UNITED NATIONS DEVELOPMENT PROGRAMME
Project of the Government of Sri Lanka

PROJECT DOCUMENT

UNDP and cost sharing financing	
UNDP	
IPF	$ 382,000
GEF	$1,510,000
GoSL	$ 194,000
UNDP & cost sharing	
Total	$2,086,000

Project Number and Title **SRL/96/G32/A/1G/99**

Sri Lanka: Renewable Energy and Energy Efficiency Capacity Building

Project Duration:	Three Years
ACC/UNDP Sector & Subsector	2000 Environment
GEF Focal Area:	Climate Change
GEF Executing Agency:	UNDP
Project Executing Agency:	Government of Sri Lanka, Ministry of Irrigation, Power and Energy
Implementing Agencies:	*The Ceylon Electricity Board, The Energy Conservation Fund*
Estimated Start Date:	June 1997

On behalf of :	Signature	Date	Name/title
The Government	_____	_____	_____
Executing Agency	_____	_____	_____
UNDP	_____	_____	_____

United Nations official exchange rate at date of last signature of project document

$1.00 =_____

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ACRONYMS

CEB	Ceylon Electricity Board
CISIR	Ceylon Institute for Scientific and Industrial Research
ECF	Energy Conservation Fund in MIPE
ESD	Energy Services Delivery project of the World Bank
FCCC	Framework Convention on Climate Change
GEF	Global Environment Facility
GEFOP	Global Environment Facility Operations Committee
GOSL	Government of Sri Lanka
IDA	International Development Agency
ITDG	Intermediate Technology Development Group
MIPE	Ministry of Irrigation, Power and Energy
NERDC	National Engineering Research and Development Centre
NGO	Non-Governmental Organization
PAC	The Project Advisory Committee
PEU	Pre-Electrification Unit of the Ceylon Electricity Board
SAARC	South Asia Association for Regional Cooperation
SLEMA	The Sri Lanka Energy Manager's Association
TA	Technical Assistance
TOR	Terms of Reference
UN	United Nations
UNDP	United Nations Development Program
UNIDO	United Nations Industrial Development Organisation
USAID	United States Agency for International Development

1.0 CONTEXT

1.1 Background

1. In 1994, Sri Lanka's population was estimated at 17.8 million inhabitants, about 80% of which were estimated to live in the rural areas. For 1993, GNP was approximately $10.1 billion, giving a GNP per capita of approximately $574. In 1993, agriculture was estimated to account for 21.3% of GDP.

2. Biomass continues to account for the largest fraction of S. Lanka's primary energy supplies, and it is consumed largely in the domestic sector. Hydro is the next most significant primary resource with the 1400 MW of installed capacity generating more than 3500 GWh in 1992. The country imports large volumes of oil and petroleum products primarily for the transport sector. To avoid a potential generating capacity gap, the Ceylon Electricity Board is considering the introduction of thermal power stations (diesel, coal and gas) totalling some 1300 MW capacity by 2010.

1.2 Strategy

3. Significant parts of the country remain unelectrified and thus stand alone energy technologies are in demand. There are estimated to be more than 5000 solar (photovoltaic) home systems in use in the country, more than 20 village micro-hydro schemes and a few micro hydro and wind powered battery chargers (for charging automotive batteries used in households). In October 1995, the Ceylon Electricity Board (CEB) approved the establishment of a Pre-Electrification Unit (PEU) to support the private sector and NGO developers of renewable energy schemes. In addition, the Ministry of Science and Technology has recently established an Alternative Energy Division. The National Engineering Research and Development (NERDC) Centre has on-going solar, wind and micro-hydro R&D programmes. The Ceylon Institute for Scientific and Industrial Research (CISIR) and the Universities are also active in some of these areas.

1.3 Prior and Ongoing Assistance

4. The GOSL has received assistance for the renewable energy sector. Emphasis on indigenous hydro generation has focused attention here. Both Netherlands and the US have provided funding for energy conservation projects and the study of wind and hydro potential. The World Bank ESD project is currently being negotiated and will provide assistance (relaxed financing) of over $20 million.

1.4 Institutional Framework

5. The Ministry of Irrigation Power and Energy is responsible for the supervision of the energy sector in Sri Lanka. Under its auspices, the Ceylon Electricity Board is a key player in the Renewable Energy and Energy Efficiency sector. Another key agency under MIPE is the Energy

Conservation Fund (ECF). The ECF was established in 1985 and revitalised in 1996 "to promote and initiate activities and projects relating to the improvement of any or all aspects of energy demand management and conservation programmes in Sri Lanka."

6. Since 1990, matters relating to the environment have been handled by the Ministry of Transport, the Environment and Women's Affairs. The environment division is the focal point for all matters relating to UN Framework Convention on Climate Change. A co-ordinating group on Climate Change has representatives from the Ministry of Irrigation, Power and Energy, Ministry of Science, Technology and Human Resources, Ministry of Agriculture, Lands and Forestry.

7. In 1995, a National Committee for preparing a Sri Lanka Energy Policy was formed comprising 14 members representing the main ministries, petroleum corporation, Chamber of Commerce and individual experts.

2.0 PROJECT JUSTIFICATION

2.1 Pre-Project Situation

8. As an Annex 2 signatory to the Framework Convention on Climate Change (FCCC) Sri Lanka, along with the major nations of the world, has committed itself to the goal of stabilising its nation's green house gas (GHG) emissions. The major unbalanced source of anthropogenic emissions for the country comes from the combustion of fossil fuels. Improvements in energy efficiency reduce GHG emissions by reducing fossil fuel consumption while meeting the same productive ends. A substitution of non-GHG emitting renewable energy for fossil fuels meets a similar reduction objective. The GOSL has identified renewable energy and energy efficiency as key elements in Sri Lanka's GHG mitigation strategy.

9. At the same time the GOSL has placed a high priority on energy and electricity production. Large scale indigenous power production is only from hydro of which about half of the country's potential has been used. Lack of capacity and a failure of the monsoon (such as experienced in 1996) can lead to power cuts; damaging to a beleaguered economy. Short term efforts to bolster supply through petroleum imports for thermal generation further hurt balance of trade deficits.

10 The GOSL energy strategy which is designed to support socio-economic and environmental goals has several objectives relevant to this project:

- optimally developing energy resources in a least economic cost and environmentally sound way
- developing and managing forest and non-forest wood fuel resources
- improving institutional capacity to develop and manage the energy sector
- promoting efficient pricing of energy
- promoting energy conservation

- diversifying energy sources and reducing dependence on imported energy sources.

11. Specifically with regard to electricity the GOSL, as part of its strategy to meet high and growing demand, has taken three key steps which underlie the importance of market based approaches.

1. To encourage the entrance of private sector investment and operation in power development the CEB will purchase power from private sector developers by entering into long term contracts with mini-hydro (and other renewable) and diesel generators for grid-fed power.

2. To promote energy efficiency by moving toward market based tariffs and encouraging demand-side management measures

3. To initiate other related legal, regulatory and policy changes.

12. The GOSL has developed energy strategy endorsed by the National Environmental Action Plan (NEAP 1994) which emphasizes the need for targeting a sustainable energy future. To this end the strategy endorses developing and managing resources for biomass fuels, assisting energy efficiency capacity building, promoting diversified energy sources, reducing dependence on imported fuels and improving the institutional capacity to develop and manage the energy sector.

13. Sri Lankan environmental strategy also recognizes the need for sustainable energy future and an amelioration of the environmental consequences of conventional fuel use. The Sri Lankan Ministry of Environmental and Parliamentary Affairs in a recent report, *Climate Change in Asia: Sri Lanka* has identified renewable energy and energy efficiency as key elements in Sri Lanka's greenhouse gas mitigation strategy.[1]

2.2 Results of the Project

14. At its conclusion the project is expected to have made a contribution to the introduction of renewable energy and energy efficiency to the country by:

- identifying resource capabilities and preinvestment issues and options for three important renewable energy sources as well as establishing the capacity to replicate the analysis in other locations;

- building capacity of the emerging Sri Lanka hydro industry in design, manufacture/procurement and maintenance;

- providing training to working energy management professionals in best-practices;

- providing training to student professionals in industrial and commercial energy efficiency technologies;

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[1]The World Bank, Proposal for Review: Sri Lanka: Energy Services Delivery Project, Feb 8, 1996

- encouraging local economic development by transferring skills and promoting indigenous technological solutions.

2.3 Beneficiaries

15. The target beneficiaries of each of the Project Activities include:

- the general population including the rural poor who will benefit from sustainable environmentally beneficial energy production and from enhanced local industry and economic development;
- the private hydro-development sector in isolated locations such as tea estates or larger grid connected sites;
- private renewable energy developers who will benefit from sound project-ready investment information;
- the public sector planning energy projects who benefit from new skills and access to resources;
- Sri Lankan commercial and industrial sectors which benefit from skilled manpower

2.4 Project Strategy and Implementation Arrangements

16. The Project has been designed to address two key barriers to expansion of renewable energy and conservation activity. These are:

- lack of familiarity of the private industrial sector and the financial community with renewable energy projects in general and the resource potential specifically;
- a need for skilled indigenous capacity in design / implementation for both energy efficiency and renewable energy projects.

17. The strategy seeks to address the chief barriers by, to the extent possible, making the private sector prime beneficiaries of TA. This will be done directly and indirectly. Direct assistance will be given to industry to increase its skills and capacities through training groups, universities and colleges or by arranging training events and exchanges specifically for the sector. Indirect assistance will be provided by directing work in the public sector to those outputs relevant to industry; thus the development of preinvestment reports. Public sector departments have been primarily selected as implementing agents of this project even when the private sector has been targeted as the focal beneficiary.

18. The renewable energy and efficiency industry is small and poorly organised in Sri Lanka. It is important to deliver capacity building assistance to the existing industry commensurate with its ability to absorb the assistance. Where no organised industry presence exists TA will be delivered indirectly through the chief energy Ministry, the Ministry of Irrigation, Power and Energy or its

sub-agencies the Ceylon Electricity Board and the Energy Conservation Fund. The Executing Agency for the project will be the Ministry of Irrigation, Power and Energy.

19. There are numerous participating agencies and stake holders in the Sri Lanka/UNDP Renewable Energy project. This reflects the varied range of activities the project is expected to cover in its objective to create an overall environment for development and dissemination of renewable energy technologies in Sri Lanka. A co-ordinating mechanism is therefore recommended to ensure adequate co-ordination.

20. **A Project Advisory Committee (PAC)** would be drawn the large number of stakeholders involved in the project. Its membership will be drawn from:

Ministry of Power, Irrigation and Energy (Chair)
Ceylon Electricity Board (participant in the ESD Project)
Energy Conservation Fund
Sri Lanka Energy Manager's Association (SLEMA)
NERDC
ITDG Sri Lanka
The private sector (represented perhaps by the Ceylon National Chamber of Industry)
The University of Moratuwa

2.5 Reasons for Assistance

21. The project seeks to remove barriers to the expanded and sustainable utilisation of renewable energy in Sri Lanka. The project will facilitate and accelerate the use of renewable energy technologies and energy efficiency measures thus reducing the need for additional fossil fuel thermal power stations and greenhouse gas (GHG) production (i.e., CO_2) associated with fossil fuel power stations. The project was designed as a technical assistance project to fit under GEF Climate Change Programme 6, Promoting the Adoption of Renewable Energy by Removing Barriers and Reducing Implementation Costs.

22. The UNDP and the GEF are supporting this project for a number of reasons:

1. the Project is compatible with energy strategy objectives of the GOSL while providing vital incremental resources. The Project promotes the sustainable use of indigenous renewable resources and promotes the growth and capacities of the private sector. While the GOSL is currently providing some resources for TA in the project areas the assistance is minor. Many parts of the energy sector are in crisis and require the bulk of resources. The project is therefore opportune in strategically assisting under-funded priority areas.

2. the project is compatible with UNDP's objective of poverty eradication and sustainable development. The role of enhanced energy supply, particularly through renewable sources, integrates well with sustainable and equitable growth objectives of the UNDP.

3. the Project supports the UNDP and the World Bank's objective to enhance private sector participation in Sri Lanka's energy sector.

4. the Project supports the GEF objective of promoting environmentally-sustainable development and of mitigating emissions of GHG.

5. the support provides medium term technical assistance to the IDA / GEF financing of the Energy Services Delivery (ESD) Project with a combined value of over $40 million. The estimated start date is in 1997 and will proceed for 5 years. While the ESD will provide an element of TA the current proposed project will not duplicate or overlap these services. Rather this project will provide medium term capacity building in some sectors targeted by the ESD and provide services which enhance the long term impact of the major infrastructure support.

2.6 Co-ordination Within the Sector

23. The project has been developed to complement and enhance the World Bank/GEF Energy Services Delivery (ESD) project. The UNDP project design was initiated in conjunction with a joint programming mission undertaken between the World Bank ESD task managers and a UNDP consultant in October/November of 1995. It has been finalised in conjunction with ESD task managers of the World Bank and UNDP-GEF after a joint mission in July-August 1996.

24. While the ESD will primarily provide considerable financing for renewable energy and energy efficiency infrastructure Technical Assistance will primarily be provided by UNDP. The TA proposed by the UNDP will compliment with that provided by the ESD. The UNDP / GEF sponsored TA will support the longer term objectives and provide a basis for continued growth of renewable energy and efficiency activities at the conclusion of the ESD.

25. The Global Environment Facility Operations Committee meeting (GEFOP) has agreed that the UNDP and the World Bank should work closely with Government of Sri Lanka (GOSL). The UNDP were to develop a Technical Assistance project that would complement the Energy Services Delivery (ESD) project in Sri Lanka to be partly funded by GEF and partly by UNDP, the GOSL and/or bilateral agencies. The proposed institutional framework thus takes into consideration the framework of the ESD project.

26. Technical assistance (TA) to support the ESD project directly is being proposed in the IDA/GEF proposal in two main areas:

(i). TA to the CEB's pre-Electrification Unit (PEU) to support private sector and NGO developers of renewable energy electricity service delivery schemes. The PEU will undertake feasibility studies, design reviews, testing and developing standards

(ii). TA to the CEB's Demand Side Management (DSM) Unit for Load Research and in particular initially the development of a DSM Action Plan and DSM Load Research Programme Implementation plan

27. Of the 6 Activities encompassed by the Project five have direct linkages of support of the ESD project. Activities 1 and 2 support the preparation of projects in the Mini hydro and wind farm sectors and provide complementary support to the PEU. Activity 4 supports training for hydro engineers, Activity 5 supports training for energy managers in the commercial and industrial sectors

and Activity 6 supports consumer and technology user's confidence in renewable energy equipment. These latter Activities provide TA support to agencies other than the CEB.

28. The Joint mission and project development objectives between World Bank (ESD) and UNDP have ensured that the activities are designed to:

- complement and support mutual objectives;
- be independent activities so that outcomes will neither be dependant on the ESD nor cause dependency within the ESD.

29 Table 2.1 summarizes both the complementarity and the exclusive nature of the 6 UNDP Activities with the IDA ESD Project.

Table 2.1: UNDP TA Activities - Relationship to the IDA ESD Project

UNDP TA Activity	Complementarity with IDA ESD Project	Features Exclusive of the IDA ESD Project
Activity 1: Mini and Small Hydro Project Preparation	The Activity complements the Credit Program which will provide financing for remote village hydro schemes. The Activity will provide training and a methodological basis for taking identified projects (both remote and grid-connected) to a commercially prepared level. Data generated by this activity will be incorporated into the renewable energy performance modelling tasks of the ESD Capacity Building Component.	Although ESD TA assistance is available to developers for project preparation this is for remote small hydro systems only. Activity 1 will provide a methodological basis for project preparation (currently required in the private sector) of both remote and mini-hydro grid-connected systems.
Activity 2: Wind Assessment and Project Preparation	The Activity complements the Pilot Wind Farm Component of ESD which will finance a small wind farm. The Activity will take projects in two high wind regime areas of the country to pre-commercial readiness in anticipation of the experience gained in the Pilot. Data generated by this activity will be incorporated into the renewable energy performance modelling tasks of the ESD Capacity Building Component.	There is no ESD TA provided for specific projects which provide additional wind resource commercialization.
Activity 3: Increasing the Effectiveness of Applied Research	The Activity supports the foremost applied research institution for energy efficiency and renewables in the country. Innovation will be supported in the technologies targeted by the ESD.	The ESD TA provides for neither the commercialization of biommass technology nor increased research activities in renewables. This Activity supports these ends.
Activity 4: Capacity Building in the Small Hydro Industry	Local Sri Lankan engineering firms can design systems up to 150 kW. Larger systems (up to 5 MW) are expected under the ESD Credit Program. Enhancing local engineering and manufacturing capabilities will help lead to cost reductions and further development of mini-hydro resources.	Training is not a component of the ESD TA.
Activity 5: Strengthening energy Audit and Management Capabilities in the Commercial , Institutional and Industrial Sectors	The Activity supports TA directed to the CEB DSM Unit which will develop a Code of Practice for Energy Efficiency in Commercial Buildings, a DSM Implementation strategy and a Load research program. A new training program developed under this Activity will complement and be coordinated with these activities.	While members of the CEB DSM Unit will benefit from a new training program provided by this Activity the intended audience will be very much broader. It will include energy managers in buildings and industry, policy makers and engineering students. The ESD Capacity Building Component does not support a revised educational program for the energy management sector.
Activity 6: Performance Testing of Micro hydro and Solar Home Energy equipment	The Activity supports the dissemination of microhydro turbines and generators and solar home equipment funded through the ESD by enhancing consumer confidence. Performance testing will help ensure the quality of equipment that reaches the market.	It is expected that equipment used in the ESD project will come from a range of manufacturers some providing certification others not. Performance testing is not provided by the ESD.

2.7 Counterpart Support Capacity

30. The GOSL and other private agencies have committed to provide $194,000 in kind and in Rupees over the three year life of the project. The majority of Activity Areas do not require commitments to sustain the results at the conclusion of the project. Outputs are generally self-contained and self-sustaining.

31. Some of the key agencies working on the project are the Sri Lanka Intermediate Technology Development Group (ITDG), The National Engineering Research Development Centre (NERDC), The Sri Lanka Energy Managers Association (SLEMA) and Moratuwa University.

32. There is a small but growing private sector capacity in small hydro. The detailed workplan for this task must account for and be designed in conjunction with the needs of private institutions. The NGO ITDG Sri Lanka is currently undertaking a phased development of cascading hydro sites ranging from 150 to 500 kW for a private tea estate. They are helping to co-finance two grid connected demonstrations and are in the process of a national assessment of up to 500 existing sites on tea estates which have fallen into disuse. They are currently correlating streamflow measurements in 3 catchments with hydrologic and geographic data. It will be important to build on the experience and use the findings. At the same time a local hydro developer, Syrex, is actively promoting half a dozen schemes they have investigated to prefeasibility stages.

33. ITDG have offered courses in a variety of micro hydro aspects and have provided training for turbine manufacturers, site surveys and design engineers. In 1996 they are offering a course directed to mini-hydro grid-connected design and analysis. Course content is comprehensive and includes: hydrology and stream flow prediction, siting, design of civil works, turbines/governors and their selection, electrical transmission and generation, cash flow and profitability analysis and so on

34. Established in 1974 the National Engineering Research Development Centre (NERDC) is a research and development laboratory under the Ministry of Science and Technology. Over 80% of its research activities are devoted to developing or improving renewable energy or energy efficiency equipment. In their nine departments they are currently actively working on projects related to biomass (gasification, improved combustion, charcoalization), hydro turbines, solar thermal (drying, water purification, chilling), wind, industrial audits, lighting and motors and so on.

35. The Sri Lanka Energy Managers Association (SLEMA) is a non-profit Colombo-based organisation of about 200 energy engineers and economists. Its membership includes the CEB (about 30), the Petroleum industry (20), the gas industry, and other managers from large buildings such as hotels and from energy consuming industries. Since 1984, SLEMA has offered and conducted energy efficiency training courses and workshops for energy managers and associated professionals. Course content is comprehensive offering theory and practicalities of energy audits and setting up an energy efficiency program. The program was initiated by USAID but the last two courses were partially supported by the Government of the Netherlands. This assistance is coming to an end. Five courses have been offered over the 12 years with an average attendance of 25 each time. After more than a decade existing training materials are out of date and do not fully conform with current best practices for energy efficiency measures.

3.0 DEVELOPMENT OBJECTIVE

36. The Development Objective of this Technical Assistance Project is to expand the use of indigenous, sustainable energy resources through the private sector and to increase energy efficiency in the commercial and industrial sectors.

4.0 IMMEDIATE OBJECTIVES, OUTPUTS AND ACTIVITIES

37. Two key, immediate objectives are the basis of project design and the delivery of technical assistance:

1. To encourage private sector investment in selected small / micro hydro, wind, and biomass projects.

2. To build the professional capacity of the renewable energy and energy efficiency industry in design and implementation.

38. Each of the Immediate Objectives are addressed below for the Project in terms of:

a) the Outputs expected by the conclusion of the Project.

b) those Activities and sub-Activities which are to be undertaken,

c) the Sri Lankan counterpart agencies which will implement the Activities,

d) the Measurable Performance Indicators used to manage the output of the Activities,

e) the Inputs required by Sri Lanka and Multi-lateral assistance,

4.1 Immediate Objective 1

To encourage private sector investment in selected small / micro hydro, wind, and biomass projects.

39. This objective targets two major renewable sources of electricity generation, hydro and wind. A third large source, biomass, perhaps one of the most neglected in terms of project financing, is also a target. The activities and sub-activities identified under this objective are designed to:

- build indigenous experience in a complete range of project preparation activities from resource assessment, to project design, to financial analysis;

- identify resource potential at promising pilot sites;

- provide parallel support to the IDA ESD project in a number of potential areas, namely; (a) Credit Line supporting Village and Grid-Connected mini and small hydro schemes and (b) Pilot Wind Farm. The TA provided by the activities

identified below will provide the project preparation documentation and experience necessary to identify new project opportunities;

- create documentation and software on models and methods used to assess and prep re projects. This will help support technology transfer activities.
- build capacity through training and exposure to new methods and technologies

4.1.1 ACTIVITY 1: MINI AND SMALL HYDRO PROJECT PREPARATION

(a) Outputs

- Resource assessment of one (1) hydrologic basin in the country;
- Preinvestment documentation for grid-connected hydro projects within said basin;
- Methodological documentation and software for further basin analysis of hydro potential;
- One (1) training and promotion seminar.

(b) Task Description

40. Activity 1 will provide experience in the analysis of mini / small hydro potential within a complete hydraulic basin of Sri Lanka. The scope of activities will be to at first apply rapid appraisal techniques in a selected water basin to determine generation potential and costs of exploitation at a reconnaissance level of accuracy. Site visits will be used to validate secondary sources of information. Second, designs will be optimised to "bundle" sites within the basin making use of design and construction efficiencies. Location will decide whether sites are to be designed as grid-connected or remote village hydro schemes. Designs will be refined at selected sites to permit more accurate costing information. Finally documentation will be prepared sufficient to allow private sector financing agencies and the CEB to make go / no-go decisions.

41. Methods, procedures and software applications will be documented separately to be presented as part of a wrap-up teaching seminar.

1.1 **Workplan:** Identify hydrologic basin taking into account scope of work and available budget as well as other factors such as potential investor interests. Develop TOR and a workplan for Activity 1.

1.2 **Flow Measurement:** Establish flow monitoring gauges at 3 to 5 strategic locations for year round monitoring. Determine flow extremes. Establish and analyse flow records and correlate these with available meteorological information.

1.3 **Rapid Appraisal and Strategic Design:** Using rapid appraisal techniques establish promising site locations and preliminary designs using topographic, geologic, environmental impact and hydrologic information. Verify and adjust promising designs with site visits. Establish whether sites will be grid connected or isolated

village systems. Design and cost accordingly. Establish rough costs of sites and prioritise. "Bundle" selected sites strategically to take advantage of design and cost efficiencies. Adjust design and costing data and document at a prefeasibility level of detail.

1.4 **Preinvestment Information:** Develop and standardise methods for expanding the technical analysis to include preinvestment information such as: Standardised Power Purchase Agreement, Standardised Tariff and grid connected code (for grid-connected schemes) or adapted demand-based income and back-up procedures for isolated sites. Identify financing options. Determine financial information such as return on investment and cash flow Determine manpower requirements including training. Identify barriers and other issues limiting investment.

1.5 **Technology Transfer:** Develop documentation recording procedures and software for the above. Conduct a seminar in two parts: one, to present technical information on how to carry out the basin analysis and project preparation and two, to present project information to potential investors and project developers.

(c) Counterpart Agencies

42. The Pre-electrification Unit of the CEB will be the primary counterpart agency for this activity. Personnel will take chief responsibility for establishing and monitoring stream flow. Assigned personnel will also be responsible for working with a team of local and foreign consultants in designing and analysing projects. Indigenous skills should be identified and utilised whenever possible in such organisations as ITDG and other private hydro developers such as Syrex.

(d) Measurable Performance Indicators

- Installed hydro capacity identified for preinvestment;
- Quantity and quality of prepared procedural documentation and computer models generated;
- Opportunities provided for financial community and developers to explore project opportunities.

(e) Inputs

Budget:	Sri Lanka	$11 K
	UNDP	$30 K
	GEF	$372 K

43. Inputs required from outside Sri Lanka consist primarily of financing of both foreign and local consulting expertise to identify and design the sub-project and to supervise its implementation by Sri Lankan nationals. Field transportation and incentives will be required. The sub-project does not warrant the costly purchase of a rugged field vehicle but allowance should be made for rental of this service. Equipment and material purchase will also be required for flow monitoring and data

logging. A minor amount of computer hardware and soft ware purchases will be made. Training material and facilities will be required.

44. Sri Lankan inputs would consist of CEB public service salaries and logistics assistance.

4.1.2 ACTIVITY 2: WIND ASSESSMENT AND PROJECT PREPARATION

(a) Outputs

- wind resource data for two (2) promising regions of the country;
- preinvestment documentation for two (2) promising wind farm schemes;
- wind data-logging equipment.

b) Task Description

45. Activity 2 will assess the wind potential at two promising areas in the country: the West coast and the interior South East in the Knuckles Range. Wind monitoring stations will be set up in these locations and hourly wind data logged at 4 elevations up to 40 m.

46. The wind resource has only been measured comprehensively in the southern lowland areas (since 1990 by CEB with support from the Netherlands Government). However should wind farm developments proceed at the rate experienced in India, for example, it is necessary to identify which areas in addition to the southern lowlands are suitable for wind farm development. To date, the necessary wind data exists only in one small area of the country. This activity will provide an expanded wind resource assessment to lay the foundation for future wind-farm development.

47. The Pre-electrification Unit of CEB can carry out the monitoring with local assistance based on their experience with wind monitoring to date.

48. Activity 2 will further extend the scope of work using data results from one year to develop a preliminary preinvestment document for two grid-connected wind farms. This work will develop private sector interest in wind exploitation and build local skills for preinvestment wind analysis.

2.1 **Wind Monitoring:** Select three to five monitoring sites each in the two locations of the Western coastal region and the interior Knuckles Range region. Install anemometers at four levels on 40 m towers to read and record with electronic data loggers hourly wind maximums and directions. Record data for at least the duration of the project.

2.2 **Introductory Training:** Provide advertised introductory training to the PreElectrification Unit of CEB and others in the private and NGO sectors on the basics of wind system design and analysis for grid connected and battery charging sites.

2.3 **Preinvestment Site Analysis:** Using 12 to 18 months of analysed wind data develop preinvestment documents for two grid-connected sites. Develop conceptual designs

so that wind farms can be costed to include inter-connection. Include an environmental impact analysis at a preliminary level. Identify interconnection technical and legal requirements such as: Standardised Power Purchase Agreement, Standardised Tariff and grid connected code. Develop cash flow and profitability analysis. Determine manpower requirements including training. Identify barriers and other issues limiting investment.

2.4 **Technology Transfer and Training:** Hold a wrap-up seminar and training session in which documented methodologies and computer models are transferred to the participants allowing them to replicate the monitoring and preinvestment analysis. Hold a parallel follow-up session with potential investors, financing agencies and project developers in which the outcome of the analysis are explained and financing is sought for the next stage of project development.

(c) Counterpart Agencies

49. The Pre-electrification Unit of the CEB will be the primary counterpart agency for this activity. Personnel will take chief responsibility for procuring and installing wind monitoring equipment as well as co-ordinating data acquisition. Assigned personnel will also be responsible for working with a team of local and foreign consultants in designing and analysing projects. Indigenous skills should be identified and utilised whenever possible in such organisations as ITDG and other private wind developers.

(d) Measurable Performance Indicators

- Cost effective wind generated capacity identified for preinvestment;
- Quantity and quality of prepared procedural documentation and computer models generated;
- Opportunities provided for financial community and developers to explore project opportunities.

(e) Inputs

Budget:	Sri Lanka	$11 K
	UNDP	$30 K
	GEF	$317 K

50. Inputs required from outside Sri Lanka consist primarily of financing of both foreign and local consulting expertise to identify and design the sub-project and to supervise its implementation by Sri Lankan nationals. Field transportation and incentives will be required. The sub-project does not warrant the costly purchase of a rugged field vehicle but allowance should be made for rental of this service. Equipment and material purchase will be required for monitoring and include 10 each of: battery-driven electronic data-loggers, anemometers, 40 m towers. A minor amount of computer hardware and soft ware purchases will be made. Training material and facilities will be required.

51. Sri Lankan inputs would consist of CEB public service salaries and logistics assistance.

4.1.3 ACTIVITY 3: INCREASING THE EFFECTIVENESS OF APPLIED RESEARCH

(a) Outputs

- Market research report for selected NERDC-sponsored biomass conversion technology;
- Trade shows, demonstrations or equivalent commercialisation events and activities;
- Technology transfer materials for in-house commercialisation training;
- Increased research activity.

(b) Task Description

52. NERDC recognises that a major barrier to the increased use of its technology is its inability to successfully promote its technologies with the private sector. Good ideas are developed to a prototype stage but stagnate because they are not picked up. A "Techno-economics" Unit has recently been established for this purpose but its resources and experience are limited.

53. It is proposed to increase the proliferation of technology applications by providing TA in support of the vital link between research and commercialisation. It is proposed to do this by providing primary support to one renewable fuel where there are outstanding innovations: biomass. Support for technologies of the one fuel type will focus assistance yet provide a model for product promotion in other areas.

54. Biomass is the principal energy resource of Sri Lanka. Improved utilisation and management of the resource can reduce needs for fossil fuel and reduce deforestation. In 1993 an inter ministerial group set up by the late president recommended such an activity. Technologies for the conversion of biomass to energy are currently in many stages of commercial readiness from "commercially available" to "demonstrated" to "under research and development". To maximise its impact the TA will support commercially ready systems which may not be widely available but nevertheless have most technical issues ironed out. As well the TA will focus on biomass conversion technology and not the cultivation of biomass nor the preparation of fuel.

55. NERDC has developed technological capability in small biomass combustion systems for commercial and industrial applications. These systems encompass gasifier (fluidized and fixed bed), boilers, ovens and incinerators. Biomass has proven cost efficiencies for direct thermal applications where gas clean-up and removal of tars is not an issue. They have developed technologies for small applications such as crematoriums, lumber drying, tea drying, smelting of scrap aluminium and brass, bakery ovens, brick and tile kilns. The use of biomass has the potential to replace fossil fuels such as LPG and to use residue sources of biomass such as paddy husk, sawdust, coconut husks or timber scraps.

56. Although NERDC have proven technologies they have difficulty in finding industrial and commercial applications which are willing to invest. TA directed toward assembling preinvestment packages for specific applications would do much to stimulate the conversion to biomass. This activity proposes to work with the Alternative Fuels Department and the Department of Techno Economics of NERDC to assist in the promotion and commercialisation of biomass thermal

conversion technology. This would be done by carrying out selected market research to determine sources of biomass and proximate demand for thermal energy. Projects would be prepared at a preinvestment level to attract investors.

57. The TA would also support increased research activity for renewable energy and efficiency technologies.

3.1 **Establish Workplan:** Identify biomass technologies within NERDC at the stage of commercial readiness. Establish a market research strategy targeting industries and commercial establishments such as crematoriums, non-ferrous foundries, bakeries, tea estates and so on. Similarly target biomass sources such as paddy husk, coconut husk, municipal waste, and sawdust.

3.2 **Market Research:** Use the services of a qualified Sri Lankan firm to conduct market research to determine technology demand, biomass supply sources, costs and constraints as well as capabilities in design and fabrication of commercial combustion units. Identify sources of finance. Further identify biomass technology applications appropriate for commercial development at NERDC.

3.3 **Technology Research:** Provide inputs to increase the effectiveness of research on applied renewable energy or energy efficiency technology. This might include travel within the SAARC region or the purchase of specialised equipment and would contribute to either capital or operational research budgets but not to salaries or overhead.

3.4 **Technology Promotion and Transfer:** On the basis of research develop a promotion program which would address key issues such as access to capital, cost recovery and so on. Hold a biomass trade show and seminar to promote NERDC technology amongst a targeted audience. Create a setting for energy users, biomass suppliers, equipment manufacturers and financial specialists to interact. Prepare demonstrations and promotional material. Help defray costs of bringing selected participants. Develop a methodological approach to commercialisation which can be transferred to the Techno-Economic Unit.

(c) Counterpart Agencies

58. The Energy Conservation Fund will implement the project, subcontracting NERDC for task activities.

(d) Measurable Performance Indicators

- the number of commercial opportunities identified for conversion to biomass cumbustors;
- the quality and quantity of technology transfer materials;
- the number of new products supported by research funding:

(e) Inputs

Budget:	Sri Lanka	$ 35 K
	UNDP	$ 20 K
	GEF	$ 274 K

59. Outside assistance will be required to establish terms of reference for the market analysis. Foreign and local consultants will be required to carry out market research and to prepare information and promotion materials. Funds will be required to assist funding of commercialisation such as a trade show, technology transfer material as well as additional research activities.

60. The NERDC Centre will contribute salaries of employees, and research facilities.

4.2 Immediate Objective 2:

To build the professional capacity of the renewable energy and energy efficiency industry in design and implementation.

61. Activities will build capacities in the emerging hydro industry and the professional energy management industry of Sri Lanka. The activities and sub-activities identified under this objective are designed to:

- increase the design, analysis and operation skills of hydro engineers in CEB, turbine manufacturers, consultants, project developers and NGO's;
- provide access to new ideas being developed regionally and beyond;
- increase the management capabilities of energy managers in the commercial and industrial sectors and;
- assist the emergence of new young professionals in the energy efficiency and renewable energy disciplines.

4.2.1 ACTIVITY 4: CAPACITY BUILDING IN THE SMALL HYDRO INDUSTRY

(a) Outputs

- Comprehensive two week courses - two (2) with course material
- Specialised two day courses - three (3) with course material
- Asia region study tour for three weeks - one (1) with evaluation report

(b) Task Description

62. This component seeks to improve the quality and the quantity of small hydro equipment available in Sri Lanka. The long term sustainability of the renewable energy technologies in Sri Lanka is dependent upon the equipment suppliers remaining competitive and having skills resulting

from a greater range of renewable energy equipment being made available. As there is no indigenous manufacture of mini-hydro equipment in the range of 150 kW to 5 MW (in contrast to stand-alone micro hydro of capacity less than 150 kW), this component seeks to develop the industry and increase skill levels through international exchange of staff and experiences focused on mini-hydro capacity.

63. Courses such as these fill an obvious need and are to be encouraged. It is proposed that this activity provide continued support for ITDG to continue providing mini-hydro programs calling in appropriate outside expertise as required. Micro hydro courses may also be expanded if learning gaps are identified. The CEB will also provide input to this course.

64. The activity would also provide a budget for a tour to relevant small hydro sites, industries and development centres in Asia.

4.1 **Course Design and Implementation:** Evaluate the existing course for its appropriateness to the needs of the industry. Adjust the content to be responsive to the needs of the industry and fill gaps in areas such as operation, control and maintenance procedures. Provide one main two to three week course a year over three years and two 3 day short term courses over the term of the project.

4.2 **Study Tour:** Organise and hold one study tour in year 2 of the project for 4 representatives from industry and 2 representatives from government. Prepare a report on significant findings of the tour for Sri Lankan industry and make the report widely available.

(c) Counterpart Agencies

65. The Energy Conservation Fund shall be the implementing agency for this activity. They in turn shall subcontract implementation of the activity to ITDG.

(d) Measurable Performance Indicators

- participation by private sector developers and implementors in workshops / seminars
- identified innovation as a result of study tour.

(e) Inputs

Budget:	Sri Lanka	$28 K
	UNDP	$15 K
	GEF	$135 K

66. Outside inputs will be required in the form of local and foreign consulting advice to upgrade instruction material. Operation of the seminar will involve the costs of classroom training facilities and field visits. Two types of courses will be given: short 2 to 3 day courses on specialised aspects and comprehensive courses generally of two or three weeks duration. Accommodation and field transport to visit sites will be required.

67. The GOSL can be expected to contribute funds through the Energy Conservation Fund and a participants can be expected to pay some tuition.

4.2.2 ACTIVITY 5: STRENGTHENING ENERGY AUDIT AND MANAGEMENT CAPABILITIES IN THE COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL SECTORS

(a) Outputs

- Course material
- Energy audit and management workshops - two (2)
- Energy audit equipment - to be specified
- University certification program
- Student / Industry awards program

(b) Task Description

68. This activity will strengthen capacity by supporting the major revision of seminar reference books and course material in association with international experts. This activity will also support procuring best-practice audit instrumentation. The target audience for this activity will be existing and potential energy managers in industrial and commercial facilities who are well represented in SLEMA membership. Once material has been updated energy efficiency workshops targeted at selected sectors of the economy will be conducted. These workshops are a direct path for introducing best practices on in-house energy efficiency audits and programs to energy managers throughout the commercial and industrial sectors.

69. The effects of th.. component, by raising awareness and technical capability among the target groups, will support and complement CEB's DSM initiative with existing commercial and industrial sector customers. This will lead to an improved level of awareness of best practices in energy management and increase the likelihood of participation in CEB's DSM management. The Energy Conservation Fund (ECF) will execute the project and SLEMA professionals will deliver it. New instrumentation will reside with the Energy Conservation Fund to be shared nationally with involved organisations such as SLEMA, NERDC, the CEB DSM program or interested Universities.

70. Support will be provided to the University of Moratuwa to take advantage of the improved SLEMA course. In the first of three years 100% funding will be provided for SLEMA and others as appropriate to present the course in a multidiscipinary program to the undergraduate and graduate levels of the faculties of Engineering and Architecture; in the second year 50% funding and in the third 25% funding will be provided. In latter years the reduced funding may be used to integrate the course material into university curricula rather than a SLEMA-presented seminar. In the final year as well a budget amount should be provided to transfer the Moratuwa program to Peradenyia University engineering program.

71. Support will also be provided to SLEMA to improve student opportunities for hands-on learning opportunities and for the Association to improve energy efficiency opportunities amongst its membership. SLEMA is to be encouraged to canvass its members for volunteers who will permit students to undertake in-house energy efficiency audits, design and analysis. In turn the project will provide an award for the most cost-efficient design as well as partial funding for an awards event.

5.1 **Course Development:** Consulting assistance both local and foreign, will review existing course content and adapt international best-practice course content to the Sri Lankan context. Course materials will be developed and pilot tested as necessary. A committee of SLEMA and ECF will supervise and review progress of the work.

5.2 **Equipment Procurement:** Co-ordinated with course development consultants will identify and procure energy audit equipment required for conducting the course and for transferring increased audit capability to the energy management community.

5.3 **Course Delivery**: Consultants will assist in the first course and provide sufficient training to local professionals to allow them to conduct energy management courses independently. ECF and SLEMA will deliver courses.

5.4 **Moratuwa University Curriculum:** Organise and co-ordinate curricula schedules to allow for energy management course presentations, testing and certification. Develop with SLEMA a co-operative program for student interns to work on projects identified by its membership. Supervise projects. Arrange an awards program.

(c) Counterpart Agencies

72. The Energy Conservation Fund will implement this project and will jointly deliver the Activity with SLEMA and the University of Moratuwa.

(d) Measurable Performance Indicators

- numbers of professional attendees at courses;
- yearly use of audit equipment by national private and public agencies.
- University program subscription;
- uptake by industry of a student intern program.

(e) Inputs

Budget:	Sri Lanka	$ 22 K
	UNDP	$ 30 K
	GEF	$282 K

73. The project will provide local and foreign consulting advice as well as audit equipment. It will provide for the course presentation as specified at Moratuwa University as well as a student / industry awards program.

74. Further inputs will be provided from SLEMA professionals donating time and course participants contributing part of the required course fee.

4.2.3 ACTIVITY 6: RENEWABLE ENERGY EQUIPMENT PERFORMANCE TESTING

(a) Outputs

- test procedures to verify performance specification for critical microhydro and solar home equipment;
- trained manpower in a Sri Lankan Research Centre to competently and efficiently conduct the specified tests;
- supplementary test equipment to provide a comprehensive, yet appropriate level of, testing program.

(b) Task Description

Activity 6 provides the basis for a professional testing service to be developed within NERD Centre targeted at key renewable energy and electrical appliances used in small remote locations. The Activity will assist the sector by providing testing facilities and procedures within which microhydro and solar home equipment can be tested and rated against specification indicators. Promoting and distributing tested and qualified equipment will increase consumer confidence in renewable energy and increase the likelihood of uptake by rural residents affected by the World Bank Energy Services Delivery Project.

Testing will be established for the following technology components:

- Micro hydro: a) turbine and drive systems and b) generators and motors
- Solar home systems: a) battery charge regulators and controllers and b) DC fluorescent light fixtures.

The NERD Centre has been identified as the appropriate institution to conduct tests because of their experience with renewable energy system testing and the existing test equipment that resides there.

The following table indicates the performance test required for equipment and supplementary test instrumentation required by NERDC if it is not already available at that institution. The test procedures are not intended to be comprehensive but to identify where key additional test equipment would be required to be purchased.

Test Procedure	Additional Equipment Required	Budget Allocation US$
Micro-Hydro: Turbine & Drive System		
Specific speeds at 10 to 1000 rpm under varied heads and flows.	Increase head and flow test capability. Flow metering.	10,000
Turbine efficiency	none	
Rotor balance at speed	Dyna.nic balancing device	40,000
Micro-Hydro: Generators and Motors		
Single and three phase up to 10 kW induction or synchronous generators	none	
Frequency, current, voltage, over speed setting, generator control response	Instruments for testing overspeed setting and generator control response	8,000
Protection device response to over-current, over speed, over/under voltage and phase imbalance	Instruments required	8,000
Solar: Battery Charge Regulator and Load Control		
Simulate and measure photovoltaic charging and battery output	Controllable voltage source	1,500
Measure set point compliance for compensation of differing battery temperatures	A controllable heat source. This can be a self built unit which allows the temperature sensor to be inserted.	5,000
Peak current testing	none	
Compliance of charge regulator for critical set points such as hi/lo voltage disconnect and reconnect, set points variation due to temperature change and performance under short circuit, over current and lightening protection.	None	
Solar: DC fluorescent lighting fixture		
Lumen Output	Hand held light meter and photometric sensor such as LI-COR LI-250 and LI-210SA	1,000
DC voltage variance for striking, and continuous operation	none	
Operating frequency and invertor output	none	
Crest Factor - peak voltages and RMS voltages	none	

The tasks required to complete this Activity encompass:

6.1 **Test Design:** Test programs for both micro hydro and solar home systems will be developed at NERDC with the assistance of foreign consultants. Tests will be developed commensurate with requirements for precision, the frequency the testing procedure will be used and the budget available. The test design will specify the organization of the test facility, test procedures and procedures for analysis and reporting of results. The World Bank Asia Alternative Energy Unit shall be consulted because of their experience in designing testing programs for microhydro and photovoltaics as well as their planned dissemination of the technologies.

6.2 **Test Equipment Specification and Procurement:** Test equipment required will be specified and procured for NERDC.

6.3 **Training:** Training will be conducted by foreign consultants and NERDC staff in test procedures, monitoring, analysis and reporting for all test series.

6.4 **Promotion:** NERDC staff will develop the test procedures as a Centre service with a cost recoverable component identified. The testing service shall be promoted amongst foreign and local suppliers of equipment with the appropriately developed materials.

(c) Counterpart Agencies

The Energy Conservation Fund shall be the implementing agency for this activity. They in turn shall subcontract implementation of the activity to NERDC.

(d) Measurable Performance Indicators

- testing procedures developed and published
- numbers of equipment suppliers taking up the service

(e) Inputs

Budget:	Sri Lanka	$35 K
	UNDP	$18 K
	GEF	$130 K

Outside inputs will be required as foreign consulting advice and test equipment purchases.

The NERDC will contribute the salaries of employees and the test facilities including test equipment already owned by the Centre.

5.0 RISKS

75. To a large extent the risks inherent in the Project and identified in the brief have been minimized in the present design of the project. To some extent the primary risk of pushing the administrative abilities of indigenous institutions, especially when the ESD will be putting considerable demands on these institutions, still remains. Largely, however, this concern is addressed by making the CEB implementing agency for only the first two Activities. Their obligation for providing at least one dedicated staff person for each Activity should reduce the risk in this case.

76. The Energy Conservation Fund, though moribund for these last years, has been given new staff and impetus. They are being asked to channel funds but not implement projects and have a proven track record in this role.

77. The Project has been designed to provide TA connected with commercially-proven technology options. With the limited assistance available this limits the technology-based risks inherent in projects with a research focus.

78. There is a risk that the focus of TA should become public sector-centred and not private. This is so because the Executing and Implementing Agencies are largely public. This shift should be guarded against by management decisions of the PAC and some supervisory control by the UNDP Sri Lankan office. In all cases a central concern should be that the outputs of Activities should primarily benefit the productive private and non-governmental sectors.

6.0 PRIOR OBLIGATIONS AND PREREQUISITES

79. For the Project to be a success the counterpart institutions must be prepared to provide inputs and be in accord with the objectives. During the project document's development phase, it was felt that obligations and preconditions are not required before commencing the project. It has, however, identified responsibilities of the counterpart organisations herein referred to as prerequisites. These are outlined below.

ACTIVITY	ORGAN-IZATION	PREREQUISITE
Project Co-ordination and Management	Ministry of Irrigation, Power and Energy	1. Organise and administer a Project Advisory Committee. 2. Receive, keep and administer Project funds for Sri Lankan agencies designated by the funding agencies. 3. On request provide a yearly project financial audit.
Activity 1: Mini Hydro Project Preparation	The Ceylon Electricity Board, Pre-Electrification Unit	1. Provide to the PAC a yearly work plan for the Activity specifying tasks and the allocation of personnel. At least one professional shall be provided full-time for the duration of the project. 2. Provide logistic assistance such as field vehicles.
Activity 2: Wind Assessment and Project Preparation	The Ceylon Electricity Board, Pre-Electrification Unit	1. Provide to the PAC a yearly work plan for the Activity specifying tasks and the allocation of personnel. At least one professional shall be provided full-time for the duration of the project. 2. Provide logistic assistance such as field vehicles.
Activity 3 Activity 4 Activity 5	The Energy Conservation Fund	1. Receive, keep and administer Project funds for Sri Lankan agencies designated by the funding agencies.
Activity 3: Effective Applied Research	The National Engineering Research and Development Centre	1. Provide to the PAC a yearly work plan for the Activity specifying tasks, targets, budget allocations and the allocation of personnel. At the same time provide a short report on Project accomplishments.
Activity 4: Hydro Training	Intermediate Technology Development Group	1. Provide to the PAC a yearly work plan for the Activity specifying tasks, targets, budget allocations and the allocation of personnel. At the same time provide a short report on Project accomplishments.

ACTIVITY	ORGAN-IZATION	PREREQUISITE
Activity 5: Energy Audit and Management Training	The Sri Lanka Energy Managers Association	1. Provide time voluntarily for training and teaching the program. 2. Establish a relationship with the University of Moratuwa to teach the course for a reduced fee, to transfer learning materials, to establish a student co-operative program in industry and to establish a joint awards program.
	The University of Moratuwa: Faculties of Engineering and Architecture	1. To establish a co-operative program with the SLEMA for the purpose of creating an integrated cross-disciplinary energy management program, a student co-operative program in industry and a joint student / industry awards program.
Activity 6: Renewable Energy Performance Testing	The National Engineering Research and Development Centre	1. Provide to the PAC a yearly work plan for the Activity specifying tasks, targets, budget allocations and the allocation of personnel. At the same time provide a short report on Project accomplishments.

80. The project document will be signed by UNDP, and UNDP assistance to the project will be provided, subject to UNDP receiving satisfaction that the prerequisites listed above have been fulfilled or are likely to be fulfilled. When anticipated fulfilment of one or more prerequisites fails to materialise, UNDP may, at its discretion, either suspend or terminate its assistance.

7.0 PROJECT REVIEWS, REPORTING AND EVALUATION

81. A project terminal report will be prepared for consideration at the terminal PAC review meeting. It shall be prepared in draft sufficiently in advance to allow review and technical clearance by the executing agency at least four months prior to the terminal PAC review.

82. The project shall be subject to evaluation 18 months after the start of full implementation. The organization, terms of reference and timing will be decided after consultation between the parties to the project document, plus any associated United Nations agency.

8.0 LEGAL CONTEXT

83. This project document shall be the instrument referred to as such in Article 1 of the Standard Assistance Agreement between the Government of Sri Lanka and the United Nations Development programme, signed by the parties on ___. The Ministry of Irrigation, Power and Energy of Sri Lanka shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government co-operating agency described in that Agreement.

84. The following types of revisions may be made to this project document with the signature of the UNDP resident representative only, provide he or she is assured that the other signatories of the project document have no objections to the proposed changes;

a) Revisions in, or addition of, any of the annexes of the project document;

b) Revisions which do not involve significant changes in the immediate objectives, outputs or activities of a project, but are caused by the rearrangement of inputs already agreed to or by cost increases due to inflation; and

c) Mandatory annual revisions which rephase the delivery of agreed project inputs, or reflect increased expert or other costs due to inflation, or take into account agency expenditure flexibility.

9.0 BUDGETS

85. Table 9.1 summarises Project costs for the three year project period. Total costs are $2.086 million. Government and counterpart staff account for about $350,000 or 17% of the budget. This includes funds required by the GOSL to operationalize and to provide administrative support. Equipment and research funding take up $316,000 or 15%, and other expenses require $450.000 or 22%.

86. For a detailed review of the derivation of the budget project build-up spread sheets are attached as Annex 5 and shown in Table A5.1 - Detailed Budget Calculations by Activity and sub-task as well as Table A5.2 - a sub-budget sheet of Table A5.1 showing the derivation of expenses for each sub-task.

87. Table 9.2 outlines sources of funding for the project.

88. Sri Lankan funds would provide $194,000 (or 9% of project costs) as additional baseline funding. The funding is premised on the baseline contribution already being made by the Government of Sri Lanka and the private sector. Funds required to manage and administer the project are assumed to be part of the baseline. An estimate of the annual contributions currently made by Sri Lanka to each Activity is detailed in Annex 2: BASELINE FUNDING BY ACTIVITY.

89. UNDP funds are proposed to provide $382,000 (or 18% of project costs) as part of baseline funding. The UNDP baseline contribution is based on an extrapolation of amounts required to replace baseline donor funding which had previously supported similar capacity building activities. This is estimated as $95,000. Funds required to manage and administer the project are assumed to be part of the baseline and make up the remaining $287,000. An estimate of the annual donor contributions to each Activity is detailed in Annex 2: BASELINE FUNDING BY ACTIVITY.

90. GEF funds are proposed to provide $1,510,000 (or 72% of project costs) as incremental funding to permit the realization of each activity task.

91. Together UNDP and GEF funds amount to a contribution of nearly $1.9 million. This contribution is to be managed by the UN system. A draft Project Budget Covering UNDP Contribution (Table 9.3) has been included making budget allocations according to UNDP budget categories and according to each of the five Activity areas. Standard UNDP and UNIDO procedures were followed in allocating support costs and in estimating per diems for local and foreign consultants.

TABLE 9.1: **BUDGET SUMMARY**

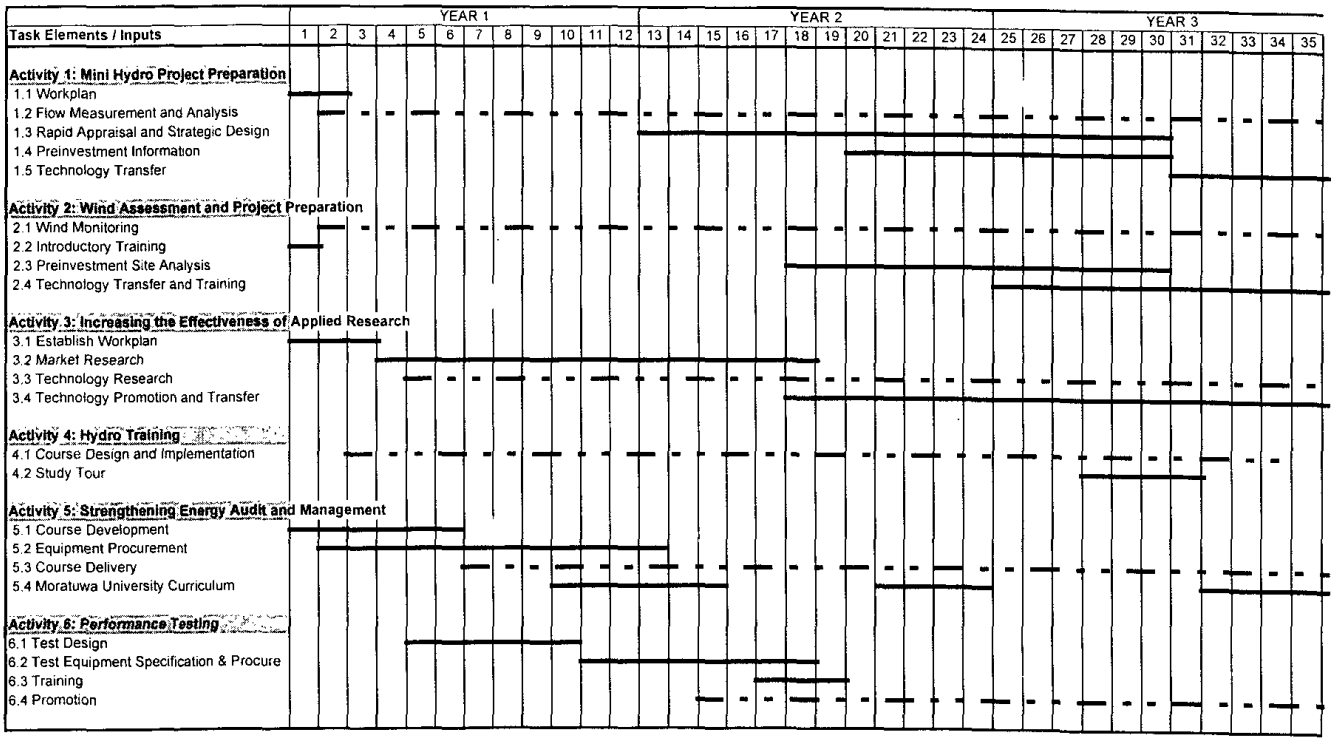
Activity Item	Subcontracts Consultants $ (000)	Counterpart & Management $ (000)	Equipment & Research $ (000)	Other Expenses $ (000)	TOTAL COSTS $ (000)
1. MiniHydro Project Prep	300	11	26	76	413
2. Wind Project Prep	217	11	66	64	358
3. Effective Applied Research	136	38	95	61	329
4. MiniHydro Training	77	2	12	86	177
5. Energy Audit Training	163	45	42	85	334
6. Performance Testing	39	38	75	31	183
Executing Agency GOSL		52			52
Executing Agency UN System	39	153		47	239
TOTAL	**970**	**350**	**316**	**450**	**2086**

TABLE 9.2 **INCOME AND EXPENSE SUMMARY**

Project Item	EXPENSE Project Cost $ (000)	INCOME Baseline Sri Lanka $ (000)	Baseline UNDP $ (000)	Incremental GEF $ (000)	TOTAL $ (000)
Activity 1: Mini Hydro Prep	413	11	30	372	413
Activity 2: Wind Prep	358	11	30	317	358
Activity 3: Effective Applied Res	329	35	20	274	329
Activity 4: Mini Hydro Training	177	28	15	135	177
Activity 5: Energy Mgt Training	334	22	30	282	334
Activity 6: Performance Testing	183	35	18	130	183
Project Subtotal	1795	142	143	1510	1795
Executing Agency GOSL	52	52			52
Executing Agency UN System	239		239		239
Total	**2086**	**194**	**382**	**1510**	**2086**

ANNEX 1: WORK PLAN SCHEDULE

ANNEX 1: WORK PLAN SCHEDULE



ANNEX 2: BASELINE FUNDING BY ACTIVITY

Table A2.1 shows the estimate for annual baseline contributions in each activity area. Baseline contributions have been found to come from three sources; the Government of Sri Lanka, the private sector of Sri Lanka and bi-lateral donors.

With respect to donors it has been difficult to identify where support begins and ends, as well as the ends to which it is used within each institution. Where donor support has been noted it has been based on past general contributions that have supported the institution in the broad Activity area. In the case of the specific Activities identified for the Project, however, no actual outside donor support is available for the activity area.

For Activities 1 and 2 the CEB currently contributes an estimated $8,000 in salaries, vehicle and equipment for the investigation of wind and hydro potential. Donor contributions contribute nearly 2 times that. Activity 3 receives some outside assistance but because of the targeted renewable energy and conservation research activities NERDC was deemed to receive more input from the GOSL. Activities 4 and 5 each have baseline contributions from the private sector in the form of course fees. These are never enough to cover course costs. Since SLEMA provides training and preparation time voluntarily instructors are deemed to contribute their salaries.

In total $95,000 was estimated annually as the base expenditure for the 5 Activities specified. This means for the 3 year project the Activities should have a base contribution of $285,000.

UN allowances were established by applying the established flat rate of 10%. A local cost allowance was established for the Colombo UNDP office by applying 3% to the project expenditures for government-implemented components only. Funds were also included for review and evaluation of the project by an outside consultant.

GEF funds only the incremental cost of each Project Activity. The Executing Agency baseline costs are shown in Section 9.0: **Budgets**. The amounts are $52,000 and $239,000 for the GOSL and the UN respectively.

TABLE A2.1:

CALCULATION OF ANNUAL BASELINE EXPENDITURES

Exchange $1.00 = Rs 54

Activity	Govt of S. Lanka Rs (000)	Private Sector Rs (000)	Total S. Lanka $ (000)	Other Donors $ (000)	Total $ (000)
Activity 1: Mini Hydro Project Preparation					
CEB Salaries	100				
Vehicle	30				
Equipment					
Computer	70				
Subtotal	**200**	**0**	**4**	**10**	**14**
Activity 2: Wind Assessment and Project Preparation					
CEB Salaries	100				
Vehicle	30				
Computer	70				
Subtotal	**200**	**0**	**4**	**10**	**14**
Activity 3: Increasing the Effectiveness of Applied Research					
NERDC Salaries & Overhead	130				
Research Capital Expenditures	400				
Research Operational Expenditures	100				
Subtotal	**630**	**0**	**12**	**7**	**18**
Activity 4: Hydro Training					
Instructor Salaries					
Course fees		500			
Subtotal	**0**	**500**	**9**	**5**	**14**
Activity 5: Strengthening Energy Audit and Management					
Course material	100				
Salaries	200				
Course Fees		100			
Subtotal	**300**	**100**	**7**	**10**	**17**
Activity 6: Performance Testing of RE Equipment					
NERDC Salaries & Overhead	130				
Research Capital Expenditures	400				
Research Operational Expenditures	100				
Subtotal	**630**	**0**	**12**	**6**	**18**
TOTAL					**95**

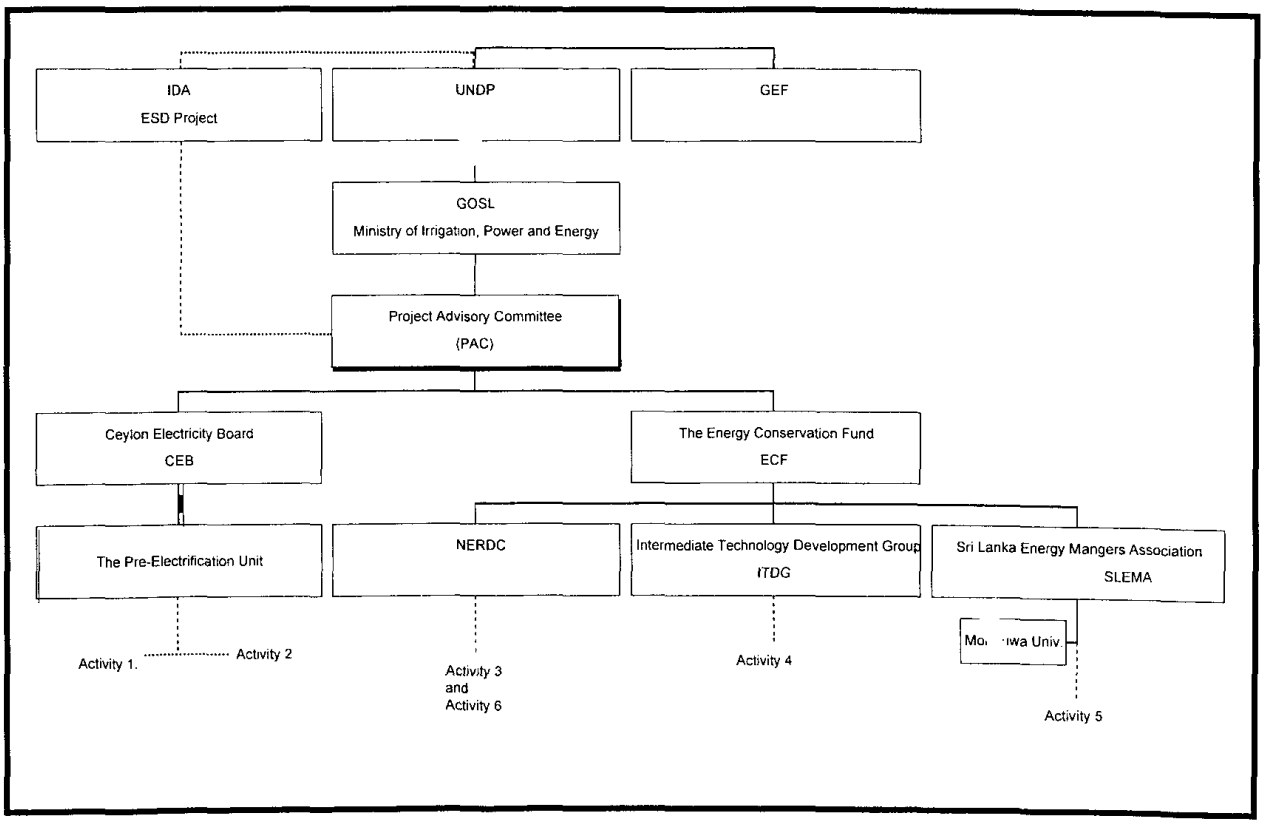
ANNEX 3: ORGANISATIONAL ARRANGEMENTS

The project has been organised to streamline reporting relationships. The Executing agency shall be the Ministry of Irrigation Power and Energy. Implementing Agency authority shall be delegated to two agencies within the Ministry, the Ceylon Electricity Board and the Energy Conservation Fund. The CEB shall operationalise the project through the Pre-Electrification Unit residing under the Planning Department. Issuance of Terms of Reference for local consultants and the procurement of equipment shall be the responsibility of the PEU. The ECF shall contract with the agencies specified for each Activity, NERDC, ITDG, SLEMA and Moratuwa University to deliver services for the Activity. The ECF shall be responsible for the issuance of TOR to and contracting with local consultants. This shall be done in consultation with the implementing organisation. The agency responsible for procurement of equipment shall be the ECF although this responsibility may be given to the responsible implementing agency under contract.

The UNDP shall be responsible for developing TOR to, and contracting with foreign consultants. This shall be done in consultation with the PAC.

Figure A3.1 graphically shows organisational relationships.

FIGURE A3.1: ORGANISATIONAL ARRANGEMENTS



ANNEX 4: THE 1995 PROPOSAL - A RESPONSE TO REVIEWER COMMENTS

The Project design in this document is formulated on the basis of an earlier, November 1995, UNDP Mission which identified 8 Activity Areas in a Project Proposal. This Proposal received authorisation for GEF funding of about $1.5 million with the balance supplied by the GOSL and the UNDP.

In revisiting the Proposal document to formulate Project Activities account was made of various reviews that were made and to the extent feasible these were integrated to the new Project design of Activities. This has given rise to differences between the Activities identified in November 1995 and now in this document. There are fewer Activities, six rather than eight. This Annex attempts to account for those differences.

First, fewer tasks reflect the observation of the limited institutional capability in Sri Lanka to handle many disparate activities channelled to a range of organisations. The administrative requirements of 6 tasks are easier to handle especially when fewer agencies are involved. There will be additional burdens on the key agencies with the addition of the ESD project. This TA did not want to create unwarranted competition for administrative resources. In one instance two Activities recommended in the Proposal document (Activity 3.1 Strengthening Private Sector Energy Efficiency Capabilities and Activity 3.1 Energy Efficiency and Renewable Energy in Education) were combined for efficiency in coordination. The change was recommended by one of the proponents and implementors, Moratuwa University, and agreed to by the other Activity implementor SLEMA.

Second, the emphasis of Activities 1, 2 and 3 has been shifted away from resource assessment toward resource commercialisation particularly by private sector financing. This reflects the concern (expressed in GEF Council comments) for the limited usefulness of resource assessment in the absence of addressing other important issues such as design optimisation, access to capital and buy-back rate structures. For this reason a major shift has been make in Activity 3 away from studies of resource potential toward market assessment of existing, proven biomass technologies. Dendrothermal projects (Activity 3.1) while technically possible have been largely untried especially on a dedicated plantation basis. Current pilot applications for cogeneration would likely have limited replication possibilities with untested environmental consequences. Research into the sector is to be encouraged but was not deemed appropriate for TA funding. This Activity's focus has been shifted (in new Activity 3) to support the commercialisation of indigenously developed biomass technology.

Significantly for two other Activities (4 and 5) a similar emphasis has been placed on coordination with and meeting the needs of commercial interests.

Third, the need for a coordinated approach with the World Bank ESD project has been more finely tuned in this Project design. Care has been taken not to overlap activities to duplicate effort. Activity 3.3 was dropped for this reason.

It was found that Activity 3.3 (Renewable Energy Promotion amongst the general public for solar home systems) duplicates the TA component of the ESD Credit Program in which:

The AU (Administrative Unit of the Credit Program) will implement a promotional effort to create a general awareness among potential customers regarding village hydro and solar home systems. This should include both promotional and educational messages regarding realistic expectations of system performance, the benefits, cost, lifetime and warranties aimed at enabling consumers to make informed purchase decisions. details of the promotion campaign will be developed by the AU in close consultation with IDA.[2]

Fourth, it was found that Activity 2.1 (Renewable Energy Equipment certification) was too ambitious and yet did not go far enough in providing a certification program for the country. It was ambitious in that national organizations felt that it is too early to attempt a standardization program for renewable energy given the limited institutional capability and the fact that standardization should apply to the full range of renewable generation equipment and end use technologies as well. The testing, labelling and promotion of energy efficient consumer technologies, such as lights, refrigerators, fans, motors and so on, was suggested by outside reviewers and by experts in Sri Lanka as an alternate to Activity 2.1. The mission investigated this potential Activity with the key testing and certification agencies; The Sri Lanka Standards Institute, The Ceylon Institute of Scientific and Industrial Research and NERDC. NERDC was the only agency agreeing to take on such a role. Subsequent investigation revealed that this Activity had significant challenges outside the scope of the NERDC mandate. Clearly a multi-agency approach would be required that covered not only testing but also labelling, consumer awareness and most importantly coordination with manufacturers and distributors. The scope of such a program, even on a pilot basis, was judged beyond the resources of this Project. It was therefore adjusted as Activity 6 to provide performance testing of selected renewable energy equipment.

While not duplicating the ESD Project tasks the UNDP TA Activities were chosen to complement and to provide medium- term support to the ESD. In other words Activities were chosen which would prepare the way indirectly through the training of professionals or the preparation of projects for an amplification of ESD objectives while at the same time not affecting outputs of the ESD. At the same time these 6 Activities are deemed to have importance in their own right.

Table A4.1 summarises the revisions made in this Project Document to the Activities proposed in the draft Proposal Document approved by the GEFOP in February 1996.

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[2]The World Bank, Draft Project Implementation Plan, Sri Lanka: Energy Service Delivery (ESD) Project - Annex 1 ,July 1996

Table A4.1: Revisions to Activities of the Proposal Document

Activity Specified in Draft Proposal Document	Project Document Activity Status	Rationale for Changes in the Project Document
Activity 1.1: National Wind Resource Assessment	Activity 2: Wind Assessment and Project Preparation - change in emphasis from national resource assessment to project preparation at two sites.	This revision while retaining resource assessment activities emphasizes preparing projects to be commercially ready.
Activity 1.2: Mini Hydro Power Resource Assessment	Activity 1: Mini and Small Hydro Project Preparation - change in emphasis from resource assessment of a river basin to project preparation on the basin.	This revision while retaining resource assessment activities emphasizes preparing projects to be commercially ready.
Activity 1.3: Assessment of Dendro thermal and Commercial Biomass	Activity 3: Increasing the Effectiveness of Applied Research - change in emphasis from dendrothermal research and biomass resource assessment to commercialization of Sri L: 'can-adapted biomass technology.	This revision while retaining resource assessment activities emphasizes preparing projects to be commercially ready.
Activity 2.1: Renewable Energy Equipment Certification	Activity 6: Renewable Energy equipment performance testing	A change in emphasis from certification to performance testing.
Activity 2.2: Private Sector Capacity Building on Mini-hydro technologies	Activity 4: Capacity Building in the Small Hydro Industry - No substantive changes.	
Activity 3.1: Strengthening Private Sector Energy efficiency Capabilities	Activity 5: Strengthening Energy Audit and Management Capabilities in the Commercial, Institutional, and Industrial Sectors - combined activities 3.1 and 3.2	Efficiency in administration of the Activity. Encourages cooperation and coordination within the energy efficiency industry and educational institutions.
Activity 3.2: Energy Efficiency and Renewable Energy in Education		
Activity 3.3: Renewable Energy Technology Promotion	Omitted	Duplication found with the IDA ESD Credit Program, TA component.

ANNEX 5: DETAILED BUDGET CALCULATIONS

TABLE A5.1:

EXPENSE SUMMARY

Activity	No.	Item	'000$ /Item	Cost $ (000)
(1) Mini and Small Hydro Development				
Travel	5	trips	5	25
Living	12	months	3	36
Stream Gauge Equip (5) Installed	5		2	10
Field travel & Living	3	months	1	3
Local training	1		3	3
Data loggers (5)	5		2	10
Computer equip	1		5	5
Software	2		0.5	1
Miscellaneous	3		3	9
Subtotal				**102**
(2) Wind Assessment and Project Preparation				
Travel	5	trips	5	25
Living	8	months	3	24
Anemometers & Towers (10)	10		4	40
Field travel & Living	3	months	1	3
Local training	1		3	3
Data loggers (10)	10		2	20
Computer equip	1		5	5
Software	2		0.5	1
Miscellaneous	3		3	9
Subtotal				**130**
(3) Increasing the Effectiveness of Applied Research				
Travel	2	trips	5	10
Living	6	months	3	18
Field Travel & Living	6	months	1	6
Local training	1		3	3
Promotion Materials	1		5	5
Local research equip	1		5	5
Foreign research equip	1		10	10
Incremental Research	3	years	30	90
NERDC contract for research delivery	3		3	9
Subtotal				**156**
(4) Hydro Training				
Travel	3	trips	5	15
Living	4	months	3	12
Course Materials	3	years	4	12
Course Facilities	5	times	4	20
Study tour travel & living	6	people	5	30
ITDG contract for course delivery	3		3	9
Subtotal				**98**
(5) Energy Management Capabilities				
Travel	4	trips	5	20
Living	9	months	3	27
Course Materials	3	years	4	12
Course Facilities	5	times	4	20
Audit Equipment	1		30	30
University / Industry Awards	3	years	3	9
SLEMA contract for course delivery	3		3	9
Subtotal				**127**
(6) Performance Testing				
Travel	2	trips	5	10
Living	3	months	3	9
NERDC contract for testing delivery	3		3	9
Promotion Materials			3	3
Test Equipment & shipping			75	75
Subtotal				**106**
(7) Management and Evaluation				
Travel	4	trips	5	20
Living	4	months	3	12
Duty Travel				15
Subtotal				**47**

Project Budget Covering UNDP Contribution

(in US Dollars)

Project Number: SRL/97/G32/11G/99
Project Title: Sri Lanka Renewable Energy & Energy Efficiency Capacity Building
Country: SRI LANKA
Budget Type: UNDP
Version/Status: PIPELINE-HARD

Code	Description	Impl Agents Code	Impl Agents Description	%	Total w/m	Total $	Total AOS	PRIOR YEAR w/m	PRIOR YEAR $	PRIOR YEAR AOS	1997 w/m	1997 $	1997 AOS	1998 m	1998 $	1998 AOS	w/m	$	AOS
10	**PROJECT PERSONNEL**																		
11	**INTERNATIONAL EXPERTS**																		
11 01	ACTIVITY 1: Hydro Engineering Specialist	37	UNIDO	10%	6 0	98,333	9,833	0 0	0	0	3 0	49,333	4,933	3.0	49,000	4,900	0 0	0	0
11 02	ACTIVITY 1: Hydrologist	37	UNIDO	10%	2 0	32,778	3,278			0	2.0	32,778	3,278	0 0	0	0	0 0	0	0
11 03	ACTIVITY 1 Other Consultants	37	UNIDO	10%	10 0	163,889	16,389			0	2.0	32,000	3,200	8.0	131,889	13,189			0
11 04	ACTIVITY 2. Wind Specialist	37	UNIDO	10%	5 0	83,846	8,385			0			0	5 0	83,846	8,385			0
11.05	ACTIVITY 2: Other Consultants	37	UNIDO	10%	8 0	134,154	13,415			0				8 0	134,154	13,415			0
11 06	ACTIVITY 3. Biomass Specialist	37	UNIDO	10%	3 0	49,500	4,950			0			0	3.0	49,500	4,950			0
11.07	*ACTIVITY 3: Market & Promotion Specialist*	37	UNIDO	10%	2 5	41,250	4,125			0			0	2 5	41,250	4,125			0
11 08	ACTIVITY 3 Other Consultants	37	UNIDO	10%	2 5	41,250	4,125			0			0	2 5	41,250	4,125			0
11 09	ACTIVITY 4. Hydro Trainer	37	UNIDO	10%	4 0	92,000	9,200			0	2 0	46,000	4,600	2.0	46,000	4,600			0
11 10	ACTIVITY 5. Audit Specialist	37	UNIDO	10%	3 0	51,818	5,182			0			0	3.0	51,818	5,182			0
11 11	ACTIVITY 5. Energy Management Specialist	37	UNIDO	10%	3 0	51,818	5,182			0			0	3 0	51,818	5,182			0
11 12	ACTIVITY 5: Other Consultants	37	UNIDO	10%	5 0	86 4	8,636			0			0	5 0	86,364	8,636			0
11 13	ACTIVITY 6: Test design Specialist	37	UNIDO	10%	3 0	58,000	5,800			0			0	3.0	58,000	5,800			0
11 49	SUBTOTAL				**57.0**	**985,000**	**98,500**	**0.0**	**0**	**0**	**9.0**	**160,111**	**16,011**	**48.0**	**824,889**	**82,489**	**0.0**	**0**	**0**
11.50	**CONSULTANTS**																		
11 51		99	GOVERNMENT	0%	0 0	0	0	0 0	0	0	0.0	0	0	0 0	0	0	0 0	0	0
11.97	SHORT TERM CONSULTANTS	99	GOVERNMENT	0%	0 0	0	0	0 0	0	0	0 0	0	0	0 0	0	0	0 0	0	0
11 98	SUBTOTAL: CONSULTANTS				0.0	0	0	0 0	0	0	0.0	0	0	0 0	0	0	0 0	0	0
11 99	SUBTOTAL: EXPERTS & CONSULTANTS				**57.0**	**985,000**	**98,500**	**0.0**	**0**	**0**	**9.0**	**160,111**	**16,011**	**48.0**	***824,889***	***82,489***	***0.0***	**0**	**0**
15	**DUTY TRAVEL**																		
15 01	**Duty Travel**	99	GOVERNMENT	0%		15,000	0		0	0		5,000	0		5,000	0		5,000	0
15 99	SUBTOTAL DUTY TRAVEL					**15,000**	**0**		**0**	**0**		**5,000**	**0**		**5,000**	**0**		**5,000**	**0**
16	**MISSION COSTS**																		
16 01	Evaluation & Monitoring	37	UNIDO	10%		71,000	7,100		0	0		11,000	1,100		30,000	3,000		30,000	3,000
16 99	SUBTOTAL MISSION COSTS					**71, 0**	**7,100**		**0**	**0**		**11,000**	**1,100**		**30,000**	**3,000**		**30,000**	**3,000**
17	**NPPP**																		
17.01	ACTIVITY 1: Hydro Engineering Specialist	99	GOVERNMENT	0%	18 0	29,500	0	0 0	0	0	3 0	4,500	0	8 0	15,000	0	7 0	10,000	0
17 02	ACTIVITY 1: Hydrologist	99	GOVERNMENT	0%	8 0	12,000	0			0			0	8 0	12,000	0			0
17 03	ACTIVITY 1: Other Consultants	99	GOVERNMENT	0%	18 0	25,500	0			0	6 0	8,500	0	6 0	8,500	0	6 0	8,500	0
17.04	ACTIVITY 2. Wind Specialist	99	GOVERNMENT	0%	24.0	38,000	0			0			0	12 0	19,000	0	12 0	19,000	0
17.05	ACTIVITY 2: Other Consultants	99	GOVERNMENT	0%	8 0	12,000	0			0			0	4.0	6,000	0	4 0	6,000	0
17 06	ACTIVITY 3: Biomass Specialist	99	GOVERNMENT	0%	6 0	9,000	0			0			0	6.0	9,000	0			0
17 07	ACTIVITY 3: Market & Promotion Specialist	99	GOVERNMENT	0%	12.0	24,000	0			0			0	8 0	12,000	0	6 0	12,000	0
17.08	ACTIVITY 3 Other Consultants	99	GOVERNMENT	0%	3 0	4,500	0			0			0	1.0	1,500	0	2 0	3,000	0
17 09	ACTIVITY 4: Hydro Trainer	99	GOVERNMENT	0%	8 0	12,000	0			0	3 0	4,500	0	5.0	7,500	0			0
17.10	ACTIVITY 5: Audit Specialist	99	GOVERNMENT	0%	5.0	7,500	0			0			0	5 0	7,500	0			0
17.11	ACTIVITY 5. Energy Management Specialist	99	GOVERNMENT	0%	5 0	7,500	0			0			0	5 0	7,500	0			0
17.12	ACTIVITY 5: Other Consultants	99	GOVERNMENT	0%	3 0	4,500	0			0			0			0	3 0	4,500	0
17.99	**SUBTOTAL NPPP**				**118.0**	**186,000**	**0**	**0.0**	**0**	**0**	**12.0**	**17,500**	**0**	**56.0**	**105,500**	**0**	**40.0**	**63,000**	**0**
19	**PERSONNEL COMPONENT TOTAL**				**175.0**	**1,257,000**	**105,600**	**0.0**	**0**	**0**	**21.0**	**193,611**	**17,111**	**114.0**	**965,389**	**85,489**	**40.0**	**98,000**	**3,000**
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Project Budget Covering UNDP Contribution

(in US Dollars)

Project Number: SRL/97/G32/ /1G/99
Project Title: Sri Lanka Renewable Energy & Energy Efficiency Capacity Building
Country: SRI LANKA
Budget Type: UNDP
Version/Status: PIPELINE-HARD

Code	Description	Impl. Agents Code	Impl. Agents Description	%	w/m	Total $	Total AOS	w/m	PRIOR YEAR $	PRIOR YEAR AOS	w/m	1997 $	1997 AOS	w/m	1998 $	1998 AOS	w/m	$	AOS
20	**SUB-CONTRACTS**																		
21.00	ACTIVITY 3 NERDC Subcontract	99	GOVERNMENT	0%		99,000	0		0	0		49,500	0		24,750	0		24,750	0
22.00	ACTIVITY 4. ITDG Subcontract	99	GOVERNMENT	0%		9,000	0		0	0		9,000	0		0	0		0	0
23.00	ACTIVITY 5 SLBMA Subcontract	99	GOVERNMENT	0%		18,000	0			0		6,000	0		6,000	0		6,000	0
24.00	ACTIVITY 6 NERDC Subcontract	99	GOVERNMENT	0%		9,000	0			0		9,000	0			0			0
29	**SUBTOTAL SUBCONTRACTS**					**135,000**	**0**		**0**	**0**		**73,500**	**0**		**30,750**	**0**		**30,750**	**0**
30	**TRAINING**																		
32	**STUDY TOURS/GROUP TRAINING**																		
32.01	ACTIVITY Study tours	37	UNIDO	10%		30,000	3,000		0	0		0	0		20,000	2,000		10,000	1,000
32.99	SUBTOTAL TOURS/GROUP TRAINING					**30,000**	**3,000**		**0**	**0**		**0**	**0**		**20,000**	**2,000**		**10,000**	**1,000**
33	**IN-SERVICE TRAINING**																		
33.01	ACTIVITY 1 Local Training	99	GOVERNMENT	0%		3,000	0		0	0		0	0		1,500	0		1,500	0
33.02	ACTIVITY 2. Local Training	99	GOVERNMENT	0%		3,000	0			0			0		1,500	0		1,500	0
33.03	ACTIVITY 3 Local Training	99	GOVERNMENT	0%		3,000	0			0			0		1,500	0		1,500	0
33.04	ACTIVITY 4 Local Training	99	GOVERNMENT	0%		32,000	0			0		5,000	0		17,000	0		10,000	0
33.05	ACTIVITY 5 Local Training	99	GOVERNMENT	0%		32,000	0			0		5,000	0		17,000	0		10,000	0
33.99	SUBTOTAL IN-SERVICE TRAINING					**73,000**	**0**		**0**	**0**		**10,000**	**0**		**38,500**	**0**		**24,500**	**0**
39	**SUBTOTAL TRAINING**					**103,000**	**3,000**		**0**	**0**		**10,000**	**0**		**58,500**	**2,000**		**34,500**	**1,000**
40	**EQUIPMENT & SUPPLIES**																		
45	**LOCAL PROCUREMENT**																		
45.01	ACTIVITY 1	99	GOVERNMENT	0%		26,000	0		0	0		0	0		26,000	0		0	0
45.02	ACTIVITY 2.	99	GOVERNMENT	0%		66,000	0			0			0		66,000	0			0
45.03	ACTIVITY 3	99	GOVERNMENT	0%		20,000	0			0			0		20,000	0			0
45.04	ACTIVITY 4	99	GOVERNMENT	0%		0	0			0			0			0			0
45.05	ACTIVITY 5	99	GOVERNMENT	0%		30,000	0			0			0		30,000	0			0
45.06	ACTIVITY 6	99	GOVERNMENT	0%		78,000	0			0			0		78,000	0			0
45.99	SUBTOTAL LOCAL PROCUREMENT					**220,000**	**0**		**0**	**0**		**0**	**0**		**220,000**	**0**		**0**	**0**
49	**SUBTOTAL EQUIPMENT & SUPPLIES**					**220,000**	**0**		**0**	**0**		**0**	**0**		**220,000**	**0**		**0**	**0**
@																			

Project Budget Covering UNDP Contribution

(in US Dollars)

Project Number: SRL/97/G32/ /1G/99
Project Title: Sri Lanka Renewable Energy & Energy Efficiency Capacity Building
Country: SRI LANKA
Budget Type: UNDP
Version/Status: PIPELINE-HARD

Code	Description	Impl Agents Code	Impl Agents Description	%	w/m	Total $	Total AOS	w/m	PRIOR YEAR $	PRIOR YEAR AOS	w/m	1997 $	1997 AOS	w/m	1998 $	1998 AOS	w/m	$	AOS
50	**MISCELLANEOUS**																		
52	**REPORTING COST**																		
52 01	Reporting Costs	99	GOVERNMENT	0%		7,460	0		0	0		1,000	0		3,000	0		3,460	0
52 99	SUBTOTAL REPORTING COST					**7,460**	**0**		**0**	**0**		**1,000**	**0**		**3,000**	**0**		**3,460**	**0**
53	**SUNDRIES**																		
53 01	Maintenance Cost	99	GOVERNMENT	0%		9,000	0		0	0		1,000	0		4,000	0		4,000	0
53 99	SUBTOTAL SUNDRIES					**9,000**	**0**		**0**	**0**		**1,000**	**0**		**4,000**	**0**		**4,000**	**0**
54	**DIRECT COSTS**																		
54 01	Direct Costs					51,940						8,370			38,449			5,121	
54 99	SUBTOTAL DIRECT COST																		
59	**SUBTOTAL MISCELLANEOUS**					**68,400**	**0**		**0**	**0**		**10,370**	**0**		**45,449**	**0**		**12,581**	**0**
93	**AGENCY SUPPORT COSTS**					**108,600**	**0**		0			17,111			87,489			4,000	
99.00	**UNDP GEF & CORE RESOURCES**					**1,892,000**	**108,600**		**0**	**0**		**304,592**	**17,111**		**1,407,577**	**87,489**		**179,831**	**4,000**
	UNDP Core Resources					**382,000**						304,592			77,408				
				0%		0	0		0	0		0	0		0	0		0	0
	SUBTOTAL					**382,000**	**0**		**0**	**0**		**304,592**	**0**		**77,408**	**0**		**0**	**0**
	UNDP CORE RESOURCES TOTAL					**382,000**	**0**		**0**	**0**		**304,592**	**0**		**77,408**	**0**		**0**	**0**
	TOTAL UNDP Core Resources					**382,000**	**0**		**0**	**0**		**304,592**	**0**		**77,408**	**0**		**0**	**0**
999	**NET UNDP/GEF TOTAL CONTRIBUTION**					**1,510,000**	**108,600**		**0**	**0**		**0**	**17,111**		**1,330,169**	**87,489**		**179,831**	**4,000**