

## **Sri Lanka Off Grid Electrification**

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The first major attempt for the off grid electrification was through the Energy Services Delivery (ESD) project in Sri Lanka. The objectives of the ESD project was to a) promote the provision by the private sector, NGOs and cooperatives of grid-connected and off-grid energy services using environmentally sustainable renewable energy technologies b) strengthen the environment for demand side management (DSM) implementation and c) improve public and private sector performance to deliver energy services through renewable energy and DSM.

The ESD project addressed some of the critical barriers and regulatory issues. The most important of them was to reduce the price of renewables by increasing sales, capacity building, promoting private sector participation, micro financing for renewables and to make them more sustainable by increasing subsidies. Grid connected renewables were promoted through licensing and by allowing third party sales

### **The key components of the project were**

- ESD Credit Program Component : This was designed to be the main channel for promoting private sector participation in providing renewables based energy services where the participating credit institutions (PSI)'s would be handling the proceeds of the credit component which would be lent by the ministry of finance and planning(MOFP). This component was also designed taking into consideration the sub borrowers through complimentary financing. This program included various technologies such as SHS, village hydro, grid connected small hydro upto 5MW capacity.
- Pilot Grid Connected Wind farm Component : This was to realize the feasibility of a wind project in SRI LANKA from a technical and commercial view.
- Capacity Building Component: This component was designed to provide training and technical support in the area of renewable energy and energy efficiency of different stakeholders and implementing entities in public and private sector.

### **Key Achievements of the ESD project were**

- Private sector participation was achieved. Participation of Micro Financing institutions was encouraged. Creation of Administrative Unit at DFCC Bank has effectively processed the loan disbursement requests and maintained the records of the same. The ESD credits were also managed without any hassels. Implementing agencies have sprung up. 11 mini hydro developers, 4 solar companies and 12-15 village hydro projects have started their operations. 80 functioning institutions for monitoring and operation- management have been set up.
- Demand Side Management Implementation has been strengthened to a great extent. CEB was given extensive training and technical support to realize DSM. First national load research program was completed under this project.

- CEB's auditing programmes were refined. Energy efficiency building codes were developed under this project
- Performance improvement in delivering energy services by public and private sector companies was undertaken. Energy Service Company, the first of its kind in SRI LANKA was set up within Lanka Transformers Ltd. 2-3 new companies on the same lines have already been set up. Regular training programmes were given to private sector and NGO's towards development of renewable energy projects.

### **Achievements: off grid electrification**

- ESD credit programs –The project catalyzed the solar market by selling 850 systems/month by four companies(Shell solar, Access solar, Selco and Alpha Thermal). 15,000 solar installations, 20,953 systems were installed. 350kW of village hydro systems were installed serving 1,732 households.

### **Lessons Learnt:**

These could be grouped in three categories as

a) Institutional b) Technical/Implementation and c) Financial/Economic

#### **a) Institutional**

- Local Community participation would render effective "Project Ownership" and thus would ensure success of the implementation, monitoring and management.
- Improving access to capital for energy investments and providing long term loans through participating credit organizations promotes renewables. Setting up of Micro Financing institutions are most suited for energy service provision than commercial banks or developers. Co-Financing grants which provide incentives to private companies are to be set up for delivering pre defined projects.
- Building a suitable environment enabling business is a must. Institutional structures must be effective and policy framework must be conducive. The government's interest and willingness to co-operate in such projects is very important. Standard Power Purchase agreements should be ensured to reduce the overhead costs. The developers, end users, banking institutions and the project co-coordinators should come together on a common platform to affect the promotion of renewables in the country.
- Good administration for handling all the major activities in a project like the administrative unit (AU) which was set up under ESD project ensures smoother implementation of projects.

#### **Technical/Implementation**

- New industry needs new organizations and involves learning of new skills. Therefore extensive capacity building measures are to be undertaken to disseminate the knowledge and provide training to all stakeholders in the project.

- Cost effective renewable energy technology to be employed. After sales service reliability to be achieved to ensure sustainability. Improve efficiency of the system on the whole. Intensive knowledge enhancement of end users.
- Effective market assessment and enhancement of consumer relationships by providing reliable energy services.
- Flexibility in the project design is a must since all areas do not cater to the same kind of people and the resources available are very different from one area to another. This also ensures success of the project in totality.

### **Financial/Economic**

- Project finance management is the most important of all to ensure success of the project. The Administrative unit set up under ESD projected an efficient way to handle all the finances. Other finances which came from GEF also supported the project in a big way.
- Rural end users were ready to pay more for reliable energy services. Only the high and middle income groups were benefited. Low income group suffered.
- Innovative financial schemes are necessary to cater to all. Micro Financing institutions were professional in facilitating such a big project catering the needs of the local people.
- There should be a direct impact on the economic development of the area by the provision of energy services. Small enterprise developmental activities should be taken up to ensure the economic growth of the end users. This would result in more enthusiasm amongst the end users to develop. This could happen only through exhaustive training programmes and capacity building of the end users.
- More subsidies and incentives from the government were required to ensure sustainability of the project.

Based on the outcome of the ESD project and the lessons learnt the next phase of the project was planned called as Renewable Energy Rural Development (RERED)

### **Renewable Energy Rural Economic Development (RERED):**

After the successful implementation of the ESD project, the Government of Sri Lanka, with the assistance of the World Bank and the Global Environment Facility (GEF) has established the Renewable Energy for Rural Economic Development (RERED) Project. This project, implementation of which started in the year 2002 and is end of this year, aims to expand the commercial provision and utilization of renewable energy resources, with a focus on improving the quality of life and economic development in rural areas by providing access to electricity generated from such resources.

The 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. Loans for individual investments (sub-projects) are disbursed through Participating Credit Institutions (PCI), who make their independent credit assessments while ensuring that sub-projects are financially viable, environmentally sound, meet required engineering standards and are economically justifiable. The

executing agency of the RERED Project is the Administrative Unit (AU) set up within DFCC Bank.

***The following are the major development objectives:***

- Provision of off-grid electricity services to invigorate the rural economy, empower the poor and improve their standard of living
- Setting up of grid-connected investment projects to encourage competition in the power sector, provide capacity addition and diversity, and achieve greater sector efficiency and transparency.

The following are key indicators of assessing the performance of the Project,

- 100,000 rural homes electrified through solar home systems and off-grid electricity connections to households through independent mini grids powered by village hydro, wind or bio mass
- 1,000 off-grid electricity connections to small and medium enterprises and public institutions
- Measurable increases in socio-economic activity in Project areas and incomes of households gaining access to electricity
- Increase in the number of energy service companies in operation from two at present to at least six by Project completion.

***Key components of the project:***

The objectives of the project will be met through the following components and respectively activities: (I) renewable energy technologies in grid-connected and off-grid hydro, wind and biomass; (ii) financing and grant mechanisms for solar home systems and other solar energy applications in rural areas through private companies, NGOs and MFIs; (iii) technical assistance for income generation and social service delivery improvements based on access of villages to electricity; and (v) technical assistance for promotion of household energy efficiency, development of carbon trading mechanisms and integration of renewables into government policy, provincial council development strategies and sector reform initiatives.

A brief description of each of the component is provided below,

***Solar PV Investments:***

The installation of solar systems is expanding rapidly since the start of the ESD projects. This component of the RERED project provided refinancing and grants support for solar PV investments for household, commercial, and institutional use. The primarily objective of which was to solidify the existing middle-range solar home system market and expand service to other applications such as: (i) smaller systems accessible to a poorer market segment; (ii) community applications for health clinics, schools, street lighting, etc.; and (iii) commercial systems for water pumping,

telecom, and other applications. The project assisted in building the economies of scale to solidify the market and increase outreach and awareness building to cater to access for poorer families.

### ***Independent Grid Systems:***

This component aimed at supporting the commercialization of village hydro and other community-based independent grid systems through: (i) refinancing and grant support for investments; (ii) project preparation support; and (iii) TA to address such issues as: (a) use of electricity in daytime - when there is little household demand - for income generation activities; and (b) stranded cost, etc. The status of independent grids within the sector reform agenda also will be emphasized in the broader sector technical assistance. The indicative target is access for 5,000 new households through independent grids – village hydros, as well as projects based on biomass and other technologies.

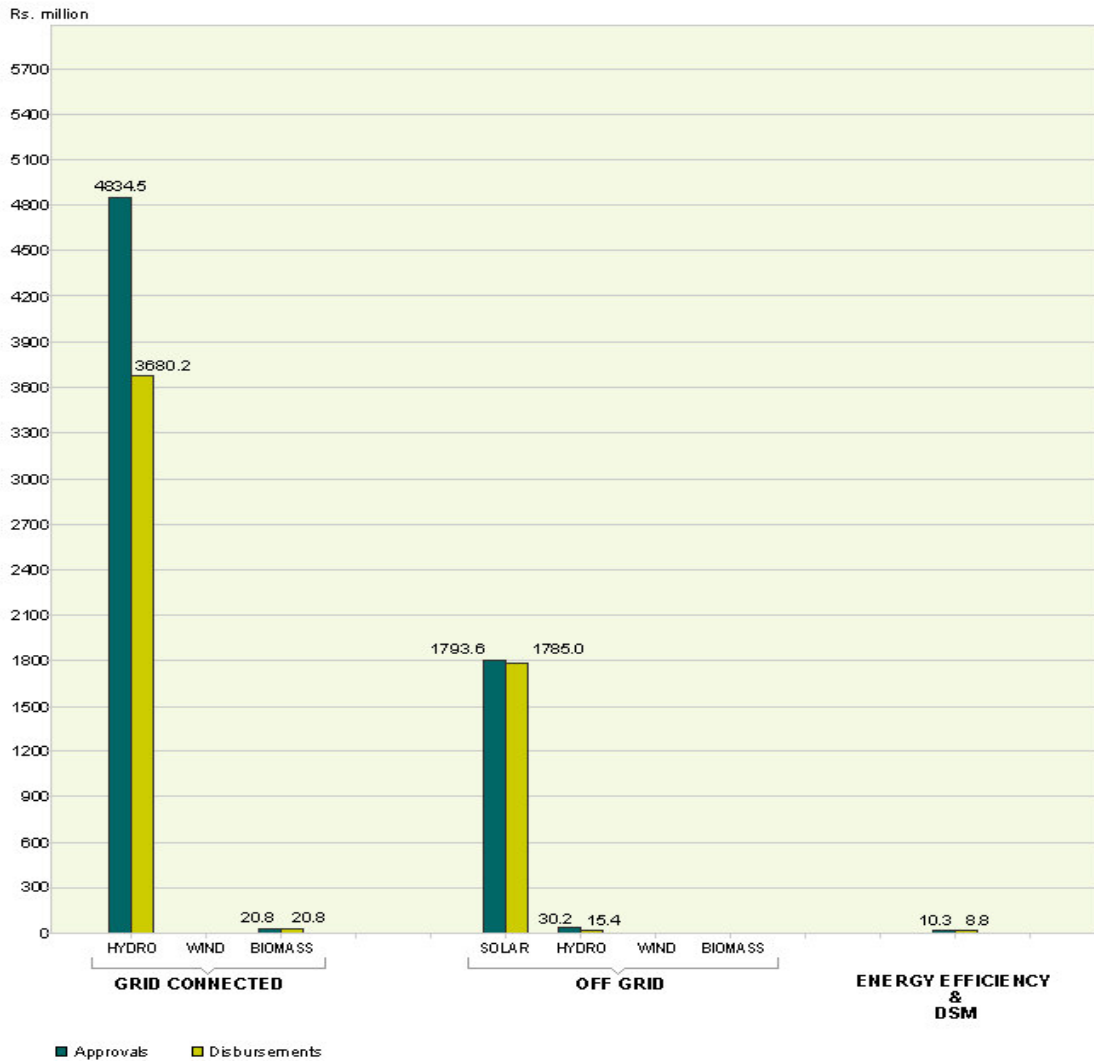
### ***Technical Assistance:***

In addition to the component-specific technical assistance described above, technical assistance under the Project was proposed for the undertaking the various activities under each component of the project,

- Project administration/promotion;
- Subproject promotion/development support;
- Technology/market introduction/promotion/capacity building;
- Cross-sectoral links;
- Sustainability; and
- Monitoring and Evaluation

### **Current status:**

About 5800 million Sri Lankan Rupees have been approved for both grid connected and off grid project implementation inclusive of EE measures, of which about 5500 million Rupees have been disbursed. The following figure presents the cumulative Approvals and Disbursements of Credit under RERED for various projects as on 31 December 2006

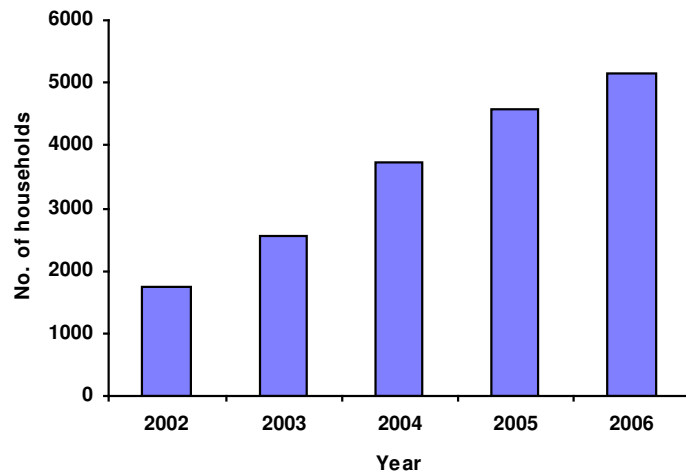


**Figure 1: cumulative Approvals and Disbursements of Credit under RERED as at 31 December 2006 (source: <http://www.energyservices.lk>)**

### **Electrification status:**

About 5000 households were electrified under the project as of 2006. The cumulative no of households electrified each year has been given in Figure 2.

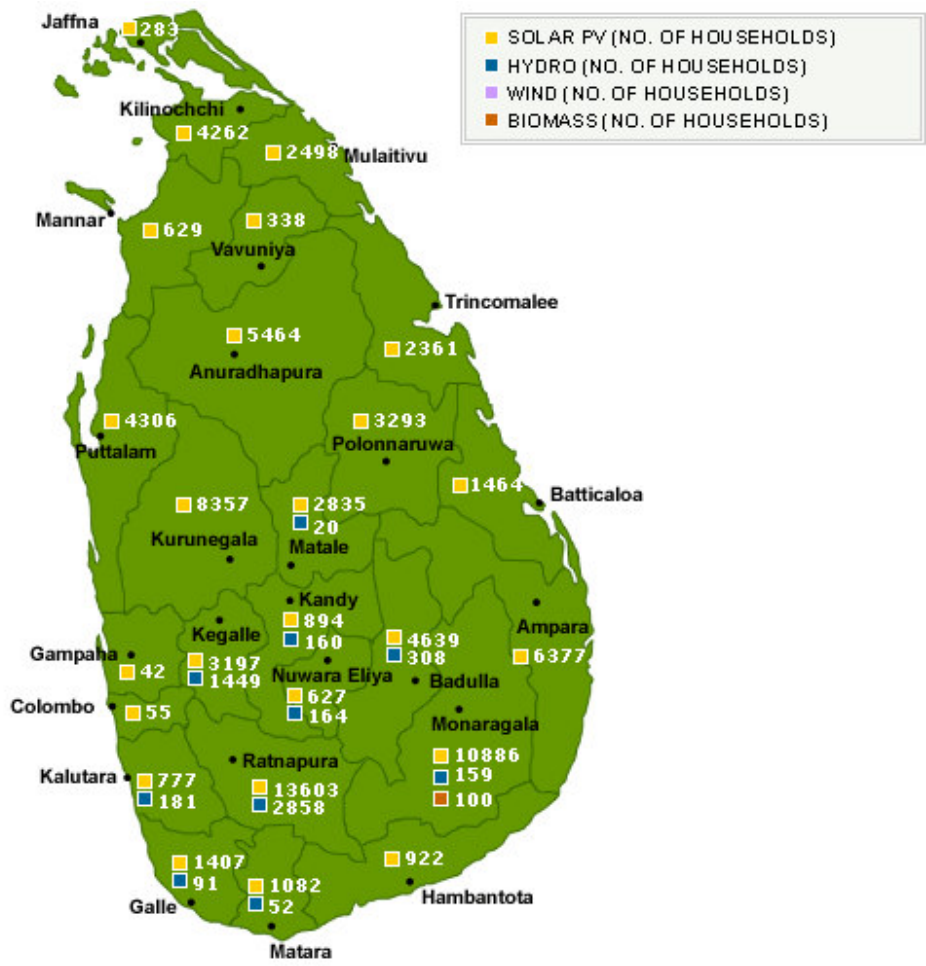
**Cumulative no. of households electrified**



**Figure 2: status of household electrification under the RERED project (2002-2006)**

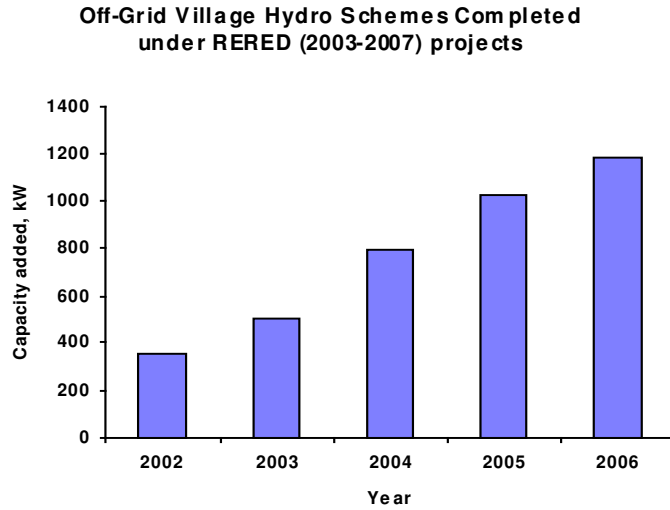
***Off-grid projects:***

The status of off-grid projects is provided in the figure below. Figure 3 presents the geographical distribution of approved projects.

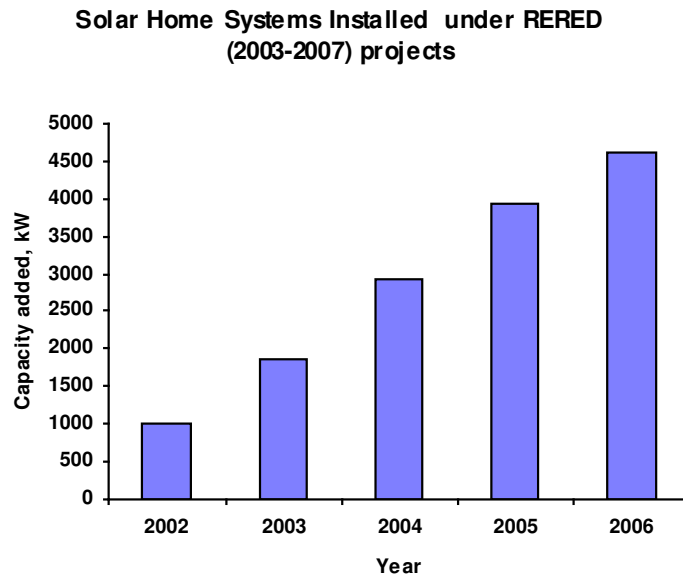


**Figure 3: Geographic Distribution of Off-Grid Projects Approved under RERED as at 31 December 2006 (No. of Households) (source: <http://www.energyservices.lk>)**

Figure 4 presents the status of completed hydropower schemes under the project.



**Figure 4: Status of off-grid hydro schemes completed under the RERED project**  
 Figure 5 presents the status of solar home systems installed this project.



**Figure 5: Status of solar home systems installed under the RERED project**