB, protectors
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The total cost of the scheme: SLRs 931,801 (Approx: 7700 Euro)

#### Breakdown of Cost

Loan Component : Rs 419,301 ( 45%)  
Contribution from the community:  
Voluntary Labour: Rs 212,500 (22,8%)  
Cash: Rs 100,000 (10.73%)  
Contribution from the Provincial Council: Rs 200,000 (21.46%)



After careful sensitization and building confidence of the village members, a consumer society was formed. The office bearers were trained to take on the appropriate responsibilities to run the project on a sustainable manner. Feasibility study and loan documentation were completed by IDEA. Processing of the loan took about 4 months. After confirmation of the loan, each household was expected to contribute Rs 4000 (33 Eur) initially to the society funds and provide labour services on a voluntary basis in the construction of civil works (?) and distribution lines. The electrical and mechanical equipment were made

by local manufacturers trained by the ITDG. All unskilled labour for the civil works was provided by the members and carried out under the supervision of IDEA. The society was able to secure Rs 200,000 from the provincial council to meet the initial cost. The construction work was completed within a period of nine months. The society a fixed monthly fee of Rs 600 (5 Eur) from each household for the use of electricity. It is virtually the loan component payable by the society/member to the bank. The loan was released by the bank after the certification provided by a chartered engineer appointed by the bank, that took nearly six months after completion. The grant of 400,000 Rs obtained under the RERED project was invested in a bank and the interests received is maintained as a separate fund to meet the cost of maintenance and operations.

The society has managed the scheme in an very good manner for the last two years. There has been enough water throughout the year for continuous operation despite the drought conditions experienced in the dry season. The power generated is used mostly for lighting, ironing and watching TV. All the 25 houses have colour TVs and electric irons and refrigerators in 4 houses. Initially only CFL lamps were allowed but fused CFLs are often replaced with incandescent lamps due to high cost. Members are however requested to avoid the use of incandescent lamps, heating equipment and

refrigerators during peak hours. During the day time the power is supplied to a 1.5 HP chili grinding mill.

The only major problem encountered has been the flooding of the power house, which costed Rs 20,000 for the repairs of the electrical equipment.

By IDEA, Kundasale, Sri Lanka.