KINGDOM OF CAMBODIA
ELECTRICITE DU CAMBODOGE

Cambodia Rural Electrification and Transmission Project
(IDA Financed Components)

E921
Volume 2

PROJECT IMPLEMENTATION PLAN

OCTOBER 2003
# Table of Contents

1. THE PROJECT .................................................................................................................. 5  
   1.1 Background .................................................................................................................. 5  
   1.2 Project Objectives ....................................................................................................... 5  
   1.3 Global Objective .......................................................................................................... 6  
   1.4 Sector Issues Addressed by the Project ...................................................................... 6  
2. DETAILED PROJECT DESCRIPTION .............................................................................. 8  
   2.1 Components ................................................................................................................ 8  
   2.2 Justification, Including Financial And Economic Analysis ....................................... 18  
      2.2.1 220 kV Transmissions System (interconnection to Vietnam) component .......... 18  
      2.2.2 The Rural and Renewable Electricity Component: ........................................... 18  
3. COST ESTIMATES AND FINANCING PLAN .................................................................. 19  
   3.1 ADB ............................................................................................................................ 19  
   3.2 IDA/GEF/RGC/Private Sector ................................................................................... 19  
   3.3 Summary of Project Cost and Financing Plan ............................................................ 24  
      3.3.1 Project Cost Estimate .......................................................................................... 24  
      3.3.2 Financing Plan ..................................................................................................... 24  
      3.3.3 IDA/GEF/RGC/Private Sector Financed Components Cost ............................. 25  
4. INSTITUTIONAL ARRANGEMENTS (IDA FINANCED COMPONENT) ......................... 26  
   4.1 Project Beneficiary and Organizations Responsible for Project Implementation ........ 26  
      4.1.1 Project Beneficiary .............................................................................................. 26  
      4.1.2 Organization Responsible for Project Implementation ......................................... 26  
   4.2 Project Management and Staffing ............................................................................... 26  
      4.2.1 EDC PMU ............................................................................................................ 26  
      4.2.2 REF PMU ............................................................................................................ 27  
   4.3 Coordinating Mechanisms ......................................................................................... 27  
   4.4 Quality Control .......................................................................................................... 28  
   4.5 Quality Control .......................................................................................................... 28  
   4.6 Monitoring and Reporting Arrangements .................................................................... 28  
5. PROCUREMENT MANAGEMENT ..................................................................................... 29  
   5.1 General ....................................................................................................................... 29  
   5.2 Procurement agency ................................................................................................. 29  
   5.3 Procurement Guidelines ............................................................................................. 30  
   5.4 Standard Documents for Procurement ..................................................................... 30  
   5.5 Domestic Preference ................................................................................................. 30  
   5.6 Advertising .................................................................................................................. 30  
   5.7 Project Costs by Procurement Arrangements ............................................................. 31  
   5.8 Procurement Packaging and Methods ...................................................................... 31  
   5.9 Installation/Civil Works ............................................................................................. 32  
   5.10 Rural Electrification Fund .......................................................................................... 33  
   5.11 Consultant services .................................................................................................. 33  
   5.12 Prior Review Thresholds ........................................................................................... 34  
   5.13 Shortlists of Entirely National Consultants ............................................................... 35  
   5.14 Procurement Supervision and Post Reviews ............................................................ 35
American Dollars **CURRENCY EQUIVALENTS**

Currency Unit = United States Dollar
Cambodian Reil 4000 = US$ 1.00 (exchange rate effective October 2003)
Fiscal Year July 1 – June 30

**ABBREVIATIONS AND ACRONYMS**

ADB  
Asian Development Bank

AFD  
Agence Francaise de Developpement

CAS  
Country Assistance Strategy

EAC  
Electricity Authority of Cambodia

EDC  
Electricite du Cambodge

ESMAP  
Energy Sector Management Assistance Programme

EVN  
Electricité du Vietnam

FY  
Fiscal Year

GEF  
Global Environment Facility

GHG  
Green House Gas

GMS  
Greater Mekong Sub Region

ICB  
International Competitive Bidding

IDA  
International Development Agency

IFC  
International Finance Corporation

IPP  
Independent Power Producers

JBIC  
Japan Bank for International Cooperation

kWh  
Kilowatt hour

MEF  
Ministry of Economy and Finance

MIME  
Ministry of Industry Mines and Energy

MOE  
Ministry of Environment

MW  
Megawatt

NCB  
National Competitive Bidding

NGO  
Non-Governmental Organization

PAF  
Project Affected Families

PIC  
Project Implementation Consultant

PMU  
Project Management Unit

PPA  
Power Purchase Agreement

RE  
Rural Electrification

REE  
Rural Electricity Enterprises

REEAG  
Rural Electrification Environmental Advisory Group

RGC  
Royal Government of Cambodia

RRE  
Rural and Renewable Energy

RREF  
Rural and Renewable Energy Fund

SBD  
Standard Bidding Documents

SPPA  
Small Power Purchase Agreement

SWAP  
Sector Wide Approaches

T/L  
Transmission Line

TA  
Technical Assistance

USS  
American Currency

WPP  
West Phnom Penh
1. THE PROJECT

1.1 Background

Cambodia is a country of about 181,035 sq. km located in the Lower Mekong Region and borders on Thailand in the west, Vietnam in the east and Lao PDR in the north. It is a predominantly rural society emerging from a long period of conflict. It has a population of about 13 million, of whom about 84 percent is rural. The country is at peace, the economy is stabilizing and recent economic performance is promising. With its accession to ASEAN, Cambodia is redefining its political and economic position in the region. Yet Cambodia faces an array of development challenges.

The electricity sector is very small in size and is in an early stage of development. The responsibility for the coordination of electricity sector policy, planning and development rests with the Ministry of Industry, Mines and Energy (MIME). The electricity consumption is very low. Per capita consumption is only about 35 kWh a year. At present about 13% of the country’s population have access to electricity.

In rural areas, electricity services are handled by a combination of local authorities and private operators, collectively called Rural Electricity Enterprises (REEs). Nationwide, more than 600 independent REEs supply power to a total of about 84,000 households either through self-generation (mainly diesel power stations with capacities from 25 kW to 5 MW) or by distributing power procured from other national producers or from two of the neighboring countries. Some of them operate under licenses, which were approved by RGC before the establishment of the EAC. Other suppliers operate informally. As noted above this has produced a regime of highly diversified and very expensive electricity rates, the tariffs are the highest in South East Asia. Currently 67 of the REEs have organized themselves in associations advocating the interest of the rural private sector, thereby aiming to improve the quality of operation of the members. Only about 7% of households in rural areas have access to electricity.

The country is served by 22 small isolated power systems. These systems can be divided into two parts: (i) Phnom Penh and seven big provincial towns served by Electricité du Cambodge (EDC), a state owned limited liability company and (ii) the remainder of the country served under the responsibility of MIME or served by private companies under contract with MIME.

1.2 Project Objectives

The Project’s main objective is to support the Government’s goal of building the foundations for sustainable development in the long term and reducing poverty. It will do so by:

- Promoting rural development by: (a) providing the benefits of electricity to rural people; and (b) eliminating the policy, institutional, financing and information barriers that impede the market development for renewable energy in Cambodia.
- Improving power sector efficiency through:
(a) Consolidating current initiatives which seek to foster an environment favorable to private participation and an overall commercialization of the power sector; and
(b) Reducing electricity costs and removing infrastructure bottlenecks.

1.3 Global objective:

The Project’s global environment objective is to contribute to reducing the risk of climate change by mitigating Cambodia’s greenhouse gas emissions (GHG). This will be achieved by promoting renewable energy technologies as alternatives to and substitutes for GHG-emitting diesel, kerosene and wood fuels.

1.4 Sector Issues Addressed by the Project

The project will address the following main sector issues:

**Combating sector inefficiencies and institutional challenges**

The project will facilitate strengthening of EDC’s corporate structure in order to combat the current sector inefficiencies. In this way the current extremely high production costs will be reduced, while the quality of services will increase. Following this, it is expected that larger customers will be attracted, and the market will strengthen. Use of Technical Assistance to explore options for unbundling the sector and tariff reforms is one means to this end. Another means is through the construction of a transmission line to the Vietnamese border that will enable EDC to access lower-cost electricity supplies through imports, thereby providing the enterprise with an opportunity to strengthen its financial situation with a view to eventual privatization. With the project, EDC will be in a better position to manage commercial pricing, to become independent of government and to assume responsibility for its financial performance.

**Institution building:**

At the institutional level, the project will facilitate capacity building in key government institutions and private organizations, and at the same time assist financial institutions in meeting international due diligence standards and in providing initial credits for RE investments. Key institutions to be targeted are MIME, EDC, EAC, REF and REE associations.

**Rural electrification services:**

The project will support RGC’s efforts to expand electricity supply to rural areas by targeting nearly 100,000 households with new electricity services, almost doubling the current level levels. To this end, targeted subsidies will compensate for high front-end costs associated with developing markets in rural areas and implementing renewable technologies.
Supporting a programmatic and multi-stakeholder approach:

The strategic direction chosen for RE and renewable energy development is to support a programmatic and multi-stakeholder approach where the private sector plays a central role in most operations and the Government acts primarily as market enabler. RE Master Plan will be prepared under the Project to guide decentralized investments in RE and delineate areas for grid and off-grid/mini-grid electricity services provision. The Project will support RGC’s electrification strategy, which aims to provide stable 24-hour services to 70% of the rural household by 2030 at acceptable price levels, and with minimal subsidy from government.

Facilitating regional integration:

The project will support the Vietnam-Cambodia interconnection, which will enhance power trade within the GMS and provide opportunities for cost savings to the participating countries. In particular, if electricity trade with Vietnam materializes, the Cambodian power system would become a landmark case within the region to demonstrate the benefits of integration.
2. DETAILED PROJECT DESCRIPTION

2.1. Components
The project consists of four principal components:

Transmission Component: This component consists of:

A1. 220 kV interconnection to Vietnam

Background:

This component of the Project, to be co-financed by ADB, would develop a first stage of a 220 kV transmission grid linking Cambodia and Vietnam that would enable regional loads to be supplied from the grid at lower costs and actively promote industrial users to switch from self-generation to the grid, as the quality and reliability of electricity supply would improve. The Project is also part of a larger strategic objective of increasing access to electricity to the rural areas in Cambodia, in particular around West Phnom Penh and Takeo where substations will be placed for this purpose.

This physical element of the project will initially generate benefits stemming from interconnection with Vietnam; it will be supported by a PPA (in reality a Bilateral Agreement) that was signed between EDC and Electricity of Vietnam (EVN) on July 24, 2000. When commissioned in 2007 the interconnection is expected to start transferring about 80 MW and be increased to 200MW after 2008. Sufficient reactive power compensation is provided not only in ADB’s -financed component but also in this component of the Project to maintain bus voltages within allowed voltage variation limits. The operation of a National Control Center is expected to reduce system operation costs, and improve system security. The reinforced 115 kV ring around Phnom Penh will be able to evacuate the power being transferred over the Cambodia-Vietnam 220 kV interconnection.

A feasibility study carried out as part of the preparation of the Project (in the year 2000) showed that the construction of the 220kV interconnection from Phnom Penh to Vietnam would be very beneficial to the Cambodian economy and part of the least cost transmission development for Cambodia. The final route of the transmission line was selected to minimize environmental and social disruption, ease of construction and maintenance access and cost. The net benefit of this project generated during the study period 2002 to 2012 were estimated at over $100 m at the time when the feasibility study was carried out.

ADB, as part of project preparation for their transmission project, has undertaken to review and update previous feasibility study carried out by IDA. To ensure compliance with ADB’s safeguard policies for the environment and involuntary resettlement, ADB will also update the resettlement plan and prepare a full inventory of all land and projects affected households. In addition, a new economic analysis will review and update results of the feasibility study carried out by IDA. IDA’s Project has utilized the update cost estimates and the Resettlement Action Plans developed by ADB as part of the required appraisal documents.

The 220 kV interconnection component of the project consists of:
A1.1 220 kV interconnection to Vietnam: This subcomponent comprises the construction of a 220 kV double circuit 109 km transmission line, with steel lattice towers at approximately 300 meters spacing;

A1.2 220/115/22 kV substation at West Phnom Penh (WPP) (120/200 MVA)

A1.3 220/22 kV substation at Takeo (16 MVA)

A1.4 Spare Parts and Equipment Subcomponent

A1.5 – HV Line O&M

This includes training to update skills of SCADA system maintenance, system protection including fault analysis and fault finding, initiation of actions to secure the safety of the system in minimum time after a fault, metering and communications systems. This TA will also ensure a competent personnel staff of the National Control Center.

A1.6 Land Acquisition/Resettlement

This includes the acquisition of land for two substations and transmission towers, removal and relocation of houses and other building from within 30m ROW, removal of trees within the ROW, and other resettlement-environmental costs, etc. It also includes costs associated with land acquisition and resettlement for the construction of the National Control Center on the same site as the WPP substation.

A1.7 Project Implementation Consultant

This includes implementation consultants for of (i) 220 kV transmission lines and substations, (ii) Resettlement; and (iii) 22kV Bulk Supply Distribution.

A1.8 Capacity Building


A2. 115 kV Transmission line reinforcement and MV Extension Component:

Background

During the previous Bank Project (i.e. Phnom Penh Power Rehabilitation Project), which connected about 50,000 additional consumers, three new primary 115 kV substations (i.e. GS1, GS2 and GS3) were built together with about 23 km of 115 kV single circuit line connecting these substations around the perimeter of Phnom Penh. In addition about 144 cct-km of MV lines and about 400 km of LV lines resulted in the improvement of reliability of supply of existing customers as well as improvement of transmission and distribution efficiency with a reduction of system losses from 33% in 1995 to 16% in 2002.

The lack of available capacity to supply the demand at Phnom Penh is becoming of increasing concern. System peak is exceeding 100 MW with a dependable supply that is currently limited to about 110 MW. Average demand growth rates have been high.
in the last years, with an average of 12.2% in the period 2000 – 2003. An important factor in the increasing demand rate of growth is the efforts made by EDC in increasing the quality of power in recent years. However, as supply is limited, this demand growth rate is expected to be reduced in the next 2-3 years.

This component of the Project is designed to reinforce the 115 kV ring around Phnom Penh as operation with a 2nd circuit would improve reliability and quality of supply to customers and increase the possible transfer capacity of the 115 kV ring to supply the increasing demand in Phnom Penh and outlying areas. Additional transformer capacity and reactive compensation, as well as improvements in the protection system, would further reduce losses and improve voltage quality in the area. The Project also includes a 115 kV connection from the new ADB-financed WPP substation to the existing 115 kV ring through two double circuit 10 km pole lines. Each line will take separate route to increase security. As stringing of the second circuit of the existing 115 kV line may require outages, attention to focused project management and in close cooperation between EDC and the contractor is expected to minimize the inconvenience to consumers.

Extension of the MV network around the new substations WPP and Takeo is also provided by the Project. This will extend the MV side of the transformer at the substations by about 130 km over a SWER three phase wire system along the main routes (WPP to Ang Snoul Road No. 4; WPP to Tram Khnar road No. 3; Takeo to Kampong Chrey Road No. 2; Takeo -Kg Chrey and Takeo to Samraong).

To support EDC’s initiatives in the Phnom Penh and adjacent areas to (a) improve quality of supply and achieve greater utilization of existing generation capacity; (b) improve the security of supply, and (c) reduce losses, the Project will provide financing toward the following subcomponents (all costs include contingencies plus taxes & duties and service charges and commitment fee). Land acquisition and resettlement costs amounting to US$ 0.36 million have been included for the 115 kV and MV extension components.

115 kV transmission line and MV extension component consist of:

A2.1 Reinforcement of the 115 kV transmission system

This subcomponent comprises (i) 20 km of 115 transmission lines, including poles, conductors, insulators and fittings, and other accessories, to connect the new WPP substation and grid substation 3 (GS3), and (ii) stringing of about 23 km of 115 kV conductors to complete the 2nd circuit between the three existing grid substations, i.e. GS1, GS2, and GS3.

A2.2 Upgrading of to 115 kV grid substations GS1, GS2, and GS3

This subcomponent comprises: (i) GS1: switchyard modifications and connection of 10 MVAR of reactive compensation at the 22 kV side; (ii) GS3: switchyard modifications, 1x115/22kV 30/50MVA transformer, 115 kV bus coupler and transformer bay, and 15 MVAR of reactive compensation at the 22 kV side; (iii) GS3: switchyard modifications, 1x115/22kV 30/50MVA transformer, 115 kV bus coupler and transformer bay, and 15 MVAR of reactive compensation at the 22 kV side.
A2.3 MV network expansion at WPP and Takeo

This component will extend the distribution networks at the new substations at WPP and Takeo to supply the MV along the roads No 3 and 4 at WPP and from Takeo to Samraong and Kampong Chrey.

A2.4 Operational Support to EDC/PMU

This operational support to EDC and the IDA-PMU is important for the smooth functioning of the PMU during implementation of the 115 kV and RE grid extension components. It consists of (i) Inspection Vehicles; (ii) Field work Vehicles; (iii) computer and peripherals; (v) Office Equipment; (vi) O&M Equipment and Tools; (vii) Power Planning Software.

A3. National Control Center component

This component is considered essential for the operation of the grid, which will eventually connect several countries. The expanding interconnected system must have a separate functional National Control Center manned by senior staff with the following functions. (i) generation planning/scheduling, load forecasting; (ii) planned and forced maintenance co-ordination; (iii) control and status monitoring of generators, circuit breakers, capacitor banks, transformers; (iv) frequency control; (v) under frequency load shedding; (vi) scheduling of spinning reserve as required by interconnected grid; (vii) real-time data acquisition of GWh generated, GWh consumed; system losses, MVAR flows, voltages; (viii) management of losses, frequency, voltage, load flows, reactive flows; (ix) sequence of events recording for fault analysis for major substation CB operations, major substation reclose operations, line protection trips and alarms, generator trips and alarms; and (x) statistics and metering data, load forecasts, billing data/reconciliations, and data required for Power Purchase Agreement with Vietnam. This component is being prepared by ADB but financed by the IDA Credit (all costs include contingencies plus taxes & duties and service charges and commitment fee).

B. Rural Electrification Component

This component of the Project will contribute to achieving this objective by extending the MV and LV networks to about 50,000 new customers in the four provincial areas of Sihanoukville, Battambang, Kampot, and Kampong Speu. EDC now provides electricity to six isolated provincial areas of which Phnom Penh is the largest. This grid extension component will support EDC in the planning, installation of low-cost feeders and backbone LV distribution systems, to the rural area, that is, non-urban areas excluding cities and towns, on a commercially sound basis. It will improve the quality of service to customers and provide the most cost-effective solution for doing so.

The main criteria drawn-up for the selection of the grid extension to rural areas was based on the following considerations:

- Expansion of EDC's grid to rural areas, which are already provided with electricity by EDC, or under contractual arrangement with MIME, or areas which are not currently electrified;

- Villages within 40 km surrounding EDC's distribution grid;
- Villages with reasonable access to roads, where there are already population living along-side the road, for ease of installation, as well as operation and maintenance;

- Villages in which the population is ready to make a partial contribution to electrification and are able to pay their electricity bills;

- Villages that have development potential for agriculture, forestry, handicrafts, or other income generation opportunities

- Villages where investments in infrastructure and electrification will assist the Government programmes for stopping internal migration, reducing nomadic farming and deforestation, or helping in the development of communes or villages;

- Villages within cost-effective reach of the grid, or cross-border points of supply.

The areas selected for grid extensions were those exhibiting amongst the highest levels of per capita income, population and load density, and where clearly the extension of EDC's grid is the least cost option. The methodology for the final selection is based on the valuation of the cost per connection for each customer, based on the MV and LV length of the conductors selected, as well as the number of distribution transformers, isolating transformers (i.e. for single-wire earth return (SWER)-based system - the use of isolating transformers allows, among other factors, for the selection of an operating voltage for SWER lines independent of the voltage of the parent supply system), poles and meters). The dominant criterion used in the selection of SWER in any particular area, is the projected load. A SWER system is selected in those areas where the estimated loading, for the next 10 years, is less than 100-500 kVA.

The estimated average cost per household connection is about US$ 214 for about 50,000 additional households to be connected by this Project, which would require about 516 cct-km of MV line (SWER). 536 cct-km of LV lines, 200 sets of single-phase transformers with capacities ranging from 50-100 kVA and one 150 kVA the phase transformer for Sihanoukville, as well as 16 sets of isolating transformers. Insulated MV 70 sqmm and ABC LV conductors are selected. The cost estimates also include any associated land acquisition and resettlement costs for this MV component of the project, which are estimated not to exceed 1% of the total costs for this component. The cost estimates for the component were based solely on the use of the SWER system for cost effective rural electrification at reasonable reliability and quality of service. The costs estimates also assume a span of 50-100 m between poles, 70 sq mm MV and LV conductors, and pole-mounted substations. All connected customers will be provided with a watt-hour meter and protected by distribution circuit breakers.

C. REF Component

Background

A recent survey carried out by Enterprise Development of Cambodia (now SME Cambodia) in January 2001 established that an estimated 600 independent entrepreneurs are currently supplying power to about 60,000 rural electric customers throughout Cambodia. The survey identified several factors that limit the ability of the Rural Electricity Enterprises (REEs) including (i) a low level of business management and technical skills; (ii) extremely limited access to reasonable priced
financing alternatives; (ii) lack of focus as to what constitutes “best practice”; and (iv) lack of valuable synergies that occur through interaction with similar and other businesses in industry sector groups or organizations.

REE’s face problems of low quality, low connections and high tariffs. Though at present REEs are operating commercially, their very high tariffs (avg. of 51 US cents/kWh) severely constrain access to rural consumers, particularly the poor. Lack of adequate technical capacity and use of sub-standard equipment also results in poor service standards. There are no incentives for growth of REE businesses and economies of scale in service delivery are not being achieved-they remain small and scattered. Provision of public support for this rural program through technical assistance and co-financing grants will help REE overcome these problems and establish businesses that have a built in incentive for growth and improved service delivery.

There is consensus among stakeholders that a joint private/public effort is essential to achieve the set RE. To embark on this partnership, the RGC has adopted a new electricity law that established the newly appointed regulator as well as initiated steps to develop the regulations and to make the EAC fully operational. Also, the RGC is working on a Rural and Renewable Electricity Strategy and Action Plan. These important activities should define “the rules of the game” for future expansion of rural electricity services in Cambodia.

The Electricity Authority of Cambodia (EAC) and a new agency called the Rural Electrification Fund (REF), created under the MIME, will closely coordinate private sector promotion. Based on the RE master plan, EAC will float RFPs to serve particular areas, determined on the basis of least cost principles. Proposals received will be evaluated based on specific indicators such as number of consumers served, level of tariff proposed by the bidder, a viable business plan and, quality and level of service. Selected bidders would be awarded a 7-10 year license to serve in an area and also be eligible to receive the small co-financing grant per customer as an incentive for rural electrification. Together, the license and the availability of grant will act as a “capital enabler” help strengthen the case for the developer in securing loans with suitable terms from commercial banks. Final grant approvals will be made by the REF only against evidence of progress towards financial closure on Bank loans and, final portion of grant disbursements will take place after physical audits and customer certification.

As the strategy to facilitate private sector involvement through the REF is a new one, it was agreed with the Government that a phased implementation approach be followed, in order to refine the operations based on lessons from a pilot phase. It was agreed with the Government and private sector stakeholders that 43-5 projects will be tested out in the initial phase of the Project in 3-4 provinces. The guidelines for the pilot phase will consist of:

- Effective license issued by EAC with a duration of not less than 5 years;
- Economic least-cost option in the area;
- Variety in fuel source (including at least 1 solar system, 1 hydro scheme);
- Variety in size (1 provincial town, 1 district, and 1 commune);
- Number of consumers should not be less than 300; and
The REF will prepare simple RFPs in collaboration with EAC; the RFP will be flexible and allow bidders to utilize one or more technologies to serve an area. To ensure transparency and current EAC process, all licenses issued will be displayed on EAC's Internet site.

Agreement has been reached in principle with the various stakeholders and Government on the level of the co-financing grant as well as on disbursement principles for the pilot phase. For the main phase and after incorporating lessons learned from the pilot phase, the process and levels of grant amounts will be reviewed and, if necessary, modified in the operational manual. The co-financing estimates for various systems for the pilot phase are:

<table>
<thead>
<tr>
<th>Type</th>
<th>Grant Proposed</th>
<th>Estimated Total Cost/Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>New household connected (diesel)</td>
<td>$45</td>
<td>$150</td>
</tr>
<tr>
<td>Mini hydro (0.75-5 MW)</td>
<td>$400/kW installed</td>
<td>$1744/kW installed</td>
</tr>
<tr>
<td>Micro hydro (avg. 50 kW)</td>
<td>$400/kW installed</td>
<td>$2700/kW installed</td>
</tr>
<tr>
<td>Solar Home System</td>
<td>$100/set of 40 Wp</td>
<td>$400/set of 40 Wp</td>
</tr>
</tbody>
</table>

Grants will be approved in parallel with the approval of loans by commercial banks for REEs. Grants will be released in 2-3 installments based on implementation progress and will be paid directly to the supplier of equipment/developers by the payment agent upon certification by the REF. In the case of SHS, co-financing grants will be released to the supplier after installation and verification. The grant allowance is expected to be calculated in a way that splits the capital costs in approximately 25% co-financing grant, hence assuming a 25% equity share and 50% loan financing.

This component will promote private sector participation in RE and renewable energy development and will include investments as well as implementation assistance. The Project would assist in financing the following:

**C1.1 REE Grid Extension**

This component comprises the provision by Rural Electrification Enterprises (REEs) of 45,000 additional new connections;

**C1.2 Solar Home System**

This subcomponent comprises the provision of electricity to about 12,000 households using solar home systems;

**C1.3 Mini Hydro**

This subcomponent comprises the construction of at least 6 MW of renewable energy capacity;

**C1.4 Village Hydro**

This subcomponent comprises the construction of about 850 kW of micro hydro plants in remote villages.

Since the off-take from the REF will be based on market demand, the allocations for the various technologies are notional and funding is fungible within sub-components.
It is useful to note that REF itself is a technology neutral mechanism for rural electrification where proposals will be selected based on economic least cost principles.

D. Institutional Development and Sector Reform Component

Technical assistance is provided for institutional strengthening/capacity building/operational support to MIME, EAC, EDC, and for training in land compensation, resettlement and environment. This component consist of:

D1. TA to MIME: The Project will provide financing towards the following:

Renewable Energy Policy Development: This comprises the development of policy that would create level playing field for renewable energy private sector investors based on renewable energy assessments and least cost planning; and other TA as required within the budget and scope of the project.

Power Market analysis of Special Zone: The triangle area by Rattanakiri and Stung Treng located close to the borders of Vietnam and Lao PDR has been designated by Government as Special Zone for agro-industrial development. This technical assistance will undertake a market analysis to assess the cross-border power trade opportunities in this area including selection of appropriate commercial tariffs.

Development of a Master Plan: To improve MIME capabilities in planning to develop a master plan for the sector, this TA would complement the assistance provided by JICA and Australia in the fields of rural electrification master planning (JICA) and energy consumption forecasting (Australia). This TA would provide consultancy service to (i) survey energy consumption in provincial and rural areas which would serve as a baseline survey of areas to be included in the grid extension component, and (ii) preparation of a power system expansion master plan including generation additions, transmission as well as distribution expansion, and zoning of grid versus off-grid areas.

D2. TA to REF: TA will be provided for:

Implementation Support for the REF PMU
The REF component will also include implementation assistance to ensure smooth administration of this component. The REF and associated PMU has yet to be established and will be operated under MIME. When the REF Decree and sub-Decree are enacted, and the REF becomes operational, this TA will be transferred from MIME to the PMU at the REF. Support will be needed to build implementation capacity of the REF PMU, including appraisal capacity, and for support of incremental operating costs. This subcomponent will provide for the implementation of financial management system. A qualified firm will be selected to put in place an efficient and transparent accounting system. In addition, as part of this support, a technical in-house advisor will also be provided to the REF to assist in the day-to-day operation of the REF PMU.

REE rural income generation promotion: TA will be provided to develop end-use activities in order to increase income generation opportunities in rural areas and enhance productive uses. This will gradually build up demand among new consumer.
It is envisaged that activities will be carried out by local consultants and NGOs so as to ensure outreach to rural consumers.

**Renewable Energy Business Development for Solar and Biomass:** TA will be provided for preparation of feasibility reports, business plans, technical training, awareness programs and promotion of the use of renewable energy sources.

**REE Improvement and association building:** Capacity building of REEs is a key objective of the project. Technical assistance will be provided under the Project to build technical and business planning capacity within REEs. This activity will work towards converging technical standards and improved services. On-going support to development of REE association will continue.

**Capacity Building of Financial Institutions:** Meetings with commercial banks indicated that main barriers with regard to financing RE projects would be high supervision costs and limited appraisal ability. To address this, assistance for appraisal and supervision would be provided as TA.

**D3. TA to EAC:** The project will provide financing towards the following:

**Institutional strengthening of EAC**
The proposed technical assistance will strengthen EAC’s capacity to discharge its responsibilities mandated in the Electricity Law, and have Regulation and Codes in place to improve the quality of the supply and services and ensure transparency in EAC’s operation. The specific tasks comprise: (i) Operation Support for consultancy service to assist EAC in (1) issuing licenses to more number of the existing service providers and all the service providers that assistance from the REF, (2) dealing with tariff applications, fixing of tariff and writing of tariff orders, (3) Monitoring of Licensees in identifying information to be recorded and the format to report the information to the EAC, and (4) Regulation and Codes including preparation of Grid Code and Distribution Code and to issue regulation/procedures to amend existing regulations/procedures to enable EAC to carry out it duties properly; (ii) Training in three areas (1) Foundation skill training in computer skill, administration and management and English language; (2) Job specific training including Power Sector Regulation, Pricing Control and methodology for tariff setting; and Public Hearing, Complaint and Dispute Resolution; (3) Practical training for managers and senior staff on best practice management and operation of a regulatory body; and (ii) Facility Support consisting of portable meter testing equipment and accessories.

**D4. TA to EDC:** The Project will provide financing towards the following:

**EDC PMU Project Implementation Consultant**
The Project Implementation Consultants (PIC) will assist EDC in engineering supervision, inspection, coordination, training and implementation of the IDA financed 115kV and RE EDC grid extensions components of the Project, as well as in the establishment of a National Control Center. As one of the components of the Project is being carried out by ADB through a co-financing arrangement, the Consultant also needs to coordinate activities with the ADB PMU which is executing the 220kV component of project. The proposed technical assistance of a Resident Engineer, adviser to EDC’s IDA-PMU Manager, is expected to extend over a period of about 36 months. In addition, senior specialists in the areas of 115kV and MV/LV transmission line design and construction, substation design and construction, system
planning and protection, and experts providing advice to the resettlement and compensation programs will be required to work in Cambodia for shorter periods. Finally for the National Control Center which would be fully equipped to carry out the extensive monitoring of the entire net-work operations, load dispatching, load and frequency control, load shedding and optimum loading of various plants, remote back-up protection etc, as well as modern SCADA system operation over optical fiberglass communications cable, specialized consultancy services are required. The Consulting Firm will also be expected to provide additional non-resident short-term consultants in various specialized fields as and when required.

EDC in-house advisor
An in-house procurement advisor has assisted EDC during in all activities related to project preparation, including procurement, and in performing the tasks in implementation of the project including NCB procurement, as well as other related tasks as determined by EDC. The in-house Advisor has been financed through retroactive financing from the proposed Credit. The mission agreed in principle to continue providing in-house advisory support to EDC through Project Launch and Project Implementation.

Independent Monitoring Agency and Project Grievance committee
The independent Monitoring Agency (IMO) monitors the resettlement and land compensation process to verify and ensure to IDA, EDC and the IRC (i.e. Inter ministerial Resettlement Committee established on 30 January 2001 by the Government headed by a representative of the Ministry of Economic and Finance and consisting as member; EDC, Representative of the Governor of each Province and municipality of Phnom Penh; Ministry of Land Management, Urban Planning and Construction; Ministry of Agriculture; Ministry of Public Works and Transport and Ministry of Environment) that the objectives are met. The agency would also be involved in complaints/ grievance procedures to ensure that any relevant concerns of the PAFs are being addressed. The Mission advised that the IMO must have a good working relationship with the Government; but at the same time needs to maintain a strong independent position and provide constructive feedback to the Project to ensure the objectives are met. EDC/PMU needs to contact NGOs to initiate the selection of a qualified IMO. The in-house Advisor will prepare TOR for the IMO.

Improvement of EDC Commercial Practices and management training
This comprises: (i) TA to fully implement ACCPAC software, including installation and training, and (ii) training to introduce new module of project costs and financial management system for use in the Project, and (iii) management training.

Capacity Building for Land Acquisition, Resettlement and Environment
This comprises activities to improve resettlement implementation in Cambodia, for both EDC and the IRC, namely: (i) Workshop; (ii) Training on IDA resettlement, land compensation and environmental monitoring and mitigation; (iii) It also includes a study tour to improve resettlement implementation in Cambodia.

Power investment Planning
Constancy services will be provided to EDC to develop the planning capacity to preparing a power investment plan which includes various alternatives for generation,
transmission and distribution investment, taking into account demand, fuel and other uncertainties, and to prepare 10 years plans on a rolling yearly basis.

2.2. Justification, Including Financial And Economic Analysis

2.2.1. 220 kV Transmissions System (interconnection to Vietnam) component:

Justification: The purpose of establishment of transmission interconnection with Vietnam is in short term to import low costs energy. In a longer term the interconnection will help to establish competition to local IPP generation lowering energy production costs, and will facilitate development of transmission grid in Cambodia providing provincial towns with access to lower costs off grid energy. The Power Purchase Agreement that was signed between EDC and Electricité du Vietnam (EVN) on July 3, 2000 commercially supports the development of the transmission interconnection.

Benefits: The benefits of the interconnection line are: (a) Substitution of EDC's high cost generation which currently supplies Phnom Penh load; (b) Substitution of high cost private generation which currently serves industrial and commercial off-grid loads in Phnom Penh area, and integration of these loads into EDC's market; (c) Supply of future demand at reasonable price both in Phnom Penh area and the provincial towns along the transmission line route.

Financial analysis: Taking into account the costs, benefits and distortions in the Cambodian economy the project yields an economic internal rate of return (EIRR) of 25.5% for Cambodia for the base case scenario. All project benefits and costs were discounted at a discount rate of 12%.

2.2.2. The Rural and Renewable Electricity Component:

Justification: The rural and renewable electricity component will address the issue of sector organization and private sector involvement in supplying electricity to rural users either by grid extensions or off-grid solutions; it will fund the extension of the grid from four provincial towns and a number of off-grid pilot projects. The project will fund also the creation of a structure to promote additional investments to scale-up off-grid systems in Cambodia. The grid-extension would constitute the core of the rural electrification effort and is expected to provide electricity to close to 50,000 new consumers.

Off-grid projects will include an important component of renewable energy developments, namely solar and mini-hydro and will promote private sector participation in RE renewable energy development through the: (a) provision by Rural Electrification Enterprises (REEs) of 45,000 additional new consumers; (b) provision of electricity to about 12,000 households using solar home systems; (c) addition of at least 6 MW mini hydro of renewable energy capacity; and construction of about 850kw of micro hydro plants in remote villages.

Financial Analysis: Economic analyses were conducted for RE’s main sub components: (i) EDC’s grid extension, (ii) mini grids by REEs, and mini hydro investments. All the main subcomponents show acceptable to good EIRRs ranging from 15% to 20% and up to 28%.
3. COST ESTIMATES AND FINANCING PLAN

3.1 ADB's Financed Components:

ADB and other financed components ($74.10 million) will comprise of:

- 220 kV transmission line from the Vietnamese border through Takeo to a substation at West Phnom Penh;
- Two new substations at West Phnom Penh (WPP) and Takeo – the WPP substation is also to be the main control center for the entire 220 kV and 115 kV transmission system;
- Reactive compensation to allow from 80-200 MW to be transferred from Vietnam over the interconnection to Cambodia; and
- Distribution connecting to project affected communities along the transmission route.

The ADB Project is named the “Power Distribution and GMS Transmission Project”.

3.2 IDA/GEF/RGC/Private Sector's Financed Components:

IDA/GEF/RGC/Private Sector's financed Component ($72.15 million) would include:

A. 115kV Transmission Line Reinforcement and MV Extension ($13.94 million) will consist of:

- Reinforcement of the 115kV transmission system (US$5.60 million): This subcomponent comprises: (a) 20 km of 115kV transmission lines, including poles, conductors, insulators and fittings, and other accessories, to connect the new WPP substation and grid substation 3 (GS3); and (b) stringing of about 23 km of 115kV conductors to complete the second circuit between the three grid substations, i.e. GS1, GS2, and GS3.

- Upgrading of to 115kV grid substations GS1, GS2, and GS3 (US$5.94 million): This subcomponent comprises: (a) GS1: switchyard modifications and connection of 10 MVar of reactive compensation at the 22kV side; (b) GS3: switchyard modifications, 1x115/22kV 30/50 MVA transformer, 115kV bus coupler and transformer bay, and 15 MVar of reactive compensation at the 22kV side; (c) GS3: switchyard modifications, 1x115/22kV 30/50 MVA transformer, 115kV bus coupler and transformer bay, and 15 MVar of reactive compensation at the 22 kV side;

- MV network expansion at WPP and Takeo (US$1.80 million): This component will extend the distribution networks at the new substations at WPP and Takeo to supply the MV along the roads No 3 and 4 at WPP and from Takeo to Samraong and Kampong Chrey.

- Operational Support to EDC/PMU (US$0.60 million): This operational support to EDC and the IDA-PMU is important for the smooth functioning of
the PMU during implementation of the 115kV and RE grid extension components. It consists of: (a) Inspection vehicles; (b) Field work vehicles; (c) Computer and peripherals; (d) Office equipment; (e) O&M equipment and tools; (f) Communication equipment; and (g) Power planning software.

B. National Control Center (US$5.33 million):

A National Control Center is considered essential for the operation of the grid, which will eventually connect several countries. The expanding interconnected system must have a separate functional National Control Center manned by senior staff with the following functions: (a) generation planning/scheduling and load forecasting; (b) planned and forced maintenance coordination; (c) control and status monitoring of generators, circuit breakers, capacitor banks, transformers; (d) frequency control; (e) under frequency load shedding; (f) scheduling of spinning reserve as required by the interconnected grid; (g) real-time data acquisition of GWh generated, GWh consumed; system losses, MVAR flows, and voltages; (h) management of losses, frequency, voltage, load flows, and reactive flows; (i) sequence of events recording for fault analysis for major substation CB operations, major substation reclose operations, line protection trips and alarms, generator trips and alarms; and (j) statistics and metering data, load forecasts, billing data/reconciliation, and data required for the PPA with Vietnam. This component is being prepared by ADB but financed from the IDA Credit.

C. EDC rural grid extension (US$13.94 million)

This component will comprise the extension of electrical networks from the following provincial towns to their adjacent rural areas:

- Sihanoukville with about 10,508 new connections;
- Battambang with about 18,579 new connections;
- Kampot with about 9,960 new connections; and
- Kampong Speu with about 10,965 connections; totaling about 50,012 new connections.

The extensions will be up to 40 km in length and will have the potential to serve an estimated population in the project area of approximately 1 million. In physical terms, this component will comprise the construction of:

- About 516 circuit-km of 22 kV lines, mostly built for single-wire earth-return operation, suitable for conversion in future years;
- 536 km of low voltage backbone lines;
- 16 isolating transformers to supply the lines from the main system;
- 200 distribution transformers;
- 25000 low voltage service cabinets for multiple customer connections;
- 50,000 energy meters;
- MV and LV poles;
- Support facilities including vehicles, communications equipment for system operation; and
- Tools and equipment, storage areas for construction and for the storage of spares for maintenance and ongoing extension.

EDC’s Grid Extension Project of September 2003 showing the network’s details and rural areas to be electrified under the Project are given in Annex 1.

D. Rural Electrification Fund ($26.37 million)

This component will promote private sector participation in RE and renewable energy development and will include investments as well as implementation assistance. The Project would provide the funding for the following:

- **REE Grid Extension (US$7.90 million):** Provision by REEs of 45,000 additional new connections;

- **Solar Home System (US$5.24 million):** Provision of electricity to about 12,000 households using solar home systems;

- **Mini Hydro (US$12.15 million):** Construction of at least 6MW of renewable energy capacity; and

- **Village Hydro (US$1.08 million):** Construction of about 850kW of micro hydro plants in remote villages.

E. The Technical Assistance (TA) Component (US$ 11.48 million)

TA for institutional strengthening/capacity building of MIME, EAC, EDC, and the REF, as well as for training to EAC and to MIME, EDC and the IRC in land compensation, resettlement and environment. This component would include:

(i) **TA to MIME (US$1.42 million):** The Project will provide financing towards the following subcomponents:

- **Renewable Energy Policy Development (US$0.62 million):** This subcomponent comprises the development of policy that would create level playing field for renewable energy private sector investors based on renewable energy assessments and least cost planning; and other TA as required within the budget and scope of the Project;

- **Power Market analysis of Special Zone (US$0.35 million).** The triangle area by Rattanakiri and Stung Treng located close to the borders of Vietnam and Lao PDR has been designated by Government as Special Zone for agro-industrial development. This TA will undertake a market analysis to assess the cross-border power trade opportunities in this area including selection of appropriate commercial tariffs;

- **Development of a Master Plan (US$0.45 million, all IDA).** To improve MIME capabilities in planning to develop a master plan for the sector, this TA would complement the assistance provided by JICA and Australia in the fields of RE master planning and energy consumption forecasting. This TA would also provide consultancy service to: (a)
survey energy consumption in provincial and rural areas which would serve as a baseline survey of areas to be included in the grid extension component; and (b) preparation of a power system expansion master plan including generation additions, transmission as well as distribution expansion, and zoning of grid versus off-grid areas.

(ii) TA to REF (US$7.17 million): The project will provide the financing for the following subcomponents:

- Implementation Support for the REF (US$2.87 million): The REF component will also include implementation assistance to ensure smooth administration of this component. The REF has yet to be established and a PMU will be operated under MIME. When the REF Decree and sub-Decree are enacted, and the REF becomes operational, this TA will be transferred from MIME to the REF. Support will be needed for implementation capacity of the REF (including appraisal capacity), incremental operating costs, implementation of a financial management system (a qualified firm will be selected to put in place an efficient and transparent system) and a technical in-house advisor to assist in the day-to-day operation of the REF.

- Rural Income Generation Promotion (US$0.35 million): TA will be provided to develop end-use activities in order to increase income generation opportunities in rural areas and enhance productive uses. This will gradually build up demand among new consumers. It is envisaged that local consultants and NGOs so as to ensure outreach to rural consumers will carry out activities.

- Renewable Energy Business Development for Solar and Mini/Micro Hydro (US$2.44 million): TA will be provided for preparation of feasibility reports, business plans, technical training, awareness programs and promotion of the use of renewable energy sources.

- REE Improvement and Association Building (US$1.26 million, all IDA). TA will be provided to build technical and business planning capacity within REEs. This activity will work towards converging technical standards and improved services. On-going support to development of REE associations will continue.

- Capacity Building of Financial Institution (US$0.24 million, all GEF). Meetings with commercial banks indicated that main barriers with regard to financing RE subprojects would be the high supervision costs and limited appraisal ability. To address this, assistance for appraisal and supervision would be provided as TA.

(iii) TA to EAC (US$0.55 million): The Project will provide financing towards the institutional strengthening of EAC by: (a) improving EAC’s capacity to discharge its responsibilities mandated in the Electricity Law; and (b) having Regulations and Codes in place to improve the quality of the supply and services and ensure transparency of EAC’s operation. The specific tasks comprise:
• Operational Support (US$0.42 million). For consultancy services to assist EAC in: (a) issuing licenses to a greater number of existing service providers and all service providers that will seek assistance from the REF; (b) dealing with tariff applications, setting tariffs and writing of tariff orders; (c) monitoring of licensees in identifying information to be recorded and the format to report the information to EAC; and (d) Formulation of regulation and codes including preparation of Grid and Distribution Codes; and (e) issuing of regulation/procedures to amend existing regulations/procedures to enable EAC to carry out it duties properly;

• Training (US$0.06 million): (a) foundation skills training in computers, administration and management, and the English language; (b) job specific training including power sector regulation, pricing control and methodology for tariff setting; public hearing; and complaint and dispute resolution; and (c) practical training for managers and senior staff on best practice management and operation of a regulatory body; and

• Facility Support (US$0.07 million) consisting of a portable meter testing equipment and accessories.

(iv) TA to EDC (US$2.34 million): The Project will provide financing towards the following subcomponents.

• EDC PMU Project Implementation Consultant (US$1.00 million). The Project Implementation Consultants (PIC) will assist EDC in engineering supervision, inspection, coordination, training, and implementation of the IDA financed 115kV and RE EDC grid extensions components of the Project, as well as in the establishment of a National Control Center. As one of the components of the Project is being carried out by ADB through a co-financing arrangement, the PIC also needs to coordinate activities with the ADB PMU which is executing the 220kV component of the Project

• EDC In-house advisor (US$0.54 million): An in-house procurement advisor has assisted EDC in all activities related to project preparation, including procurement, and project implementation tasks, including NCB procurement, as well as other related tasks as determined by EDC. The in-house Advisor has been financed through retroactive financing from the proposed Credit. This service will be continued to providing in-house advisory support to EDC from Project Launch to Project Implementation.

• Independent Monitoring Agency and Project Grievance Committee (US$0.04 million): The Independent Monitoring Agency (IMO) will monitor the resettlement and land compensation process to verify and ensure to IDA, EDC and the IRC that the objectives are met. The agency would also be involved in complaints/grievance procedures to ensure that any relevant concerns of project affected families are being addressed.
- Improvement of EDC Commercial Practices and management training (US$0.45 million): This subcomponent comprises: (a) TA to fully implement ACCPAC software, including installation and training, (b) new billing and collection software; (c) training to introduce new module of project costs and financial management system for use in the Project; and (d) management training.

- Capacity Building for Land Acquisition, Resettlement and Environment (US$0.06 million): This subcomponent comprises activities to improve resettlement implementation in Cambodia, for MIME PMU/REF, EDC and the IRC, through: (a) workshop; (b) training on IDA resettlement, land compensation and environmental monitoring and mitigation; and (c) study tours to improve resettlement implementation in Cambodia.

- Power Investment Planning (US$0.25 million): Consultancy services will be provided to EDC to develop planning capacity to prepare power investment plan which includes various alternatives for generation, transmission and distribution investment, taking into account demand, fuel and other uncertainties, and to prepare 10 years plans on a rolling yearly basis. The consultant will also provide power system planning advisory services in operational planning as well as medium to long term planning.

### 3.3 Summary of Project Cost and Financing Plan:

#### 3.3.1 Project Cost Estimate:

The estimated project cost of the integrated Project (both IDA and ADB components) is US$146.25 million.

#### 3.3.2 Financing Plan:

The financing of the integrated Project (both IDA and ADB components) is shown in the Table below:

<table>
<thead>
<tr>
<th>Financing Plan of Integrated Project</th>
<th>Local</th>
<th>Foreign</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Counterpart Funds (IDA)</td>
<td>6.67</td>
<td>0.00</td>
<td>6.67</td>
</tr>
<tr>
<td>Government Counterpart funds (ADB)</td>
<td>18.25</td>
<td>0.00</td>
<td>18.25</td>
</tr>
<tr>
<td>IDA</td>
<td>8.92</td>
<td>31.08</td>
<td>40.00</td>
</tr>
<tr>
<td>ADB and Other</td>
<td>9.72</td>
<td>46.13</td>
<td>55.85</td>
</tr>
<tr>
<td>Private funds</td>
<td>7.57</td>
<td>12.16</td>
<td>19.73</td>
</tr>
<tr>
<td>GEF grant</td>
<td>1.36</td>
<td>4.39</td>
<td>5.75</td>
</tr>
<tr>
<td>Subtotal</td>
<td>52.50</td>
<td>93.75</td>
<td>146.25</td>
</tr>
</tbody>
</table>
### 3.3.3 IDA/GEF/RGC/Private Sector Financed Components Cost:

The project costs financed by IDA/GEF/RGC/Private sectors are described below:

<table>
<thead>
<tr>
<th>Project Cost by Component</th>
<th>Foreign</th>
<th>Local</th>
<th>Total (US$ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>115kV Transmission and MV extension at WPP and Takeo *</td>
<td>8.64</td>
<td>1.69</td>
<td>10.33</td>
</tr>
<tr>
<td>National Control Center</td>
<td>3.60</td>
<td>0.40</td>
<td>4.00</td>
</tr>
<tr>
<td>EDC RE Extension (50,000 new connections)</td>
<td>7.49</td>
<td>3.71</td>
<td>11.20</td>
</tr>
<tr>
<td>Rural Electrification Fund (45,000 new connections) (GEF US$1.54 m)</td>
<td>14.71</td>
<td>5.87</td>
<td>20.58</td>
</tr>
<tr>
<td>Technical Assistance to MIME (GEF US$0.62 million)</td>
<td>0.92</td>
<td>0.50</td>
<td>1.42</td>
</tr>
<tr>
<td>Technical Assistance to EAC</td>
<td>0.37</td>
<td>0.12</td>
<td>0.49</td>
</tr>
<tr>
<td>Technical Assistance to EDC</td>
<td>1.71</td>
<td>0.57</td>
<td>2.28</td>
</tr>
<tr>
<td>Technical Assistance and training to REF (GEF: US$3.59 million)</td>
<td>5.30</td>
<td>1.77</td>
<td>7.07</td>
</tr>
<tr>
<td>Training program for EDC/MIME/IRC in resettlement and environment</td>
<td>0.04</td>
<td>0.02</td>
<td>0.06</td>
</tr>
<tr>
<td>Training program for EAC</td>
<td>0.05</td>
<td>0.01</td>
<td>0.06</td>
</tr>
<tr>
<td><strong>Total Baseline Cost</strong></td>
<td>42.91</td>
<td>14.98</td>
<td>57.89</td>
</tr>
<tr>
<td>Physical Contingency</td>
<td>1.73</td>
<td>0.58</td>
<td>2.31</td>
</tr>
<tr>
<td>Price Contingency</td>
<td>2.01</td>
<td>2.60</td>
<td>4.61</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>46.65</td>
<td>18.16</td>
<td>64.81</td>
</tr>
<tr>
<td>Taxes and Duties</td>
<td></td>
<td>6.36</td>
<td>6.36</td>
</tr>
<tr>
<td><strong>Total Project Cost</strong></td>
<td>46.65</td>
<td>24.52</td>
<td>71.17</td>
</tr>
<tr>
<td>Service Charges</td>
<td>0.54</td>
<td></td>
<td>0.54</td>
</tr>
<tr>
<td>Commitment Fee</td>
<td>0.44</td>
<td></td>
<td>0.44</td>
</tr>
<tr>
<td><strong>Total Financing Required</strong></td>
<td>47.63</td>
<td>24.52</td>
<td>72.15</td>
</tr>
</tbody>
</table>

Financing from GEF 4.39 1.36 5.75
Financing from Government - 6.67 6.67
Financing from Private Sector ** 12.16 7.57 19.73
Financing from IDA 31.08 8.92 40.00

* Including land compensation and resettlement cost.

** Of the US$6.36 million of Taxes and Duties, US$2.63 million is assumed to be incurred by the Private Sector.
4. INSTITUTIONAL ARRANGEMENTS

4.1 Project Beneficiary and Organizations Responsible for project Implementation

4.1.1 Project Beneficiary

Beneficiary organizations will be: (a) EDC, which will be able to reduce its production costs and improve its service quality; (b) REEs in providing services extensions and higher quality services; (c) MIME and EAC, who will benefit from technical assistance to manage and promote different modes of private sector participation; and (d) renewable energy business, including community groups, involved in providing service extensions or developing renewable sources of energy.

4.1.2 Organizations Responsible for project Implementation

The executive agencies for the project will be: (i) Electricité Du Cambodge (EDC): EDC will be responsible for management and implementation of the 115 kV Transmission System and MV network extension as well as EDC rural grid extension components. (ii) Rural Electrification Fund (REF): REF will be responsible for the REF component.

4.2 Project Management and Staffing:

The IDA financed components of the Project will be managed by two PMUs: (i) EDC PMU and (ii) REF PMU.

4.2.1 EDC Project Management Unit (PMU)

Two PMUs have been established by EDC on July 7, 2003, one for implementation of the IDA financed components, while the other for the ADB financed components. Both PMUs are hosted under the Corporate Planning and Project Department and will report to a Project Director (served by the Deputy Managing Director responsible for planning and technical aspects). Both PMUs will share the same staff for procurement, resettlement and environment. The IDA PMU comprises five teams, with respective responsibility for the 115kV transmission line and substation component, the grid extension component, procurement and administration, resettlement and environment, as well as accounting and finance. Key staff has been appointed, including one project manager, one deputy project manager, and five team managers. Other staff will be appointed in due course. It is expected that the PMU will be staffed with 20 professionals (including various managers). The organizational structure of EDC's PMU, as well as its functions and responsibilities are presented in Annex.2.

In-house Advisor: An expatriate consultant has been hired to provide assistance in various aspects related to project preparation. The in-house advisor has been financed through retroactive financing from the proposed credit. These services will be continued for providing the in-house advisory support to EDC from the Project Launch to Project Implementation.
Project Implementation Consultant (PIC): An international firm will be hired to assist EDC in project implementation in various areas including engineering, design, bidding documents and procurement, construction supervision, testing and commissioning, resettlement and environment, as well as project management related training. The PIC will also help coordinate the implementation of the ADB-financed components. Terms of Reference and narrative selection criteria for the PIC consultant are given in Annex 3 and Annex 4 respectively.

4.2.2 REF PMU:

The autonomous REF organization to be created by the Royal Decree will be the implementing agency for this component. As the REF organization will be set-up only after the passage of the Decree, a transition PMU in MIME has been created to support project preparation. The PMU comprises of MIME and EDC staff. As the procurement and disbursement experience is low within MIME, EDC will help during the transition. The organization structure of the transitional PMU, as well as PMU functions and responsibilities are presented in Annex 5.

As the strategy to facilitate private sector involvement through the REF is a new one, a phased implementation approach will be followed in order to refine the operations based on lessons from a pilot phase. 6-10 projects will be tested out in the initial phase of the Project in 3-4 provinces. The organization of the REF is summarized as follows:

4.3 Coordinating Mechanisms

EDC would coordinate all project activities. ADB’s project processing schedule is basically the same as IDA’s, and cross-default provisions are planned for inclusion in the relevant documents of both IDA and ADB credits. The World Bank and ADB’s as much as possible will conduct joint supervision missions and joint project workshops during project implementation, as necessary. Financed under the proposed Project, the Project Implementation Consultant has the responsibility for coordinating activities with the ADB PMU executing the 220kV component of the Project.
4.4 Project oversight

MIME would ensure that all project activities are in accordance with national power sector policies and oversee project implementation, including necessary approvals, policy for overall energy sector program and reform, the RE policy and master plan, the framework for renewable energy, and tariff policy. MEF would oversee financing and disbursements, be responsible for monitoring compliance with the financial covenants described below, and supervise and advise EDC and REF on financial matters. The Office of the Prime Minister would provide policy guidance to all entities. EAC would ensure that all operators in the power sector adhere to standards and regulations and facilitate private sector involvement in RE by means of regulatory instruments. The Board of Directors of EDC and the REF would be in charge of reviewing progress of their respective project sub-components.

4.5 Quality Control

The project supervision will be performed through the Bank. The main areas of focus will be (a) compliance with loan covenants enables RGC to sustain its commitments and also to assure EDC’s financial health as it conducts a large investment program; (b) technical supervision; (c) reform in power sector; (d) RGC’s institutional development; (e) social and environmental aspects; and reform in power sector. The Bank will carry out prior review of draft tender documents and finalized tender documents, bid evaluation reports, draft contracts and signed contracts for all ICB procurement. For consulting services, prior review will be carried out of draft terms of reference (TOR) and finalized TOR, cost estimates, selection criteria, consultant shortlists, requests for proposals and final contracts. Prior review will also be undertaken for all of GEF-financed contracts.

4.6 Monitoring and Reporting Arrangements

The executing agencies will furnish quarterly progress reports to the Bank. The reports will include the progress on the physical works, financial matters and any other information required by the Bank. The executing agencies will also participate in the preparation of the Implementation Completion Report (ICR) according to the guidelines provided by the Bank. The ICR will be finalized by six months after credit closing.
5. PROCUREMENT MANAGEMENT

5.1 General

Sound procurement planning is essential to achieve timely project implementation. The procurement planning should include, but not limited to: procurement packaging, procurement methods, scheduling, and preparation of bidding documents, advertising. The objective should be to achieve contract awards by the time when the IDA funds become available.

Procurement will comprise contracts for works, goods and services to implement the 115 kV T/L, RE and TA components. Works contracts pertain mainly to construction of electricity grid extensions in rural areas, and to the mini and village hydro sub-projects. Procurement involves Supply and installation (S&I) contracts for the 115 kV transmission lines and modification of existing grid substations; national control center; and supply of equipment and materials for rural electrification components; and MV network extension. Purchase of vehicles, computers and support equipment is also required. Solar home systems together with mini and village hydro systems will be procured / constructed.

Technical assistance involves recruitment of international specialists or consulting firms to support project implementation and monitoring. Additionally, local and/or international service contracts associated to project facilitation; support and training will be procured.

5.2 Procurement agency:

Project procurement will be implemented through two institutions:

(i) Electricite Du Cambodge: EDC will process procurements related to 115 kV transmission system, MV network extension and EDC's RE grid extension development. EDC will engage a Project Implementation Consultant (PIC) to assist in project implementation, including preparation of bidding documents, bid evaluation, contract award, and contract management. The selection schedule of the PIC is presented in Annex.6.

(ii) Rural Electrification Funds (REF): The REF will process procurements related to renewable and off-grid development. As the REF has yet to be fully promulgated, a transition PMU has been set up within MIME to establish the REF. Initially, the PMU would comprise 3 MIME staff and two EDC staff. In addition, an external consultant (local or international) will be hired to provide assistance to the PMU in various areas.

The REF will provide co-financing grants to eligible subprojects (REE, mini hydro, solar home systems, etc.) upon completion and technical audit. The associated goods & construction services would be procured by the subproject owners in line with the established local private sector commercial practices, except those large procurement packages with estimated cost exceeding $5 million equivalent per package for which ICB may be the more efficient and economic procurement method.
Notwithstanding above, the REF will directly finance TA activities to REEs and local financial institutions, for which the IDA guidelines for selection of consultants will need to be followed. To this end, the EDC staff to be selected should have previous experience with the IDA financed procurement (consultant selection in particular). The external consultant is also expected to be familiar with the IDA guidelines and procedures.

5.3 Procurement Guidelines


5.4 Standard Documents for Procurement


For employment of consultants, the Standard Request for Proposals (dated July 1997, Revised April 1998, July 1999, and March 2002) shall be used. In evaluation of the proposals following QCBS and QBS, the Bank Sample Form of Evaluation Report for Selection of Consultants (October 1999) shall be used.

5.5 Domestic Preference

In evaluation of bids following ICB procedures, qualified domestic manufacturers of goods would be eligible for a margin of preference of 15% of the Cost, Insurance and Freight (CIF) price or the actual customs duty, whichever is lower.

5.6 Advertising

The invitation to bid for each contract estimated to cost US$10 million equivalent or more shall be advertised in accordance with the procedures applicable to large contracts under paragraph 2.8 of the IDA Procurement Guidelines. Advertisements for all contracts for consulting firms shall be published in a national newspaper/gazette, and those inviting expressions of interest for consultancy contracts above US$200,000 shall also be published in Development Business (on-line version) according to the procedures applicable to large-value contracts under paragraph 2.5 of the IDA Guidelines for Selection of Consultants. In addition, a General Procurement Notice (GPN) has been published in UNDB Issue No. 604 on April 16, 2003; it shall be updated on an annual basis.
5.7 Project Costs by Procurement Arrangements

The estimated project costs by procurement arrangements are summarized in the table below:

<table>
<thead>
<tr>
<th>Expenditure Category</th>
<th>ICB</th>
<th>NCB</th>
<th>Other</th>
<th>N.B.F.</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Works</td>
<td>0.79</td>
<td>-</td>
<td>0.30</td>
<td>(0.79)</td>
<td>1.09</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Goods</td>
<td>24.55</td>
<td>1.20</td>
<td>25.75</td>
<td>(24.55)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. REF</td>
<td>8.08</td>
<td>14.76</td>
<td>22.84</td>
<td>(6.18)</td>
<td>(24.55)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Consultant Services</td>
<td>12.33</td>
<td>-</td>
<td>12.33</td>
<td>(8.48)</td>
<td>(1.90)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Miscellaneous</td>
<td>0.56</td>
<td></td>
<td>0.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. IDC, Commitment Fee</td>
<td>0.98</td>
<td>0.98</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>24.55</td>
<td>0.79</td>
<td>20.41</td>
<td>17.80</td>
<td>63.55</td>
</tr>
<tr>
<td></td>
<td>(24.55)</td>
<td>(0.79)</td>
<td>(14.66)</td>
<td>-</td>
<td>(40.00)</td>
</tr>
</tbody>
</table>

1/ Figures in the parenthesis are the amounts to be financed by the IDA Credit and GEF respectively. All costs include contingencies.
2/ Including: Goods to be procured through IS and NS procedures; and consultant services.
4/ ADB will cofinance (US$56.42 million) the Project on a parallel basis. The associated procurement will be carried out separately following ADB’s guidelines. ADB’s procurement arrangements are not included in the above table.

5.8 Procurement Packaging and Methods

Goods to be financed under 115kV Transmission and EDC RE Grid Extension components (total estimated cost is US$25.75 million including contingencies, of which the IDA credit will cover US$24.55 million): The procurement shall be carried out through the ICB procedures, based on the arrangements of supply and installation and supply only. However, for smaller packages with estimated cost not exceeding US$100,000 or US$50,000 equivalent per package (up to an aggregate amount of US$1.0 million), procurement may be carried out following the International Shopping (IS) or National Shopping (NS) procedures. Operational support to EDC, consisting of goods, are also included. The related procurement packaging arrangements are presented in table below:
### Procurement Packaging for Goods

<table>
<thead>
<tr>
<th>Package No.</th>
<th>Description</th>
<th>Estimated Cost (S'000)</th>
<th>Procurement Method</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EDC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IFB-1</td>
<td>115kV Transmission Line</td>
<td>4,000</td>
<td>ICB</td>
<td>S&amp;I</td>
</tr>
<tr>
<td>IFB-2</td>
<td>115kV Substation Modifications</td>
<td>4,270</td>
<td>ICB</td>
<td>S&amp;I</td>
</tr>
<tr>
<td>IFB-3</td>
<td>National Control Center – SCADA System</td>
<td>4,000</td>
<td>ICB</td>
<td>S&amp;I</td>
</tr>
<tr>
<td>IFB-4</td>
<td>Cables and Conductors (M &amp;LV)</td>
<td>2,260</td>
<td>ICB</td>
<td></td>
</tr>
<tr>
<td>IFB-5</td>
<td>Concrete Poles (MV&amp;LV)</td>
<td>2,520</td>
<td>ICB</td>
<td></td>
</tr>
<tr>
<td>IFB-6</td>
<td>Distribution &amp; Isolating Transformers (MV&amp;LV)</td>
<td>560</td>
<td>ICB</td>
<td></td>
</tr>
<tr>
<td>IFB-7</td>
<td>Insulators &amp; Fittings, Cross Arms, Accessories</td>
<td>1,820</td>
<td>ICB</td>
<td></td>
</tr>
<tr>
<td>IFB-8</td>
<td>Meters and Meter Boxes</td>
<td>2,100</td>
<td>ICB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inspection Vehicles</td>
<td>95</td>
<td>IS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Field Work Vehicle</td>
<td>95</td>
<td>IS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Computers and Peripherals</td>
<td>95</td>
<td>IS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Office Equipment</td>
<td>80</td>
<td>IS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operation &amp; Maintenance Equipment and Tools</td>
<td>80</td>
<td>IS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Planning Software</td>
<td>45</td>
<td>IS</td>
<td></td>
</tr>
<tr>
<td><strong>EAC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IFB-9</td>
<td>Portable Meter Testing Equipment for EAC</td>
<td>70</td>
<td>IS</td>
<td></td>
</tr>
<tr>
<td><strong>REF</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IFB-10</td>
<td>Vehicles</td>
<td>60</td>
<td>IS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Computers and Peripherals</td>
<td>25</td>
<td>IS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Office Equipment</td>
<td>20</td>
<td>IS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Office Furniture</td>
<td>20</td>
<td>IS/NS</td>
<td></td>
</tr>
</tbody>
</table>

ICB: International Competitive Bidding  
S&I: Supply and Installation  
IS: International Shopping  
NS: National Shopping

5.9 **Installation / Civil Works** (Total estimated cost is US $1.09 million including contingencies, of which the IDA credit covers US$0.79 million): The installation works associated with the EDC rural grid extension component shall be carried out through the NCB procedures. The related procurement packaging arrangements are presented in table below:

### Procurement Packaging for Civil Works

<table>
<thead>
<tr>
<th>Package No.</th>
<th>Description</th>
<th>Estimated Cost (S'000)</th>
<th>Procurement Method</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Works for Sihanoukville Area</td>
<td>450</td>
<td>NCB</td>
<td>Smaller Works</td>
</tr>
<tr>
<td>2</td>
<td>Works for Battambang Area</td>
<td>800</td>
<td>NCB</td>
<td>Smaller Works</td>
</tr>
<tr>
<td>3</td>
<td>Works for Kampot Area</td>
<td>400</td>
<td>NCB</td>
<td>Smaller Works</td>
</tr>
<tr>
<td>4</td>
<td>Works for Kampong Speu Area</td>
<td>800</td>
<td>NCB</td>
<td>Smaller Works</td>
</tr>
<tr>
<td>5</td>
<td>MV Networks (West Phnom Penh &amp; Takeo)</td>
<td>330</td>
<td>NCB</td>
<td>Smaller Works</td>
</tr>
<tr>
<td>6</td>
<td>Warehouse</td>
<td>500</td>
<td>NCB</td>
<td>Smaller Works</td>
</tr>
</tbody>
</table>
Notes: The above costs exclude contingencies and taxes (thus may not reconcile with Table A).

NCB: National Competitive Bidding.
Smaller Works mean IDA’s Standard Bidding Documents for Procurement of Works (Smaller Contracts).

The procurement schedule is presented in Annex 7.

5.10 Rural Electrification Fund (total estimated cost is US$22.84 million; of which the IDA credit covers US$6.18 million, GEF grant finances US$1.90 million, and Private Sector US$14.76 million). The REF will provide co-financing grants to eligible subprojects (rural electrification enterprises, mini hydro, micro hydro, solar home systems, etc.) upon completion and technical audit. The associated goods and construction works will be procured by the subproject owners (private companies) in line with established local private sector commercial practices, except those large procurement packages with estimated cost exceeding US$2 million equivalent per package for which ICB may be the more efficient and economic procurement method. Based on the current survey and estimation, it is unlikely there will be procurement packages of this size. Note: Operational support to the REF. In the amount of US$2.01 million (GEF of US$0.4 million) has been included under consultant services.

5.11 Consultant Services (total estimated cost is US$12.33 million; of which the IDA credit covers US$8.48 million and GEF grant finances US$3.85 million): All consultant services will be subject to QCBS or QBS procedures except those cost less than US$100,000 for which CQ procedures would be more practicable (up to an aggregate amount not to exceed US$2.0 million). For the assignments that would be performed more effectively by individual consultants such as operational support to PMUs and in-house advisors, individual consultants shall be selected through comparison of qualifications of at least three candidates, with the following exception.

An in-house advisor (an expatriate individual consultant) has been financed previously under the PPF to assist EDC in various technical and administrative aspects. The advisor has established a very close and effective working relationship with EDC and has earned high trust of EDC management and staff. In view of the substantial delays in project preparation and the necessity of his service, EDC has decided to retain the advisor under its own budget upon depleting of the funds allocated under the PPF, with an understanding that related expenditures will be reimbursed from the IDA credit upon its approval and effectiveness. IDA issued no-objection to the extension of advisor’s contract and endorsed the above arrangement on a retroactive financing basis. The advisor will continue his service during the period of project implementation.

The consultant services arrangement is summarized in table below:
## Consultant Services and Training Arrangements

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Estimated Cost (S'000)</th>
<th>Selection Method</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MIME Component</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Renewable Energy Policy Development</td>
<td>620</td>
<td>QCBS</td>
<td>Firm</td>
</tr>
<tr>
<td>2</td>
<td>Power Market Analysis of Special Industrial Zone</td>
<td>350</td>
<td>QCBS</td>
<td>Firm</td>
</tr>
<tr>
<td>3</td>
<td>Development of a Power Sector Master Plan</td>
<td>450</td>
<td>QCBS</td>
<td>Firm</td>
</tr>
<tr>
<td>4</td>
<td>Implementation Support to REF (including accounting system, expatriate technical advisor, local long-term consultants)</td>
<td>2,870</td>
<td>QCBS, CQ, IC</td>
<td>Multi-contracts, firm &amp; individual</td>
</tr>
<tr>
<td>5</td>
<td>REE Rural Income Generation Promotion</td>
<td>350</td>
<td>CQ</td>
<td>Multi-contracts, local consultants &amp; NGOs</td>
</tr>
<tr>
<td>6</td>
<td>Renewable Energy Business Development for Solar and Mini/Micro Hydro</td>
<td>2,440</td>
<td>QCBS, CQ, IC</td>
<td>Multi-contracts, firm &amp; individual</td>
</tr>
<tr>
<td>7</td>
<td>REE Improvement and Association Building</td>
<td>1,260</td>
<td>QCBS, CQ, IC</td>
<td>Multi-contracts, firm &amp; individual</td>
</tr>
<tr>
<td>8</td>
<td>Capacity Building for Financial Institutions</td>
<td>250</td>
<td>QCBS, CQ, IC</td>
<td>Multi-contracts, firm &amp; individual</td>
</tr>
<tr>
<td><strong>REF Component</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Operational Support</td>
<td>420</td>
<td>IC</td>
<td>Individual</td>
</tr>
<tr>
<td>10</td>
<td>Training</td>
<td>60</td>
<td>CQ, IC</td>
<td>Multi-contracts, firm &amp; individual</td>
</tr>
<tr>
<td><strong>EAC Component</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Project Implementation Consultant (PIC)</td>
<td>1,000</td>
<td>QCBS</td>
<td>Firm</td>
</tr>
<tr>
<td>12</td>
<td>In-house Advisor</td>
<td>540</td>
<td>SSS</td>
<td>Individual</td>
</tr>
<tr>
<td>13</td>
<td>Independent Monitoring of Land Acquisition and Resettlement</td>
<td>20</td>
<td>CQ</td>
<td>Local NGO</td>
</tr>
<tr>
<td>14</td>
<td>Project Grievance Committee</td>
<td>20</td>
<td>CQ</td>
<td>Local NGO</td>
</tr>
<tr>
<td>15</td>
<td>Commercial Practice Improvement and Management Training</td>
<td>450</td>
<td>QCBS, CQ, IC</td>
<td>Multi-contracts, Firm &amp; Individual</td>
</tr>
<tr>
<td>16</td>
<td>Capacity Building for Land Acquisition, Resettlement, and Environmental Management</td>
<td>60</td>
<td>CQ</td>
<td>Firm</td>
</tr>
<tr>
<td>17</td>
<td>Power Investment Planning</td>
<td>250</td>
<td>QCBS</td>
<td>Firm</td>
</tr>
</tbody>
</table>

**Notes:** REF Component – the REF has not yet been established. The assignment details shall be worked out in due course with the progress of project implementation.

**QCBS:** Quality-and Cost-Based Selection  
CQ: Selection Based on Consultants' Qualifications  
SSS: Single-Source Selection  
IC: Individual Consultant

### 5.12 Prior Review Thresholds

For procurement of goods and works, IDA prior review in line with the IDA Procurement Guidelines shall be carried out for all procurement packages with estimated cost exceeding US$200,000 equivalent. According to the current
procurement packaging arrangements, such prior review would cover at least 95% of the value of all goods.

No prior-review would be conducted for commercial-practice-based procurements under subprojects to be co-financed by the REF.

For consultant services, Bank prior review in line with the IDA Guidelines for Selection of Consultants shall be required for all contracts with estimated cost exceeding US$150,000 for firms and US$50,000 for individuals. Such prior review would cover at least 90% of all consultant contracts to be financed by the IDA. Prior Review Thresholds is given in the table below:

**Thresholds for Procurement Methods and Prior Review**

<table>
<thead>
<tr>
<th>Expenditure Category</th>
<th>Contract Value Threshold (US$'000)</th>
<th>Procurement Method</th>
<th>Contracts Subject to Prior Review (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Works</td>
<td>&gt;500 (all contracts)</td>
<td>NCB</td>
<td>&gt;200,000</td>
</tr>
<tr>
<td>2. Goods</td>
<td>&gt;100</td>
<td>ICB</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;100</td>
<td>IS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;50</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>3. Consultant services</td>
<td>&gt;200</td>
<td>QCBS</td>
<td>&gt;150,000 for firms</td>
</tr>
<tr>
<td></td>
<td>100-200</td>
<td>QBS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;100</td>
<td>CQ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NA</td>
<td>IC</td>
<td>&gt;50,000 for individuals</td>
</tr>
</tbody>
</table>

5.13 Shortlists of Entirely National Consultants

National consultants and local NGOs would be capable and more economically perform certain services under the Project, such as rural income generation promotion activities, independent monitoring of land acquisition and resettlement; project grievance services. In such cases, the shortlist may comprise entirely national consultants (firms registered or incorporated in Cambodia), if the assignment is below a ceiling of $100,000.

5.14 Procurement Supervision and Post Reviews

Field based supervision of procurement work will be conducted as part of the regular project supervision missions, which are expected to be fielded every six months. For those contracts that are not subject to IDA prior review, post-reviews will be carried out based on a ratio of one out of three.

5.15 Procurement Progress Reporting

Procurement progress will be reported as part of the Quarterly Project Progress Reports. Information would include but not limited to the following: (a) progress of the bidding process and updated procurement schedule with explanations for any delays; (b) contract awards; (c) contract amendments, with explanations and justifications; and (d) compliance with prior-review threshold levels and aggregate limits on specified methods of procurement.
5.16 NCB Provisions

The acceptability of Government NCB procurement procedures is summarized in the CPAR dated March 1997 (the Annex B). Nevertheless, for NCB procurement, EdC follows as much as possible IDA’s ICB procurement guidelines. As requested, an internal regulation entitled “EdC’s Guidelines for Procurement of Goods and Works for National Competitive Bidding and Local Shopping” was prepared by EdC in end 2002 in English and has been translated into Khmer. This regulation, which is generally in line with the IDA ICB procurement guidelines, provides clearer procedures for EdC staff to follow in the future procurement including that financed under the proposed Project.

5.17 Disbursement Percentages of IDA Credit

The Bank loan will be disbursed as follows: (a) for contracts under the transmission components – 100% of the foreign expenditures for directly imported equipment and materials quoted on a CIF basis; 100% of local expenditures ex-factory for locally manufactured items; and 75% of local expenditure for other items procured locally; (b) for installation services, 80% of the contract value; and (c) for consultant services and training, 100% of the contract value.

5.18 Retroactive Financing

Royal Government of Cambodia (RGC) has taken the Project Preparation Advance (PPF) of $290,480 from the Bank for the preparation of the Project and support of the initial operation of the Electricity Authority of Cambodia. An in-house advisor (an expatriate individual consultant) to EDC was appointed under the PPF to assist EDC in (a) completion of project preparation (mainly related to technical and procurement aspects); (b) launching of the project for implementation; and (c) other related tasks as determined by EDC. In view of the substantial delays in project preparation, EDC is continuing these services from its own budget upon depleting of the funds allocated under the PPF, with an understanding that such expenditures will be reimbursed from the IDA credit upon its effectiveness. The IDA issued its no-objection to the extension of the in-house advisor’s services and endorsed the above “advance contracting” on a retroactive financing basis.

5.19 Contract Management

Contract management will be carried out by the implementing agencies, with the assistance of the project implementation consultants.

EDC and the REF will provide procurement information to IDA in quarterly reports indicating: (a) contract awards and purchases; (b) revised contract prices (if and when increases occur) giving reasons for the changes; (c) updates of the procurement processing schedule with explanations for any delays in project implementation; and (d) compliance with prior-review threshold levels and aggregate limits on specified methods of procurement.
6. Financial Management and Disbursement Arrangements

6.1 Financial Management

6.1.1 Accounting Organization and Staffing

The financial management arrangements for the proposed project will be handled as follows:

(i) External Finance Management Office (EFM) of the FA Department of EDC will be responsible for the management of all the components of the Project except REF component. The Manager of the EFM office would report to the Project Manager (PMU) concerning overall financial management of the Project.

(ii) The REF will be responsible for the management of the REF component of the Project. As the REF has not yet been fully promulgated, a transition PMU has been set up within MIME to establish the REF. As the procurement and disbursement experience is low within MIME, EdC will help during the transition.

EdC and MIME would be responsible for ensuring that IDA guidelines and procedures are followed on disbursements, auditing and overall financial management. This will include maintaining the Project’s books of accounts, requesting disbursement from the SA managed by the MEF and replenishments of Project Accounts, monitoring overall project disbursements, coordinating with the MEF on annual counterpart fund requirements, preparing withdrawal applications for the MEF to submit to IDA, producing quarterly Financial Management Reports (FMRs), preparing annual financial statements, and having them audited by an external auditor acceptable to the IDA.

6.1.2 Reporting Arrangement

The executing agencies of the project shall provide the IDA with FMRs in accordance with the Guideline to Borrowers issued on November 30, 2001. The FMRs shall include: (a) Discussion of Project Progress; (b) a Balance Sheet; (c) Sources and Uses of Funds by Disbursement Categories; (d) Uses of Funds by Project Activities; (e) Output Monitoring Report; and (f) Procurement Status Report. The reports shall emphasize linkages between expenditures and physical progress.

EDC and REF will be responsible for submitting the FMRs to IDA on a quarterly basis within 45 days of the quarter end starting the first quarter following Project’s first disbursement. Additional output monitoring report and key performance indicators will be identified and developed to suit project needs during implementation, as appropriate.
6.2 Disbursement Arrangements

6.2.1 Disbursement:

Disbursement of the proceeds of the Credit will be made based on the traditional system: from the Special Accounts with reimbursements made based on full documentation or against SOEs; and direct payment from the credit account.

6.2.2 Allocation of Credit Proceeds:

Disbursement of the proceeds of the credit would be made against expenditure categories as shown in table below:

<table>
<thead>
<tr>
<th>Allocation of Credit Proceeds</th>
<th>IDA Credit Amount in US$ million</th>
<th>GEF Grant Amount in US$ million</th>
<th>Financing Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenditure Category</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Works</td>
<td>2.71</td>
<td></td>
<td>75%</td>
</tr>
<tr>
<td>2. Goods</td>
<td>22.19</td>
<td></td>
<td>100% of foreign expenditures, 100% of local expenditures (ex-factory cost), and 75% of local expenditures for other items procured locally.</td>
</tr>
<tr>
<td>3. REF</td>
<td>9.63</td>
<td>2.50</td>
<td>100%</td>
</tr>
<tr>
<td>4. Consultants’ Services</td>
<td>5.17</td>
<td>3.25</td>
<td>100%</td>
</tr>
<tr>
<td>5. PPF Refinancing</td>
<td>0.30</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Total</td>
<td>40.00</td>
<td>5.75</td>
<td></td>
</tr>
</tbody>
</table>

6.2.3 Use of Statement of Expenditures:

Some of the proceeds of the Credit are expected to be disbursed on the basis of SOEs as follows:

- works estimated to cost the equivalent of US$200,000 or less;
- goods estimated to cost the equivalent of US$200,000 or less;
- REF estimated to cost the equivalent of US$ xx or less;
- consulting firms estimated to cost the equivalent of US$150,000 or less; and
- individual consultant’s contract estimated to cost the equivalent of US$50,000 or less.

Disbursement for any expenditure exceeding the above limits will be made in accordance with respective procurement guidelines and provision in the Credit Agreement against submission of full documentation and signed contracts.

The documentation supporting SOE disbursements will be retained by the Project during the life of the Project and until one year after the receipt of the audit report for the last year in which the last disbursement would be made. These documents will be made available for review by the auditors and IDA supervision missions. The SOE documents will be audited annually by independent auditors acceptable to IDA.
Should the auditors or IDA supervision missions find that disbursements have been made that are not justified by supporting documentation, or are ineligible, IDA will have the right to withhold further deposits to the Special Accounts. IDA may exercise this right until the Borrower has refunded the amount involved or (if IDA agrees) has submitted evidence of other eligible expenditures that offset the ineligible amounts.

The disbursements are expected to begin in 2004 and be completed in 2009 with the completion of RE components of the Project.

6.3 Special Accounts

To facilitate credit disbursement, three Special Accounts (SA) denominated in US dollars will be maintained at Bank of Cambodia, the central bank, on terms and conditions satisfactory to IDA including appropriate protection against set off, seizure and attachments. The SAs, which would cover the IDA share of eligible expenditures in all disbursement categories, will be as follows: (a) SA to be managed by EDC for all components, except for the REF component, with an authorized allocation of US$ xx million; (b) SA to be managed by MIME for the REF component, with an authorized allocation of US$ xx million; and (c) SA to be managed by MIME for TA activities related to it, with an authorized allocation of US$ xx million. The SAs should be replenished regularly, preferably monthly (but not less than quarterly) or when the amounts withdrawn equal 20% of the initial deposit, whichever comes first. Reconciled bank statements will accompany all replenishment applications from the depository bank showing all transactions in the SAs. The SAs will be audited annually by independent auditors acceptable to IDA.

Government counterpart funds will be channeled through two separate project bank accounts assigned to the Project and managed each by EDC and MIME.

6.4 Audit Arrangements

EDC and MIME will be responsible for ensuring that the annual financial statements under their responsibility are audited in accordance with International Auditing Standards (IAS) by an independent external auditor appointed under term of reference satisfactory to IDA. The auditor will be required to express opinion on: (a) the annual project financial statements; (b) whether the Special Account funds have been correctly accounted for and used in accordance with the IDA Credit and Grant Agreements; and (c) the adequacy of supporting documents and controls surrounding the use of the Statement of Expenditures (SOEs) as a basis for disbursements. A letter of internal control is normally attached in the auditor’s reporting package. The audited financial statements will be submitted to IDA within six months after the end of each fiscal year.

6.5 Financial Management Action Plan

EDC will carry out a time-bound action plan as stated below for strengthening their financial management system.
### Actions

**Financial Management System and Reporting**

1. Put in place a project accounting system capable to produce FMRs, annual financial statements and required statutory reports:
   - EDC – a computerized accounting system using ACCPAC.

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>EdC/Consultant</td>
<td>By May 2004</td>
</tr>
<tr>
<td>REF/Consultant</td>
<td>By April 2004</td>
</tr>
</tbody>
</table>

2. Agree on the format of the quarterly FMRs to be used for project monitoring and IDA supervisions.

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>EdC/REF</td>
<td>By October 2003</td>
</tr>
</tbody>
</table>

**Financial and Administration Manual (FAM)**

3. Develop a project FAM describing overall financial management, flow of funds, disbursement procedures, and internal controls for the project satisfactory to the IDA

   Finalize the FAM, satisfactory to IDA

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>REF/Consultant</td>
<td>By June 2004</td>
</tr>
</tbody>
</table>

**Training**

Provide training to relevant staff:
- at EDC to fully operate the ACCPAC accounting software.
- at REF to be able to maintain the manual accounting records.

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>EdC</td>
<td>By May 2004</td>
</tr>
<tr>
<td>REF</td>
<td>By April 2004</td>
</tr>
</tbody>
</table>

**Audit Arrangement**

5. Appoint an independent auditor acceptable to IDA to carry out the audit of the Project in accordance with TORs satisfactory to IDA.

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>EdC</td>
<td>By June 2004</td>
</tr>
</tbody>
</table>

### 6.6 Project Implementation Schedule

The project will be implemented over a period of 5 years from 2004 -2009. The Project Implementation Schedule is presented in Annex. 8.
7. RESETTLEMENT MANAGEMENT

7.1 Impacts

This section describes issues relating to resettlement and compensation. Under the transmission component of the Project, certain amount of land acquisition and resettlement will be required, which is mainly caused by acquiring land for substations, building tower bases, and clearing right of way (ROW) under the transmission lines. As for the RE-EDC grid component, while construction of MV and LV requires little land acquisition and resettlement, small land acquisition might be required for the construction of mini hydro and some MV facilities.

7.2 Resettlement Action Plan (RAP) for the Transmission Component

The RAP for the transmission component was based on 100% census survey of all affected people along the ROW and social economic survey among 25% of potentially affected families. According to the RAP, a total of 9.1 ha of land areas will be acquired for both substations and tower bases, most of them are paddy land. Along with land acquisition, a total of 132 households will be relocated from the ROW, most of whom will be moved within a short distance. For those who will lose farmland, replacement farmland or cash at replacement value will be provided; while those losing structures and other attachments, compensation will be provided at replacement value. Due to a change in the Project's financing plan, the transmission component would be financed jointly by IDA and ADB, with ADB financing all 220 kV elements (two 220 kV substations and one 220 kV transmission line) and IDA financing all 115 kV elements.

Under the World Bank requirements, the preferred form of compensation for involuntarily acquired land, is provision of replacement land nearby of equivalent type, size and value with similar access to livelihood opportunities (‘land for land’). Replacement houses are to be provided to an equivalent size and standard within the same village, with similar access to resources and facilities such as land, roads and livelihood opportunities. Materials from the existing structure are to be available to the owner for salvage with no deduction from the compensation value. Similarly there is to be no deduction for depreciation, taxes, stamp duty, fees or other payments. The land within the ROW from which the house has been removed will generally be suitable for other uses such as farming of ground crops. If it is not required for the project it shall remain the property of the previous occupant.

7.3 Resettlement Policy Framework and Procedure Guidelines for the RE Component:

For the EDC on-grid extension and grid- and off-grid REF subprojects under the RE component, although little land acquisition are expected for MV and LV connections, small land acquisition might be required for the construction of mini hydro and some MV facilities. Since detailed project selection and design has not yet been prepared, a resettlement policy framework and procedure guidelines has been developed to ensure that any land acquisition and resettlement will follow the same resettlement policy as
under the transmission component. The draft resettlement policy framework and procedure guidelines includes key elements: (a) resettlement principles; (b) project description; (c) potential impacts and resettlement screening procedures; (d) legal framework; (e) organizational structure; (f) consultation and grievance procedures; and (g) monitoring arrangements. According to the policy framework, an impact/compensation data sheet will be prepared by the implementation agency if less than 200 people are affected by a subproject. If more than 200 people are affected by a subproject, then a RAP will be prepared. The screening of resettlement impacts will be the responsibility of two implementation agencies: EDC for the on-grid component, and PMU in MIME for the REF subprojects.

7.4 Implementation

Implementation of the resettlement aspects for the proposed Project will be carried out by two agencies: (a) EDC, for the transmission and on-grid RE components; and (b) the PMU in MIME, which will be responsible for setting up Rural Electrification Fund, under which, grid and off-grid RE subprojects will be implemented. Within EDC, the resettlement implementation will be carried out by a special resettlement and environment office, assisted by IRC and provincial sub-committees. Key aspects are as follows:

- An Interdepartmental Resettlement Committee (IRC) will be established for the project, headed by the Ministry of Economics and Finance (MIEF) as the funding body for resettlement and compensation.
- A RRAP Coordinator shall be appointed under the Project Engineer to coordinate the day to day activities.
- An Independent Monitoring Organization shall be appointed to monitor the process and verify that the World Bank’s requirements are met.
- An ongoing community liaison program and a complaints and grievances procedure shall be established.
- Capacity building and other assistance will be incorporated into the project for the implementing agency and for the Independent Monitoring Organization.
- Establishment of a formal process for land acquisition.

The schedule for implementation must allow for the requirements of the RAPP, including establishment of replacement land and houses prior to the commencement of construction activities affecting these.
8. ENVIRONMENTAL MANAGEMENT

This section describes issues relating to environmental assessment.

Environmental assessment has been carried out for the project as required by World Bank safeguard policies (OP4.01 Environmental Assessment) and Cambodia law. The project has been classified under World Bank environmental screening requirements as a Category B project that is it is unlikely to have significant adverse environmental impacts that are sensitive, diverse or unprecedented. This Consultation has been carried out with key stakeholders including government agencies, non-government organizations, local administration and project-affected families. There is no effect requiring action with respect to other World Bank safeguard policies including natural habitats (OP4.04), cultural property (OP4.11) or indigenous or other ethnic minorities (OP4.20).

8.1 Transmission Component

Alternative routes have been analyzed and ranked according to a range of environmental, technical and economic criteria. The proposed route is preferred on environmental, technical and economic grounds. It avoids any environmentally and socially sensitive areas such as temples and other cultural sites, schools, urban areas, forests and ecologically sensitive areas. During the survey of the line, local adjustments were made to the route to minimize the number of houses affected and completely avoid sensitive sites such as temples and schools.

Social surveys were carried out and inventories prepared (refer to RRAP for further discussion).

The key measures proposed to minimize or mitigate impacts include:

- Selection of the transmission line route to avoid houses and other sensitive areas.
- Minimizing the width of the Right of Way in order to minimize the number of houses and trees needing to be removed, while providing adequate width for electrical safety and meeting health guidelines for electric and magnetic fields (EMFs) by separating the line from houses.
- Development and implementation of a Resettlement and Rehabilitation Action Plan
- Development of Construction Environmental Management Plan by the Contractor to ensure the design and construction is in meets the undertakings given in the Environmental Assessment and RRAP.
- Establishment of Inter ministerial Resettlement Committee (IRC) for the project;
- Appointment of RRAP/Environmental Coordinator within PM02;
• Monitoring of the project implementation by an Independent Monitoring Organization.

• Capacity building within implementing agency and IMO;

• Ongoing community liaison, including a procedure for complaints to be heard and acted upon, including through the Independent Monitoring Organization or their local political representative.

• A formal process will be followed for the acquisition of the Right of Way (refer to RRAP section).

• Measures to minimise construction disturbance.

• Measures to minimize risk of spills of oils, fuels and other hazardous materials.

• Measures to ensure electrical safety.

• Measures to protect workers’ health and safety and mitigate social and public health impacts.

The implementation of the environmental provisions of the project will be in conjunction with the resettlement and compensation provisions.

8.2 Rural Electrification component:

The environmental impact of the grid extension component is expected to be minimal as it is composed only of distribution power lines at voltage of 22kV or less. The lines will be erected along roads and will be of a form similar to those already in existence and erected by EDC at present. Necessary measures for environmental protection will be considered during the design stage in order to minimize any adverse environmental impacts that might arise during construction or during operation. The terms of reference of the project implementation consultant will include suitable guidelines regarding environmental aspects.
9. MONITORING AND EVALUATION

9.1 Performance Indicators

The Rural Electrification and Transmission Project has been formulated to implement initial strategies that will contribute to achieving the long-term target of providing electricity to 70% of the rural households and communities by the year 2030.

The key performance indicators for the project are given below:

<table>
<thead>
<tr>
<th>Key Performance Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sector Indicators:</strong></td>
</tr>
<tr>
<td>- Electrification ratio nationwide increases from ...% to ...%</td>
</tr>
<tr>
<td>- Growth in economic activity in grid and off-grid areas (not measurable)</td>
</tr>
<tr>
<td><strong>Project Development Indicators:</strong></td>
</tr>
<tr>
<td>- Electrification ratio increases in project areas from ...% to ...%</td>
</tr>
<tr>
<td>- Private power to account for at least ...% of supply in project areas outside Phnom Penh at MTR and ...% by end of project</td>
</tr>
<tr>
<td>- EAC and RREF effectively operating</td>
</tr>
<tr>
<td>- Average production costs reduced by ...%</td>
</tr>
<tr>
<td>- EDC’s diesel generators are retired</td>
</tr>
<tr>
<td><strong>Project Output Indicators:</strong></td>
</tr>
<tr>
<td>- At least 50,000 new rural consumers connected to the grid</td>
</tr>
<tr>
<td>- At least 45,000 rural consumers having access to off-grid supplies - of which 5-10,000 to renewable energy sources</td>
</tr>
<tr>
<td>- T/L operating and loaded</td>
</tr>
<tr>
<td>- Issuance of guidelines</td>
</tr>
<tr>
<td>- All IPPs and ...% of REEs licensed by MTR</td>
</tr>
<tr>
<td>- ...% of REEs licensed by end of</td>
</tr>
<tr>
<td><strong>Project Component Indicators:</strong></td>
</tr>
<tr>
<td>- Installation of:</td>
</tr>
<tr>
<td>- Installation of 109 km of 220 kV line</td>
</tr>
<tr>
<td>- Installation of 9 Km of two 115 kV double line and stringing of 23 km of second circuit of exiting 115 kV ring main</td>
</tr>
<tr>
<td>- Construction of new 220 kV sub-stations at WPP and Takeo</td>
</tr>
<tr>
<td>- National Control center</td>
</tr>
<tr>
<td>- MV network extension from WPP and Takeo</td>
</tr>
<tr>
<td>- 100,000 household connections</td>
</tr>
<tr>
<td>- Off-grid installations:</td>
</tr>
<tr>
<td>- '07 '08 '09</td>
</tr>
<tr>
<td>- Solar powered system</td>
</tr>
<tr>
<td>- Support to project implementation</td>
</tr>
<tr>
<td>- Training of EDC, EAC, REF, REEs and credit agents</td>
</tr>
<tr>
<td><strong>Monitoring and Supervision</strong></td>
</tr>
<tr>
<td>- Sector / Country Reports</td>
</tr>
<tr>
<td>- Bank supervision missions</td>
</tr>
<tr>
<td>- Mid Term Review</td>
</tr>
<tr>
<td>- EAC reporting</td>
</tr>
<tr>
<td>- RREF reporting</td>
</tr>
<tr>
<td>- Bank supervision missions</td>
</tr>
<tr>
<td>- EAC regulations</td>
</tr>
<tr>
<td>- Verification of EDC financial reports</td>
</tr>
<tr>
<td>- Progress reports:</td>
</tr>
<tr>
<td>- Disbursement records</td>
</tr>
<tr>
<td>- Financial</td>
</tr>
<tr>
<td>- Monitoring Reports</td>
</tr>
<tr>
<td>- Bank supervision missions</td>
</tr>
<tr>
<td>- Project inspectors</td>
</tr>
</tbody>
</table>
9.2 The key indicators and targets

The key indicators and targets for the RE component of the Project to achieve by the end of 2008 are as follows:

- Number of new quality electricity services to households, businesses, schools, health centers, and pagodas in rural areas by EDC (close to 50,000);
- Number of new quality electricity services to households, businesses, schools, health centers, and pagodas in rural areas and by privately owned REEs (close to 45,000);
- Number of new quality electricity services using solar home systems (12,000);
- Addition of at least 6MW of renewable energy capacity; and
- Construction of micro hydro plants in remote villages.

9.3 Supervision Plan

Supervision Missions Bank staff will carry out one mission every four months, including special procurement supervision for post-review/audits. In addition, procurement staff from the Resident Mission in Cambodia or the Field Office in Laos will be available for monitoring the project and for continuous support.

Mid-Term Reviews. In addition to its regular supervision, IDA and RGC will jointly conduct a Mid-Term Review about three years after project effectiveness.
Rural Electrification
EDC’s Grid Extension Project

Document prepared for the
World Bank Project
Rural Electrification and Transmission Project
the Implementation of the
Cambodia Rural Electrification Strategy and Implementation Program

Corporate Planning and Projects Department

September 2003
Table of Contents

Chapter | Title | Page
---|---|---
Title of Page | | 1
Table of Contents and List of Tables | | 2
I. Introduction | | 49
1.1 Background | | 49
1.2 Objectives of the Project | | 49
1.3 Scope of the Project | | 50
1.4 Process of the Study | | 50
II Selecting Criteria | | 50
2.1 Definition of the Rural Area in this Project | | 50
2.2 Common Criteria for Selecting GE RE Candidates | | 50
III. Methodology | | 51
3.1 Process of Data Preparation and Data Collection | | 51
3.2 Analysis Method and Preparation | | 51
IV. Connecting Points and Estimation of Electrified Communes | | 52
4.2 House-holds connected in the Rural Area | | 52
V. Cost Estimation | | 52
VI. Conclusion | | 53

List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Number of Households selected in the RE-GE area</td>
<td>52</td>
</tr>
<tr>
<td>Table 2</td>
<td>The quantity of equipment/material of the project</td>
<td>52</td>
</tr>
<tr>
<td>Table 3</td>
<td>The cost estimation of the distribution system and cost per connection</td>
<td>53</td>
</tr>
</tbody>
</table>
I. Introduction

1. Background

Cambodia is a small country of about 181,035 sq. km in the Lower Mekong region sandwiched between Thailand in the west, Vietnam in the east and Lao PDR in the north. It has a population of about 11.5 million in 1998, of whom about one third live in poverty and 85% are in the rural areas. GDP per capita is about US$260 in 2001, making it one of the poorest countries in the Asia region. Cambodia desperately needs to improve its infrastructure especially in rural areas. Lack of budget resources is constraining improvement. The improvement of this country has followed a program focused on the repairs and restoration of basic infrastructure. At this stage, the basic improvement of the country's infrastructure approaches completion; the Government is increasingly focus on further development, which aims of improving the socio-economic conditions of the people of Cambodia. The best prospects for development are in agriculture, forestry, textiles and tourism.

Its main source of indigenous energy is wood-fuel, and it has no proven deposits of coal, oil or gas, although there is ongoing offshore exploration for oil and gas by foreign concessionaires. The country is therefore almost totally reliant on imported oil based fuels as the primary energy source for the transport and electricity sectors. Potential for development of hydropower resources is substantial (above 10,000 MW), but development is hampered by the lack of hydrological data and the high cost of its development.

The electricity sector in Cambodia is small in size and is in an early stage of development. The country-installed capacity, mainly operated by EDC\(^1\) is 160 MW, with the sale 467 GWh per 2002. The average country electrification ratio is approximately 13%. The rural electrification ratio is 8.6%. The country is served by 22 small isolated power systems. The responsibility for the coordination of electricity sector policy, planning and development rests with the Ministry of Industry, Mines and Energy (MIME). The Electricity Law of the Kingdom of Cambodia, which enacted in February 2001, provides for creation of an Electricity Authority of Cambodia (EAC) to license operators, approve prices and provide and enforce supply standards.

1.2 Objectives of the Project

The report will identify the commune or villages in the rural area namely Battambang, Sihanoukville, Kampot and Kampong Speu, will be connected to the Electricité du Cambodge (EDC's) grid under the World Bank Rural Electrification Project. The report will also provide the estimation cost of the connection, the main access road for the main grid extension from EDC power distribution and power generation sources with the attachment the map of the expected grid extension plan for Rural areas in Cambodia within existing and future EDC coverage area.

---

\(^1\) Cambodia power systems is two parts: (i) Phnom Penh and six big provincial towns served by Electricité du Cambodge (EDC), a state owned limited liability company and (ii) the reminder of the country served under the responsibility of MIME or served by private companies under contract with MIME.
1.3 Scope of the Project

At present, EDC is undertaken the operation of the business units of six isolated areas, of which Phnom Penh is the largest power system in Cambodia. Soon this year, EDC will be handed the other 7 business area. Also, cross-border MV distribution system with Viet Nam (PC2) at four areas have been put into operation since 2001. From the above mentioned project coverage areas of EDC, the scope of this project aims at providing the grid extension to Rural area from EDC's main grids. The scope will identify the communes or villages in Battambang, Sihanoukville, Kampong Speu, to be connected, number of households, the access road to those communes or villages (sketch map), cost estimation of getting connection and etc. The result provided is limited only with forty killo-meter surrounding the EDC's power distribution and generation grid.

1.4 Process of the Study

EDC sent a team to existing and future coverage areas, in order to search and check with the selected RE grid extension (GE) bases on the desk study report. The team was working in the office for five working days, and went to the fields for two weeks. The data analysis and re-mapping the target points were done within five working days, to get the preliminary result. After checking the result, the draft final report was done for the approval from EDC's management.

II Selecting Criteria

2.1 Definition of the Rural Area in this Project

In Cambodia it may be appropriate to define rural electrification of non-urban areas, excluding the cities and towns, which are provided with electricity service from EDC or under contractual agreement with MIME. Rural electrification would also include any area not currently electrified, or electrified under arrangements not currently by MIME and/or Electricity Authority of Cambodia (EAC).

2.2 Common Criteria for Selecting GE RE Candidates

The following detail criteria that EDC selects the communes for the grid extension rural electrification project:

1. Non-urban areas, excluding the cities and towns, which are provided with electricity service from EDC or under contractual agreement with MIME. Rural electrification would also include any area not currently electrified, or electrified under arrangements not currently by MIME and/or EAC.

2. Villages are to be within forty killo-meter surrounding EDC's distribution and generation grid.

2 Those are under the Provincial Power Supply Project of ADB namely: Kampot, Takeo, Kampong Speu, Prey Veng, Svay Rieng, Banteay Mean Chey, Stung Treng, Ratanakiri. The project is expected to complete at the end 2004.
3. Villages are reasonable access road, which easy for operation and maintenance and installation,
4. Village can be reached by access roads, where there are population living along it,
5. Villages in which people are ready to make a partial contribution to electrification and are able to pay their electricity bills,
6. Villages which have development potential for agricultural, forestry, handicrafts production or other income generation opportunities and need electricity to develop this potential,
7. Villages where investment in infrastructure and electrification will help the Government program for stopping internal migration, reducing nomadic farming and deforestation or helping the development of communes or villages,
8. Villages which are included in the list of other development assistance program or projects for developing infrastructure such as transportation, water supply, health clinics, schools etc and
9. Villages within cost-effective reach of grid or cross-border points of supply.

III. Methodology

3.1 Process of Data Preparation and Data Collection

The Rural Electrification extension from the EDC's power system in this study is involving the energy supply from generation plant of existing network of EDC and as well as the future provincial power supply system in the towns where will be handed over to EDC.

The survey team have been dispatched to the location where expect to be the potential for this grid extension study. The teams estimated the quantity MV and LV line from the sources of supply, number of households expects to connect to the grid, find out the area where it is marching with the selecting criteria etc.

3.2 Analysis Method and Preparation

The analysis for the cost per connection of the customer is determined. Base on the RE design criteria; the cost estimation is based on the Single Wire Earth Return (SWER) system extension from EDC grid. The lines system is mainly used of the cover conductors for MV lines and Arial Bundle Conductors (ABC) for LV lines. The span of the poles is 50-100m. The poles mounted substations are considered. The estimation of the MV network is calculated in two main parts, which are supply line\(^3\) and MV spur lines\(^4\). MV & LV lines are calculated based on the cross section of conductor of 70 sq.mm. At each distribution point there will be installed the meter for the feeders consumption. All customers are connected by watt-hour meters and protected by distribution circuit breakers (Safety Breaker).

\(^3\) from EDC's grid to distribution points by 22 kV
\(^4\) the points where connected from supply line
The number of households are expected to connect to EDC's grid are estimated by using the location map and counting for the sample by the surveyors. The estimation cost per connection is assumed by averaging the overall cost of connection of each feeders.

IV. Connecting Points and Estimation of Electrified Communes

Among the projects' area, Battambang is the highest potential for the GE-RE. There are 50,012 rural area consumers are expected to connect. The estimation of consumers is based on the nearest supplying points in accordance to the selecting criteria, but not outside 30 km vicinity. Table 1 bellow depicts the expect consumers connecting to GE-RE.

Table 1 Number of Households selected in the RE-GE area

<table>
<thead>
<tr>
<th>#</th>
<th>Province</th>
<th># Houses</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>Battambang</td>
<td>18,579</td>
</tr>
<tr>
<td>II.</td>
<td>Sihanoukville</td>
<td>10,508</td>
</tr>
<tr>
<td>III.</td>
<td>Kompong Speu</td>
<td>10,965</td>
</tr>
<tr>
<td>IV.</td>
<td>Kampot</td>
<td>9,960</td>
</tr>
<tr>
<td></td>
<td>Grand Total</td>
<td>50,012</td>
</tr>
</tbody>
</table>

Source: EDC/Survey data 2001

V. Cost Estimation

The project component is estimated 516 cct-km of the MV 22kV line (SWER) and LV lines is approximately of 536 cct-km and as well as the transformers are approximately 200 sets of single phase transformers with the capacity ranks from 50 to 100 kVA and one 150 kVA three phase for Sihanoukville. The isolated transformers for SWER is 16. Covered conductors MV and ABC LV line is selected 1x70sq.mm and 2x70sq.mm, respectively. The quantity of equipment of the project depicts in Table 2 bellow.

Table 2 The quantity of equipment/material of the project

<table>
<thead>
<tr>
<th># Province</th>
<th>MV, cct-m</th>
<th>LV, cct-m</th>
<th>Meter, set</th>
<th>Tr., set, 50-100kVA</th>
<th>Iso., Tr., 150kVA</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Battambang</td>
<td>130,800.00 185,000.00</td>
<td>18,579</td>
<td>61.00</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. Sihanoukville</td>
<td>75,200.00</td>
<td>75,000.00</td>
<td>10,508</td>
<td>30.00</td>
<td>2</td>
<td>1x3ph: 150kVA</td>
</tr>
<tr>
<td>III Kampong Speu</td>
<td>198,300.00</td>
<td>151,000.00</td>
<td>10,965</td>
<td>59.00</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>IV Kampot</td>
<td>111,700.00</td>
<td>125,000.00</td>
<td>9,960</td>
<td>34.00</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td>516,000.00</td>
<td>536,000.00</td>
<td>50,012</td>
<td>184</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

Source: EDC estimation

The Cost estimation divided as the cost of supply line by 22 kV and the cost of distribution system. The cost of supply line is depicted in Table 3. The supply line (MV Line) and LV Line cost are computed with the consideration of its complete accessories. The transformers including isolated transformers for the SWER system is US$3,800 per set in average including its accessories. The metering is including the Safety Breakers, kWh meters and Meter Cabinets.
The above average cost is excluded Tax and VAT for the material for procurement.

Table 3  The cost estimation of the distribution system and cost per connection

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Battambag</td>
<td>383,593</td>
<td>1,422,784</td>
<td>787,285.00</td>
<td>260,496.00</td>
<td>3,710,407.7</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>81</td>
<td>0</td>
<td>856,247.93</td>
<td>0</td>
</tr>
<tr>
<td>II. Sihanoukville</td>
<td>218,533</td>
<td>753,270.73</td>
<td>445,277.00</td>
<td>124,416.00</td>
<td>1,716,646.0</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>396,149.09</td>
<td>8</td>
</tr>
<tr>
<td>III. Kompong Speu</td>
<td>547,206</td>
<td>1,014,420</td>
<td>464,642.00</td>
<td>223,332.00</td>
<td>2,924,481.3</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>20</td>
<td>0</td>
<td>674,880.30</td>
<td>1</td>
</tr>
<tr>
<td>IV. Kampot</td>
<td>303,660</td>
<td>9878,876.17</td>
<td>422,055.00</td>
<td>143,856.00</td>
<td>2,272,982.5</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>524,534.43</td>
<td>4</td>
</tr>
<tr>
<td>Grand Total</td>
<td>1,452,995</td>
<td>3,848,351</td>
<td>2,119,258.50</td>
<td>752,100.00</td>
<td>10,624,517.0</td>
</tr>
<tr>
<td></td>
<td>47</td>
<td>91</td>
<td>0</td>
<td>6</td>
<td>64</td>
</tr>
</tbody>
</table>

Source: EDC estimation

Total investment cost of the project in the four grid extension systems for the rural area from EDC's grid is estimated US$10.62 million. The investment extent the benefits to the customers approximately of 50,000 households. The breakdown of the investment in each province is depicted in Table 3.

VI. Conclusion

There are no supply lines extended to the rural area, at present. The estimation investment cost is divided to the cost of supply line and the cost of distribution system. The cost shown that whether EDC is to own the supply line with the bulk supply to the existing Rural Electrical Enterprises (REEs), while private sector (REEs) have to participate in the distribution. The other option, EDC will own the whole system to the rural area from it own business areas in those project location. From this point of view, the investment for the supply line is more than 30% of the total investment including the transformers. The people in the rural area approximately 50,000 households get benefits from this investment. The average cost per customer connected to the grid is US$214. The study suggested that the investment for the supply line is the priority and then the expansion the distribution system will become step by step in term of economic point of view, investment availability and so on. The distribution system operation and maintenance under this project should be opened to REEs participation.
Annex 2
Project Implementation Unit (WB PMU)

Electricité du cambodge

The World Bank

Cambodia Rural Electrification and Transmission Project
--115 kV Transmission Lines and RE Grid Extension Component--

Corporate Planning and Projects Department
Project Management Office
Project Management Unit (PMU-WB)

September 2003
Project Management UNIT (PMU) and Staffing

The Project Management Office (PMO) is a permanent office to implement the World Bank Rural Electrification and Transmission Project. In PMO the PMU was established in July 2003. The office staff is manned on a full time basis and it will be dissolved after the project is handed over to the EDC. The organisational structure of PMO is presented on Figure 1 and described in detail below:

![Organizational Chart](image)

*Figure 1 EDC's Organization Chart*
115 kV Transmission & RE Grid Extension Component

1. Project Director (PD)

The PD is responsible for the implementation and the technical performance of the project. He is the liaison with the World Bank representative. He reviews and approves all the Project Implementation Consultant’s works. He is assisted by an In-House Advisor.

1.1 Project Manager (PM)

The PM is responsible for the management of the project and supervises all the activities of the managers in the PMU. He is the counterpart to the Project Implementation Consultant. He reports directly to the PD.

1.2 Deputy Project Manager (DPM)

The DPM assists the PM in the coordination of all the activities of the different managers in the PMU. He reports directly to the PM.

1.3 Manager Substation and Transmission (M Sub.&T)

The M Sub.&T is responsible for the engineering and construction work for Substation and Transmission. He supervises all the supervisors and reports to DPM and PM.

1.3.1 Supervisor Project Engineering (SPE)

The SPE supervises all technical specifications, construction/installation contract documents, approval action regarding shop drawings and field engineering changes, etc. to be in conformity with EDC technical standard. SPE is from Technical Office of CPP.

1.3.2 Supervisor Project Installation and Construction Substation (SIC-S)+NCC

The SIC-S is responsible for the site supervision of the construction works and installation of equipment of the Substation and National load Control Center (MCC). The SIC-S is responsible for the preparation, conducting of the project commissioning and hand over to EDC and coordinates this latter activity closely with the SPE. The SIC-S is from PMO Office of Corporate Planning and Projects Department (CPP) and the staffs are from Technical Office of CPP the Transmission and Despatching Office of Transmission and Distribution Department of EDC.

1.3.3 Supervisor Project Installation and Construction Transmission (SIC-T)

The SIC-T is responsible for the site supervision of the construction works and installation of equipment of the 115kV transmission line. The SIC-T is responsible for the preparation, conducting of the project commissioning and hand over to EDC and coordinates this latter activity closely with the SPE. The SIC-T is from PMO and the staffs are from the Technical Office of CPP,
Transmission and Despatching Office of Transmission and Distribution Department of EDC.

1.4 Manager Rural Electrification-Grid Extension (M RE-GE)

The M RE-GE is responsible for the engineering and construction work for Rural Electrification-Grid Extension. He supervises all the supervisors and reports to DPM and PM.

1.4.1 Supervisor Project Installation and Construction-RE Grid (SIC-RE Grid)

The SIC-RE Grid is responsible for the site supervision of the construction works and installation of equipment in the field including the preparation and conducting of project commissioning and hand over to EDC and coordinates this latter activity closely with the SPE. The SIC-RE Grid is from PMO/Technical Office of CPP Department and from the EDC Provincial Business Unit where the project applied.

1.4.2 Supervisor Project Engineering (SPE)

The SPE supervises all technical specifications, construction/installation contract documents, approval action regarding shop drawings and field engineering changes, etc. to be in conformity with EDC technical standard. SPE is from Technical Office of CP&P.

1.5 Manager--Cost and Accounting (M—C&A)

The M—C&A is responsible for all financial and accounting matters of the Projects and reports to the PM and to PD, including project accounts, cash disbursement book, account ledger and journal. He shall prepare the annual project financial statement for auditing. The M—C&A is from the Office of External Management of Accounting and Finance Department of EDC.

1.6 Manager--Procurement (M-P)

The M-P is responsible for the procurement. He is from the PMO of CPP and reports to PM.

1.6.1 The Project Procurement Supervisor

The Project Procurement Supervisor is responsible to the M-P for all project procurement, including procurement of consultant services, construction & installation, and contractor services and goods (equipment and materials) and is responsible for the purchase of equipment, supplies and services for the PMU. He is from the PMO and reports to M-P.

1.6.2 Supervisor for Project Administration and Scheduling (SPAS)

The SPAS is responsible to M-P for formulating and updating project schedules, for analysis and control of the recommendations concerning project scheduling and progress. The SPAS is also responsible for the administration
of project records, files and correspondence, including data management for project costs/scheduling, reporting from contractors, change order or contract modification, administration control procedures, project report generation and dissemination, contract administration files, and PMU office management. He is from the PMO of CPP and reports to M-P.

1.7 Manager-Environment and Resettlement (M E&R)

The M-E&R assists the PM in the Environment and Resettlement activities according to the Resettlement Action Plan approved by the Royal Government of Cambodia. The M-E&R is responsible for the environment quality and resettlement performance throughout the project site. The M E&R is from Office of Resettlement and Environment of CPP. He supervises all site supervisors for Environment and Resettlement and reports to PM and PD.

1.7.1 Supervisor Project Land Acquisition and Resettlement (SP-Resettlement)

The SP-Resettlement is responsible for supervising the performance of resettlement work for Project. He is from Socio & Environment Office of CPP and reports to M-E&R.

1.7.2 Supervisor Project Environment (SP-Environment)

The SP-Environment and is responsible for supervising the Environmental work for the Project. He is from Socio & Environment Office of CPP and reports to M-E&R.
Annex 3

RURAL ELECTRIFICATION AND TRANSMISSION PROJECT
(115kV Transmission system and EDC Rural Grid extension Component)

Consulting Services for Project Implementation, Engineering Supervision, Coordination, Inspection, Monitoring and Training

Term of Reference

A. Background

General Information

1 Cambodia is a country of about 181,035 sq. km located in the Lower Mekong Region and borders on Thailand in the west, Vietnam in the east and Lao PDR in the north. It is a predominately rural society emerging from a long period of conflict. It has a population of about 13 million, of whom about 84 percent is rural. The country is at peace, the economy is stabilizing and recent economic performance is promising. With its accession to ASEAN, Cambodia is redefining its political and economic position in the region. Yet Cambodia faces an array of development challenges. The electricity sector is very small in size and is in an early stage of development. The responsibility for the coordination of electricity sector policy, planning and development rests with the Ministry of Industry, Mines and Energy (MIME). The electricity consumption is very low. Per capita consumption is only about 35 kWh a year and less than 15% of households have access to electricity. The country is served by 22 small isolated power systems. These systems are divided into two parts: (i) Phnom Penh and six big provincial towns served by Electricité du Cambodge (EDC), a state owned limited liability company and (ii) the reminder of the country served under the responsibility of MIME or served by private companies under contract with MIME.

2 Grid-connected electricity demand is only concentrated in the main load center at Phnom Penh with a peak demand of about 100 MW, a population of about 1 million and a customer base of 135,000 consumers. In rural areas, electricity services are handled by a combination of local authorities and private operators, collectively called Rural Electricity Enterprises (REEs). Nationwide, more than 600 independent REEs supply power to a total of about 84,000 households either through self-generation (mainly diesel power stations with capacities from 25 kW to 5 MW) or by distributing power procured from other national producers or from two of the neighboring countries. Some of them operate under licenses, which were approved by RGC before the establishment of the Electricity Authority of Cambodia (EAC). Other suppliers operate informally. An Electricity Act was passed in early 2001 and EAC an independent regulatory body was established in September 2001. The main function of this regulatory body is: i) to regulate the electric power services; and ii) to approve the electricity tariff on competitive approach.

As noted above this has produced a regime of highly diversified and very expensive electricity rates, the tariffs are the highest in South East Asia. Currently 67 of the REEs have organized themselves in associations advocating the interest of the rural
private sector, thereby aiming to improve the quality of operation of the members. Only about 7% of households in rural areas have access to electricity.

B. PROJECT OBJECTIVES

3. The RGC has applied for a credit from International Development Association to finance Rural Electrification and Transmission Project (Project). The Project's main objective is to support the Government's goal of building the foundations for sustainable development in the long term and reducing poverty. It will do so by:

Promoting rural development by: (a) providing the benefits of electricity to rural people; and (b) eliminating the policy, institutional, financing and information barriers that impede the market development for renewable energy in Cambodia.

Improving power sector efficiency through:

(a) Consolidating current initiatives which seek to foster an environment favorable to private participation and an overall commercialization of the power sector; and

(b) Reducing electricity costs and removing infrastructure bottlenecks. It will be done so by constructing a transmission connection with Vietnam facilitating import of low cost energy from Electricity of Vietnam (EVN) in order to lower electricity tariffs. This is expected to encourage self-generating industry to accept grid supply, increase un-contracted base load demand to facilitate establishment of large-scale generation in Cambodia, and to extend availability of low cost energy to provinces and rural areas.

C. Project Description

4. The main components of the project are:

Development of 220kV interconnection with Vietnam includes: (a) 220 kV transmission line from the Vietnamese border through Takeo to Phnom Pen; (b) two new substations at West Phnom Penh (WPP) and Takeo; (c) reactive compensation to allow from 80-200 MW to be transferred from Vietnam over the interconnection to Cambodia; (d) 22 kV distribution connections at both WPP and Takeo; and (e) shielding distribution wire for connecting to project affected communities. This component will be funded by ADB. Separate consultant will be recruited to manage this component of the Project

115kV Transmission system includes: (a) 9 km of two 115kV double circuit transmission lines from the new 220/115/22 kV substation at West Phnom Penh to the existing 115 kV ring main around Phnom Penh; (b) stringing of about 23 km of second circuit of the existing 115 km transmission line; (c) modification of existing three 115 kV grid substations in Phnom Penh.

A National Control Centre (NCC): The NCC shall be fully equipped to carry out the extensive monitoring of the entire net-work operations, load dispatching, load and frequency control, load shedding and optimum loading of various plants, remote back-up protection etc. A modern SCADA system operating over optical fiberglass communications cable will be installed at the NCC to monitor and control of all the above operations.
The Rural Electrification includes:

(a) EDC rural grid extension: Consist of grid extension in the outlying areas of the following provincial towns: (i) Sihanoukville with about 14,000 new connections; (ii) Kampot with about 14,000 new connections; (iii) about 4000 new connections around new West Phnom Penh Substation; and (iv) Kampong Speu with about 13,000 connections; totaling about 45,000 new connections.

(b) Rural Electrification and Renewable Energy Fund (REF): This component will promote private sector participation in RE and renewable energy development through the: (i) provision by Rural Electrification Enterprises (REEs) of 45,000 additional new services; (ii) provision of electricity to about 10,000 households using solar home systems; and (ii) addition of at least 6 MW of renewable energy capacity. Separate consultant will be recruited to manage REF component of the Project

Institutional strengthening/capacity building.

The items 4(ii); 4(iii); 4(iv) and 4(v) i.e. 115 kV Transmission Systems; the NCC; Rural Electrification; and Institutional strengthening/capacity building components of the Project will be financed by the World Bank.

D. Implementation Arrangement

5. Electricité du Cambodge (EDC) a wholly state owned limited liability company would be the Executing Agency (EA) of the project. EDC would be responsible for the implementation of the project.

6. EDC has already established a Project Management Unit (PMU). The Project Manager reporting (through the Director, Corporate Planning and Project Deptt.) to the Deputy Managing Director of EDC has already been assigned. Other supporting staff will be appointed shortly. The PMU will remain in operation and fully staffed throughout the execution of the project.

E. Summary of Services

7. A consulting firm will be engaged to act as a Project Implementation Consultant (PIC) to assist EDC in implementation of the Project. The PIC will assist EDC in engineering, design, procurement and supervision of works, testing and commissioning, coordination, training, and implementation of the following IDA financed components of the project:

115kV Transmission system component consists of: i) about 9 km of two 115kV double circuit transmission lines from the new 220/115/22 kV substation at West Phnom Penh to the existing 115 kV ring main around Phnom Penh; ii) stringing of about 23 km of second circuit of the existing 115 km transmission line; iii) modification of existing three 115 kV grid substations in Phnom Penh;

National Control Centre (NCC): The NCC shall be fully equipped to carry out the extensive monitoring of the entire net-work operations, load dispatching, load and frequency control, load shedding and optimum loading of various plants, remote back-up protection etc. A modern SCADA system operating over optical fiberglass communications cable will be installed at the NCC to monitor and control of all the above operations;
EDC rural grid extension component: This will be done at least cost methodology that includes: i) introduction and use of single wire earth return technology (SWER); ii) simplify transformers installation; iii) use center-tapped single phase LV system; iv) introduce more cost efficient concrete pole design to facilitate longer spans on cross-country 22 kV lines; and introduction LV ABC conductors and pole mounted LV supply cabinets; and

Institutional strengthening/capacity building of EDC’s personnel.

8. The proposed consulting services are estimated to utilize a total of 60 person-months consisting of 35 person-months of international consultants and 25 person-months of domestic consultants. EDC’s staff will participate actively in all stages of implementation of the project together with the PIC with the objective of developing EDC’s intuitional capability for engineering supervision and management of transmission and rural electrification projects.

9. The PIC is expected to appoint a Resident Engineer to act for and on behalf of the PIC. The Resident Engineer should be specialized in the management of transmission projects; rural electrification projects; and cost, quality and schedule control; and will advise the EDC’s Project Manager, and staff of PMU in all activities related to this project implementation program. The Resident Engineer would be responsible for the management of contracts and will also assist EDC in the preparation of bid documents, evaluation of contractor proposals, selection of implementation contractors, approval of designs and drawings, storage and material handling arrangements, on-site construction supervision, commissioning of works, land acquisition, implementation of Resettlement and rehabilitation Action Plan (RRAP) and environmental management plan, monitoring and reporting on the progress and quality of contractor works and will provide training to EDC staff as required. The PIC will also be expected to provide additional non-resident short-term consultants in various specialized fields as and when required.

10. As one of the components of the Project is being carried out by the Asian Development Bank (ADB) through a co-financing arrangement, the PIC also needs to coordinate the activities with ADB PMU, which would be executing the 220 kV component of the Project. The Resident Engineer will be stationed in Phnom Penh, Cambodia for the first year to assist EDC in implementation of the project. Subsequently they should be prepared to make extended visits up to two months per year for the next three years. The PIC will also be expected to provide additional short-term consultants in various specialized fields as and when required.

F. SCOPE OF CONSULTING SERVICES

11. The PIC shall provide all services necessary for the fulfillment of the objectives discussed above in Section “E” and carry out the following main task, which are not exclusive:

(a) 115kV Transmission System:

Advise EDC on any modifications needed at existing three (namely GS1, GS2 & GS3) 115 kV grid substations for the proper functioning of the project works. Grid Substation (GS) modifications include, which are not inclusive:
(i) GS1: Protection and control modifications to provide for connection of two 115kV circuits from West Phnom Penh 220/115/22kV Substation (WPP) with a double Tee into GS3;

(ii) GS2: Extension of existing 115kV bus, addition of a second 115/22kV transformer, termination of two circuits from WPP, and protection and control modifications;

(iii) GS3: Extension of existing 115kV bus, addition of a second 115/22kV transformer, termination of two circuits from the double WPP-GS1 Tee connection, and protection and control modifications; and

(iv) Modification to existing communication equipment on OPGW fibre-optic link including between GS1, GS2 and GS3 such that WPP is connected directly to GS1 and GS3 via one link and directly to GS2 via second link.

Review of protection settings and reactive power compensation controls and requirement of additional compensation equipment at the existing 115 kV grid substations GS1, GS2 and GS3.

Review of pole positions for the 115kV transmission line in Phnom Penh and checking of field test results.

Inspection of staking of 115 kV transmission line route.

Assist EDC in securing of right of way for construction of 115 kV transmission line and distribution lines and substations.

Review the cost estimate of 115 kV transmission systems.

b) National Control center:

Prepare scope of supply and technical specification for the National Control Centre including material and equipment for operation and maintenance.

Consolidate the above in to a design report giving details, drawings, costs, and implementation schedule.

c) EDC rural grid extension component:

Undertake detailed distribution planning using least cost methodology for the rural areas adjacent to the four provincial towns namely: (i) Sihanoukville; (ii) Battambang; (iii) Kampot; and (iv) Kampong Speu. Low cost methodology involves: i) introduction and use of single wire earth return technology (SWER); ii) simplify transformers installation; iii) use center-tapped single phase LV system; iv) introduce more cost efficient concrete pole design to facilitate longer spans on cross country 22 kV lines; and introduction LV ABC conductors and pole mounted LV supply cabinets;

Prepare scope of supply and technical specification for the distribution network including material and equipment for operation and maintenance;
Consolidate the above in to a design report giving project details, drawings, costs, and implementation schedule.

d) Preparation, Evaluation of Bids and Implementation of the Project

The PIC shall prepare the bidding documents for all the equipment and services required for implementation of the above components of the Project. For International Competitive Bidding (ICB), the Bank’s standard Bidding Documents will be used and for National Competitive Bidding (NCB), internal regulations drafted by EDC will be followed. In addition, PIC shall:

Assist EDC in inviting and evaluating bids and awarding contracts;

Assist EDC to review contractor's detailed 115 kV Transmission System; HV and LV distribution line survey plans, substation layouts and approve detailed design drawings for construction;

Assist EDC with construction supervision that includes cost/ quality/ schedule control to ensure the timely completion of the project;

Review and compile as-built drawings and review the operation and maintenance manual provided by the contractors for accuracy and adequacy;

Monitoring the implementation of Environmental Management Plans

Witness commissioning, guarantee and acceptance tests and assist EDC in taking-over the completed facilities

Review of as-built records; and

Review of construction and maintenance manuals.

12. The PIC shall identify in consultation with EDC further transmission and distribution requirements for Bank funding. When instructed by the Bank and EDC, the consultant shall proceed to assist EDC with preparation of a further project for Bank funding.

Implementation of RRAP and Environmental Management

13. The PIC shall be responsible for ensuring that the Resettlement Plan (RP) and environmental requirements are fully implemented including ensuring the resolution of any issues that may arise between this and other aspects of the Project. The PIC shall include international RP/ Environmental specialist (RPES) and a domestic RPES as members of team to coordinate all resettlement activities, to provide capacity building for all agencies involved in resettlement activities. Specific areas of support provided by the RPES include preparation of land acquisition and compensation procedures, organization of community consultation, stakeholder management, process management, and liaison with independent monitoring/auditing organization.

14. The PIC shall propose and implement a comprehensive program of on and off-the-job training in all aspects of the work. This program shall be reported on the monthly reports from the consultant to EDC and EDC’s quarterly reports to the Bank.
G. OTHER SERVICES AND REPORTING

15. The consultant shall prepare and submit the following documents to the Bank and EDC related to the project:

Project Inception report, which includes detailed work program to achieve objective of the projects within one month after commencement of the contract.

Design reports for all the project works.

Monthly and quarterly progress reports throughout the project period. The progress reports should include at least the following:

Project implementation schedule

Procurement progress (by stage), contract data [all in comparison between estimates (dates, costs) and actual]

Contract disbursement status, funds flow/budget requirement

A brief summary of progress of works achieved during the reporting period.

Project synopsis and scope of work.

Consultant’s activities.

Contractor’s activities.

Detailed progress of works during the reporting period.

Problems for the works.

Schedule for the next month/quarter

Factory Inspection and Test Report.

Site Inspection and Test Reports.

Project Completion Report.

Accurate and systematic records and accounts of the project.

Other reports as and when required by the World Bank, EDC and other authorities.

Four copies of these reports will be provided to EDC and two copies to the World Bank.

16. The PIC shall report to Deputy Managing Director (Technique) EDC.

H. Project Implementation Period

17. The project implementation is expected to start in the first quarter of 2004 and completion expected about end of 2008. The consulting assignment is expected to commence in January 2004.
Annex 4

NARRATIVE EVALUATION CRITERIA FOR PIC CONSULTANT
(Rural Electrification and EDC's Grid Extension components of RE &T Project)

EVALUATION CRITERIA

APPLICATION

I. Qualification of Proposer (10 Points)

a. Experience in similar projects (5 Points)

Reference Projects are those included in the proposals and relating to procurement, installation and commissioning of:

- Transmission line above 115 kV
- Grid substations above 115kV
- National Dispatch/ Control Center
- Rural electrification

Five relevant projects required:

- One project 50%
- Three Projects 75%
- Five or more projects 100%

b. Experience in similar geographical area (5 Points)

Area experience is not limited to reference projects.

- One or more projects in Cambodia 30%
- One project in similar SE Asia Country 30%
- Two project in similar SE Asia Country 50%
- Three or more projects in similar SE Asia country 70%

II. Approach and Methodology (30 points)

a. Understanding of Objectives (5 Points)

General understanding of the project requirements and coverage of principal components as requested in TOR.

- General understanding 50%
- Component coverage 50%

b. Quality of Methodology (5 Points)
The degree to which the presented methodology / approach:
matches the requirements of the TOR;
matches the level of detail given in the work program.
has specific application to EDC and Site visit requirements as determined by a site visit.

Satisfies 50%
Level of detail 25%
Site visit 25%

**c. Innovation and Work-Plan (10 Points)**

i) Innovation (2 Points)

Evidence of an alternative and unique approach, which would improve the quality of the project.

A workable alternative is to be given maximum points. No innovation to be given zero points.

ii) Work Plan (8 Points)

The Work Plan includes:
Organization chart,
Graphical presentation of work plan (network or bar chart), and
Staffing schedule.

The organization chart is to be assessed on the relationship between client and consultant and show the project management and counterpart arrangements (max. 20%)

The staffing Schedule in the format of the Invitation Letter is to be assessed on suitability, phasing, and consistency with the work program (max. 40%)

Work program to be assessed on logical sequence of events and consistency with the tasks described in the Methodology (max. 40%)

**d. Other factors (10 Points)**

i) Person-Months Requirements (6 Points)

a) Relationship between required person-months and estimated project requirements, and

b) Person-Months for individuals

For full marks proposed person-months should be within +/- 5% of estimate for foreign inputs and +/- 10% for local inputs.

Person months for individuals should be compatible with the tasks allocated in the work program.

ii) Counterpart Facilities (2 points)

Requirement of office space transportation equipment and services.

Assessment of reasonableness and completeness of requirements and understanding of local conditions.
iii) Proposal Presentation (2 points)
Clarify of the entire proposal.

If all items requested in the invitation Letter are covered in a clear and easily understandable form and the proposal is assembled in a professional manner maximum points are to be given.

**Personnel (60 Points)**

a). Resident Engineer Transmission and Distribution Engineer 20 pts
   - Team Leadership (10)
   - Technical Ability (10)
b). Substation Engineer 10 pts
c). SCADA/ Communication Engineer 10 pts
d). Civil Engineer 4 pts
e). Socio-economist 4 pts
f). Environmentalist 4 pts
g). Domestic Experts by expertise
   - i) Transmission/Dist. Engineer 4 pts
   - ii) Environmental/RP Expert 4 pts

When more than one individual are assigned under an area of expertise, the overall score will be computed as weighted average of the individuals' scores adjusted for seniority and then prorated on the basis of total person-months allocation.
When an individual is assigned to more than one area of expertise, his/her qualifications and experience will be evaluated separately for each area of expertise.

a). **General Qualifications (20%)**

The score on qualifications will depend on academic and professional qualifications and on the relevance of the qualifications to the assignment in the consultant team.
Bachelor degree of equivalent 80%
Additional degree 5% for Masters; or second degree
Special relevant training 15%

b). **Project Related Experience (60%)**

The score on project experience will depend on the number of relevant projects that are pertinent to the assignment. Due regard will be given to role performed by each individual and its relevance to the role assigned in this project.
c). **Experience in Developing Countries (15%)**

The score on overseas experience will depend on the number of years of experience in developing countries.

5 years (or more) relevance in developing member countries experience including at least one year in Cambodia full marks.

Maximum score if no Cambodia experience = 90%

d). **Permanent Staff of Firm (5%)**

The score on employment status will depend on the expert's employment status with the firm. Permanent staff for the last one year will be given 100%, otherwise 0%.
Annex 5  
Rural Electrification Fund  
Interim Project Management Unit  
Ministry of Industry, Mines and Energy  
Royal Government of Cambodia  

The World Bank  

Rural Electrification Fund (REF)  

REF Interim Project Management Unit (PMU)  

September 2003
Structure of the Interim Project Management Unit (PMU) for the REF

Background
MIME will establish a Project Management Unit (PMU) to manage and facilitate the establishment of the REF in the transition period before the REF Royal Decree is passed to establish the REF Board and Secretariat. This document aims to explain the structure and operation of the REF PMU.

PMU Requirements
The productive capacity of the PMU is limited by the limited resources of its members. Therefore in order to produce the deliverables described here by the required milestone dates, the PMU requires the following basic assistance from the World Bank:

a) Assignment of Mr. Kunthap Hing to directly assist the PMU to produce the deliverables, including an allowance to cover actual office costs expended to enhance administrative capacity within the office of the Department of Energy Technique (DET); and

b) Provision of budget to support initial PMU activities such as advertising and workshop, to a maximum of $5000; and

c) Urgent funding of the existing TOR submitted to the World Bank/ESMAP for development of the "RECambodia.org" website as this will be an essential communications channel for the PMU.

PMU Structure
The PMU will be organised according to the diagram below.

---

Project Director
Mr. Khlaut Randy

Manager of Budget and Reporting
Mr. Tun Lean

Mr. Victor
Jonah

(Admin. Assistant)

Technical Advisors
(EDC Rep's x 2)

Manager of Procurement and Promotion
Dr. Sat Samy

Mr. Hing Kunthap

Mr. Andrew Williamson

Mr. Sovanna Toch

Mrs. Sophag Chum

---
PMU Positions and Responsibilities

1. **Project Director (PD)**
The PD shall be responsible for achieving the deliverables specified in the Action Plan in accordance to the scheduled dates. The Chairman shall delegate work to the Managers and seek the advice of the Technical Advisors as necessary. The PD shall liaise closely with the World Bank representative.

1.1 **Manager of Budgets and Reporting (MBR)**
The (MBR) shall be responsible for preparing progress and performance reports as requested by the Project Director regarding the PMU status against the Action Plan. He will also track any income and expenditure by the PMU and provide reports for the Project Director or the World Bank Liaison as requested.

1.2 **Technical Advisors (TA)**
The two TAs will be appointees from Electricity du Cambodge (EDC) who will be responsible for ensuring that all relevant documents produced by the PMU are consistent with any relevant EDC practices, standards or strategies. The relevant documents shall be referred to the TAs by the PD.

1.3 **Manager of Procurement and Promotion (MPP)**
The MPP shall be responsible for producing the documentation identified in the Action Plan. This documentation forms some crucial aspects of the REF operation, and as such should where possible be drafted with the input of relevant stakeholders. The MPP shall also be responsible for implementing the REF awareness and promotion activities such as promotion of Request for Proposals (RFP), organising an REF workshop and advertising for REF Secretariat Staff. The MPP shall arrange for all relevant documents and awareness activities to be translated into Khmer language.

**PMU Action Plan**
The Draft PMU Action Plan in Table 1 below will be modified and agreed with the World Bank to ensure realistic and achievable targets. Once agreed, the Action Plan shall form the basis of the PMU activities.
Table 1: Draft PMU Action Plan

<table>
<thead>
<tr>
<th>Deliverables</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>REF decree and sub-decree submitted for approval</td>
<td>September 30</td>
</tr>
<tr>
<td>Finalize Operational Manual, including criteria for sub-project selection,</td>
<td>October 17</td>
</tr>
<tr>
<td>technical specifications, and REFS staff job descriptions</td>
<td></td>
</tr>
<tr>
<td>Draft procedures for registering sub-project proposals</td>
<td>October 31</td>
</tr>
<tr>
<td>Draft terms of reference for REF Technical Advisor; TA for project</td>
<td>October 31</td>
</tr>
<tr>
<td>developers; TA for financial institutions; TA for financial management</td>
<td></td>
</tr>
<tr>
<td>system; and, REF outreach/promotion/training activities</td>
<td></td>
</tr>
<tr>
<td>REF decree and sub-decree approved</td>
<td>Negotiations</td>
</tr>
<tr>
<td>Government budget contribution for transitional phase confirmed</td>
<td>Negotiations</td>
</tr>
<tr>
<td>Announcement/RFP/workshop for REF</td>
<td>November 30</td>
</tr>
<tr>
<td>Disseminate REF eligibility criteria, technical specifications, subsidy</td>
<td>November 30</td>
</tr>
<tr>
<td>rates on website</td>
<td></td>
</tr>
<tr>
<td>Invitations for nominations to REF Board</td>
<td>November 30</td>
</tr>
<tr>
<td>Advertise for REF Technical Advisor and TA consultants</td>
<td>November 30</td>
</tr>
<tr>
<td>Advertise for REFS staff</td>
<td>November 30</td>
</tr>
<tr>
<td>Nominated candidates proposed to PM for REF Board</td>
<td>December 31</td>
</tr>
<tr>
<td>REF special deposit account established</td>
<td>January 31</td>
</tr>
<tr>
<td>Arrangements for REF office space, equipment, etc.</td>
<td>January-February</td>
</tr>
<tr>
<td>Process applications for REF Secretariat staff, Technical Advisor and TA</td>
<td>January 31</td>
</tr>
<tr>
<td>consultants</td>
<td></td>
</tr>
<tr>
<td>Sub-decree appointing REF Board approved</td>
<td>January 31</td>
</tr>
<tr>
<td>Pilot sub-project proposals registered</td>
<td>February-April</td>
</tr>
<tr>
<td>Deliverables</td>
<td>Date</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>REF Board meeting convened</td>
<td>February 29</td>
</tr>
<tr>
<td>Technical Advisor and TA consultants contracted</td>
<td>February 29</td>
</tr>
<tr>
<td>REFS Executive Director appointed</td>
<td>March 31</td>
</tr>
<tr>
<td><strong>PMU transfers to REF</strong></td>
<td>April 30</td>
</tr>
<tr>
<td>REFS staff appointed and trained</td>
<td>April-May</td>
</tr>
<tr>
<td>REF Payment Agent contracted</td>
<td>May 31</td>
</tr>
<tr>
<td>Evaluation and approval of pilot sub-projects</td>
<td>June 30</td>
</tr>
</tbody>
</table>
Annex 6

Procurement Schedule of PIC

<table>
<thead>
<tr>
<th>ID</th>
<th>Task Name</th>
<th>Duration</th>
<th>Start</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Contract Selection &amp; Controlling</td>
<td>32.20 week</td>
<td>Thu 3/6/03</td>
<td>Thu 3/6/04</td>
</tr>
<tr>
<td>02</td>
<td>Request for EOI/DSB (on-line version)</td>
<td>0 days</td>
<td>Thu 3/12/03</td>
<td>Thu 3/12/03</td>
</tr>
<tr>
<td>03</td>
<td>Request for EOI/DSB (Paper copy only)</td>
<td>0 days</td>
<td>Wed 4/16/03</td>
<td>Wed 4/16/03</td>
</tr>
<tr>
<td>04</td>
<td>Request for EOI/DSB Cambodia Draft</td>
<td>0 days</td>
<td>Mon 4/16/03</td>
<td>Mon 4/16/03</td>
</tr>
<tr>
<td>05</td>
<td>Design for EOI</td>
<td>0 days</td>
<td>Wed 4/16/03</td>
<td>Wed 4/16/03</td>
</tr>
<tr>
<td>06</td>
<td>Submission of EOI/DSB/Bid Documentation to PCA for review</td>
<td>0 days</td>
<td>Thu 7/11/03</td>
<td>Thu 7/11/03</td>
</tr>
<tr>
<td>07</td>
<td>WBS review &amp; approval</td>
<td>0 days</td>
<td>Thu 7/12/03</td>
<td>Thu 7/12/03</td>
</tr>
<tr>
<td>08</td>
<td>Selection of short-list consultants</td>
<td>0 days</td>
<td>Mon 10/07/03</td>
<td>Mon 10/07/03</td>
</tr>
<tr>
<td>09</td>
<td>Drafts for proposal submission</td>
<td>1 day</td>
<td>Mon 10/07/03</td>
<td>Mon 10/07/03</td>
</tr>
<tr>
<td>10</td>
<td>Evaluation of consultant proposals</td>
<td>1 day</td>
<td>Mon 10/07/03</td>
<td>Mon 10/07/03</td>
</tr>
<tr>
<td>11</td>
<td>WBS review &amp; approval of technical evaluation</td>
<td>1 day</td>
<td>Mon 10/07/03</td>
<td>Mon 10/07/03</td>
</tr>
<tr>
<td>12</td>
<td>Opening of financial proposals</td>
<td>1 day</td>
<td>Mon 10/07/03</td>
<td>Mon 10/07/03</td>
</tr>
<tr>
<td>13</td>
<td>Financial &amp; technical evaluation</td>
<td>2 days</td>
<td>Thu 11/14/03</td>
<td>Mon 11/14/03</td>
</tr>
<tr>
<td>14</td>
<td>Review of consultant evaluation</td>
<td>2 days</td>
<td>Sat 11/14/03</td>
<td>Wed 11/14/03</td>
</tr>
<tr>
<td>15</td>
<td>Contract negotiations</td>
<td>2 days</td>
<td>Sat 11/14/03</td>
<td>Wed 11/14/03</td>
</tr>
<tr>
<td>16</td>
<td>WBS review of draft contract</td>
<td>2 days</td>
<td>Thu 11/14/03</td>
<td>Tue 11/14/03</td>
</tr>
<tr>
<td>17</td>
<td>Contract signing</td>
<td>2 days</td>
<td>Thu 11/14/03</td>
<td>Tue 11/14/03</td>
</tr>
<tr>
<td>18</td>
<td>Delivery of final contract</td>
<td>0 days</td>
<td>Thu 11/14/03</td>
<td>Thu 11/14/03</td>
</tr>
<tr>
<td>19</td>
<td>Contract to start works</td>
<td>0 days</td>
<td>Thu 11/14/03</td>
<td>Thu 11/14/03</td>
</tr>
</tbody>
</table>

Page 76 of 78
### Annex 7

**Procurement Schedule**

**CAMBODIA**

**Rural Electrification & Transmission Project**

**Procurement Schedule**

<table>
<thead>
<tr>
<th>Task Name</th>
<th>Duration</th>
<th>Start</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procurement of Building Documents</td>
<td>3.14 days</td>
<td>Wed 3/1/04</td>
<td>Thu 3/25/04</td>
</tr>
<tr>
<td>DA Review &amp; Rejection to Building Doc</td>
<td>4 days</td>
<td>Thu 3/24/04</td>
<td>Thu 4/7/04</td>
</tr>
<tr>
<td>Specific Requirements Notes</td>
<td>0 days</td>
<td>Thu 3/24/04</td>
<td>Thu 4/7/04</td>
</tr>
<tr>
<td>Release Notice of Bid Documents</td>
<td>0 days</td>
<td>Thu 3/24/04</td>
<td>Thu 4/7/04</td>
</tr>
<tr>
<td>Deadline for Bid Submission</td>
<td>0 days</td>
<td>Thu 3/24/04</td>
<td>Thu 4/7/04</td>
</tr>
<tr>
<td>Bid Opening</td>
<td>0 days</td>
<td>Thu 3/24/04</td>
<td>Thu 4/7/04</td>
</tr>
<tr>
<td>Bid Evaluation</td>
<td>30 days</td>
<td>Thu 4/2/04</td>
<td>Thu 4/29/04</td>
</tr>
<tr>
<td>DA Review and Rejection</td>
<td>10 days</td>
<td>Thu 4/29/04</td>
<td>Thu 5/11/04</td>
</tr>
<tr>
<td>Contract Discussion</td>
<td>15 days</td>
<td>Thu 5/11/04</td>
<td>Thu 5/26/04</td>
</tr>
<tr>
<td>Contract Signing</td>
<td>0 days</td>
<td>Thu 5/26/04</td>
<td>Thu 5/26/04</td>
</tr>
<tr>
<td>Submission of Contract to IDA</td>
<td>0 days</td>
<td>Thu 5/26/04</td>
<td>Thu 5/26/04</td>
</tr>
<tr>
<td>IDA Process</td>
<td>194 days</td>
<td>Mon 6/14/04</td>
<td>Wed 2/24/05</td>
</tr>
<tr>
<td>Procurement of Building Documents</td>
<td>3.14 days</td>
<td>Wed 3/1/04</td>
<td>Thu 3/25/04</td>
</tr>
<tr>
<td>DA Review &amp; Rejection to Building Doc</td>
<td>4 days</td>
<td>Thu 3/24/04</td>
<td>Thu 4/7/04</td>
</tr>
<tr>
<td>Specific Requirements Notes</td>
<td>0 days</td>
<td>Thu 3/24/04</td>
<td>Thu 4/7/04</td>
</tr>
<tr>
<td>Release Notice of Bid Documents</td>
<td>0 days</td>
<td>Thu 3/24/04</td>
<td>Thu 4/7/04</td>
</tr>
<tr>
<td>Deadline for Bid Submission</td>
<td>0 days</td>
<td>Thu 3/24/04</td>
<td>Thu 4/7/04</td>
</tr>
<tr>
<td>Bid Opening</td>
<td>0 days</td>
<td>Thu 3/24/04</td>
<td>Thu 4/7/04</td>
</tr>
<tr>
<td>Bid Evaluation</td>
<td>30 days</td>
<td>Thu 4/2/04</td>
<td>Thu 4/29/04</td>
</tr>
<tr>
<td>DA Review and Rejection</td>
<td>10 days</td>
<td>Thu 4/29/04</td>
<td>Thu 5/11/04</td>
</tr>
<tr>
<td>Contract Discussion</td>
<td>15 days</td>
<td>Thu 5/11/04</td>
<td>Thu 5/26/04</td>
</tr>
<tr>
<td>Contract Signing</td>
<td>0 days</td>
<td>Thu 5/26/04</td>
<td>Thu 5/26/04</td>
</tr>
<tr>
<td>Submission of Contract to IDA</td>
<td>0 days</td>
<td>Thu 5/26/04</td>
<td>Thu 5/26/04</td>
</tr>
<tr>
<td>IDA Process</td>
<td>194 days</td>
<td>Mon 6/14/04</td>
<td>Wed 2/24/05</td>
</tr>
</tbody>
</table>

---

*Page 77 of 78*
## Annex 8

### Implementation Schedule

**CAMBODIA**

**Rural Electrification & Transmission Project**

**Overall Project Implementation Schedule**

<table>
<thead>
<tr>
<th>No.</th>
<th>Task Name</th>
<th>Duration</th>
<th>Start Date</th>
<th>Finish Date</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>O&amp;M Staff Establishment</td>
<td>0 days</td>
<td>Mar 3/04</td>
<td>Mar 3/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Agreement of PC</td>
<td>2 days</td>
<td>Mar 5/04</td>
<td>Mar 5/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Project Launch Workshop</td>
<td>3 days</td>
<td>Mar 8/04</td>
<td>Mar 8/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Line SW Component</td>
<td>144 days</td>
<td>Mar 13/04</td>
<td>Mar 13/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Procurement Process for 132kV TL</td>
<td>199 days</td>
<td>Mar 13/04</td>
<td>Mar 13/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Feasibility study and Feasibility study and Feasibility study and 132kV TL Study</td>
<td>111 days</td>
<td>Mar 15/04</td>
<td>Mar 15/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>National Control Center</td>
<td>144 days</td>
<td>Mar 18/04</td>
<td>Mar 18/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Procurement Process for MCC</td>
<td>139 days</td>
<td>Mar 21/04</td>
<td>Mar 21/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Feasibility study and Feasibility study and Feasibility study and 132kV TL Study</td>
<td>111 days</td>
<td>Mar 22/04</td>
<td>Mar 22/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Line SW Component (ASB)</td>
<td>91 days</td>
<td>Mar 25/04</td>
<td>Mar 25/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Procurement Process for 132kV TL Study</td>
<td>111 days</td>
<td>Mar 26/04</td>
<td>Mar 26/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>EPC Design</td>
<td>111 days</td>
<td>Mar 29/04</td>
<td>Mar 29/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Survey &amp; Design</td>
<td>16 days</td>
<td>Mar 31/04</td>
<td>Mar 31/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Procurement Process of EPC &amp; Design</td>
<td>104 days</td>
<td>Apr 3/04</td>
<td>Apr 3/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Feasibility study and Feasibility study and Feasibility study and 132kV TL Study</td>
<td>111 days</td>
<td>Apr 6/04</td>
<td>Apr 6/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>EPC Design</td>
<td>111 days</td>
<td>Apr 9/04</td>
<td>Apr 9/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Design Phase 1</td>
<td>76 days</td>
<td>Apr 12/04</td>
<td>Apr 12/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Design Phase 2</td>
<td>171 days</td>
<td>Apr 15/04</td>
<td>Apr 15/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Implementation of TEP Program</td>
<td>231 days</td>
<td>Apr 18/04</td>
<td>Apr 18/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Mid Term Review</td>
<td>3 days</td>
<td>Apr 21/04</td>
<td>Apr 21/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Overall Project Completion</td>
<td>7 days</td>
<td>Apr 28/04</td>
<td>Apr 28/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Digital Data Collection</td>
<td>7 days</td>
<td>Apr 28/04</td>
<td>Apr 28/04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Page 78 of 78