

ASIAN DEVELOPMENT BANK

TAR:CAM 34390

TECHNICAL ASSISTANCE

TO THE

KINGDOM OF CAMBODIA

FOR PREPARING THE

**POWER DISTRIBUTION AND GREATER MEKONG SUBREGION
TRANSMISSION PROJECT**

January 2003

CURRENCY EQUIVALENTS

(As of 16 December 2002)

Currency Unit	–	riel (KR)
KR1.00	=	\$0.0026
\$1.00	=	KR3,835

ABBREVIATIONS

ADB	–	Asian Development Bank
EAC	–	Electricity Authority of Cambodia
EDC	–	Electricité du Cambodge
EVN	–	Electricity of Viet Nam
GMS	–	Greater Mekong Subregion
IEE	–	initial environmental examination
kV	–	(kilovolt) 1,000 volts
kWh	–	(kilowatt-hour) The energy of 1 kW of capacity operating for 1 hour
MIME	–	Ministry of Industry, Mines and Energy
MW	–	(megawatt) 1,000,000 watts
PIR	–	poverty impact ratio
PPTA	–	project preparatory technical assistance
RRP	–	report and recommendation to the President
SIEE	–	summary initial environmental examination
TA	–	technical assistance
TOR	–	terms of reference

NOTES

- (i) The fiscal year (FY) of the Government and its agencies ends on 31 December.
- (ii) In this report, "\$" refers to US dollars.

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I. INTRODUCTION

1. During the 2002 Country Strategy and Programming Mission, the Government of Cambodia requested technical assistance (TA) from the Asian Development Bank (ADB) to prepare a feasibility study of rehabilitating and expanding distribution facilities in selected provincial towns¹ and constructing a high-voltage transmission line. The TA was included in the 2003 Country Strategy Program Update.² To enhance efficient power supply in the Greater Mekong Subregion (GMS), six countries signed an Inter-Governmental Agreement on 3 November 2002. A regional master plan on power interconnection in the GMS outlining transmission links between the region's present and expected future generating facilities has been developed.³ Under this plan a transmission link between Phnom Penh and Chau Doc substation in southwest Viet Nam is identified for implementation at the earliest possible date. A power purchase agreement was signed by Electricité du Cambodge (EDC) and Electricity of Viet Nam (EVN) on 24 July 2000. The Government of Cambodia has requested ADB to provide a loan to cofinance with the World Bank the Cambodia Rural Electrification and Transmission Project.⁴

II. ISSUES

2. Responsibility for coordinating the Government's electricity sector policy and planning rests with the Energy General Directorate of the Ministry of Industry, Mines and Energy (MIME). By a royal decree in 1996, EDC was established as a limited liability company owned jointly by MIME and the Ministry of Economy and Finance. Before 1996, EDC operated as a government department under the direction of MIME. Its 1996 charter gives EDC the nonexclusive right to generate, transmit, and distribute electricity throughout Cambodia. Although EDC formally operates as a separate entity, the Government continues to have an unofficial role and sometimes adverse effect on EDC's performance. MIME owns and operates some of the systems in the urban areas that are not under EDC's control.

3. With the promulgation of the Electricity Law (2001), the Government further clarified and separated its role as policy maker, owner, regulator and also customer of EDC. In September 2001, the Electric Authority of Cambodia (EAC) was established as the independent regulator of electricity supply. While EAC has issued licenses to EDC and large private providers of electricity, its tasks and workload currently exceed its resources. The World Bank has provided some technical assistance under its previous loan, but EAC may require additional support to prepare and issue the guidelines and rules (especially in the area of tariff setting) before it becomes fully functional as the regulator. In addition, it is unclear whether EAC in its current capacity can license and effectively monitor the large number of small private sector operators.

4. Ravaged by 20 years of civil war and neglect, the power system of Cambodia has been unable to supply the demand for electricity by conventional grid connections. Isolated power grids are supplied mostly by small and medium-size diesel generators and operated by private

¹ In addition to the eight towns currently being rehabilitated under ADB. 2000. Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Cambodia for the *Provincial Power Distribution Project*. Manila.

² The TA first appeared in *ADB Business Opportunities* (Internet edition) on 26 September 2002.

³ ADB. 2000. *Technical Assistance for an Indicative Master Plan on Power Interconnection in GMS Countries*. Manila.

⁴ Letter to the Director, Cambodia Resident Mission, from the Senior Minister, Ministry of Economy and Finance, dated 3 September 2002.

enterprises. Cambodia's electricity supply at present comprises at least 22 licensed small isolated systems and numerous other ones, which are not licensed.

5. With 13% of households and only 7% of rural households electrified, Cambodia's electrification ratio is among the lowest in Asia. The power sector is highly inequitable, with an electrification ratio of 65% in Phnom Penh and 27% in other towns, which have a considerably higher poverty incidence. Consumption patterns are also skewed, with per capita consumption rates ranging from 328 kilowatt-hours (kWh) per month in Phnom Penh to 9 kWh per month in provincial areas. These inequities have strong implications for the distribution of economic growth and poverty reduction.

6. Electricity demand continues to grow at approximately 10–12% per annum, with most of this growth expected in the Phnom Penh area. The challenge for EDC is to continue to develop (or facilitate development of) new sources of power generation, improve operations of the existing systems, and reduce the average purchase cost of generation. The challenge for the Government, given its limited financial resources, is to improve and efficiently expand electricity supply throughout the country.

7. With the steep tariff increases in 1999, many customers in Phnom Penh opted for self-generation instead of the EDC supply. EDC must provide more competitive tariffs and increase reliability to attract these customers back and to facilitate industrial and commercial development in Cambodia. With generation options limited in the short term to additional independent power producer contracts, the Government has decided to pursue interconnection with Thailand (80 megawatts [MW]) to serve western load centers and interconnection with Viet Nam (200 MW) to serve Phnom Penh and the southeastern towns. Once these connections are made, the average cost of generation will be significantly reduced, leading to affordable and competitive tariffs. Such beneficial tariff restructuring will still allow EDC to improve its financial performance and ability to finance capital expenditures.⁵ These power interconnections will also promote subregional cooperation in utility planning as part of the overall GMS strategy in the Mekong basin.

III. THE TECHNICAL ASSISTANCE

A. Purpose and Output

8. The TA will prepare/update feasibility studies designed to facilitate international power transfers and stimulate equitable economic growth across the country to promote sustainable poverty reduction. The outputs will be reports that (i) update the feasibility study⁶ of a 220 kilovolt (kV) transmission line from the Vietnamese border to Phnom Penh, including substations at Takeo and West Phnom Penh; (ii) assess the feasibility of providing the villages along the route with low-voltage electricity; (iii) assess the feasibility of rehabilitating and expanding the generation and distribution systems in selected⁷ provincial towns; (iv) assess the training needs of EDC staff with respect to management, operation and maintenance of high-voltage systems and provincial grids; and (v) prepare terms of reference (TORs) for the project implementation consultants to review/update prefeasibility studies of small hydroelectric projects and to prepare bidding documents for build-own-operate-transfer implementation, and to assist

⁵ More specifically, long-term base load generation options at Sihanoukville and Kamchay.

⁶ Feasibility Study for the First Transmission Link between Phnom Penh and the Southern Region of Cambodia in 6 volumes, April 2001, prepared for the World Bank's proposed Rural Electrification and Transmission Project.

⁷ Selection criteria will consider economic growth potential, impacts on poverty, and equitable distribution of social benefits.

with bidding and evaluation. The TA will incorporate the findings of the current study⁸ into appropriate models for private sector participation in the refurbished electricity systems in the provincial towns and evaluate the capacity of EAC to properly license private sector operations in a timely and effective manner.

B. Methodology and Key Activities

9. The TA will be in two parts. Part 1 will assess the transmission component and Part 2 will study a set of subprojects under a generation/distribution component. The report on part 1 have a strict deadline within 4.5 months of the appointment of the consultants, and the report on part 2 after a further 7 months. Key activities cover six major areas: (i) review of the capacity of the electricity regulator to license private sector operators in the provincial towns; (ii) compliance with ADB's safeguard policies; (iii) identification of project areas under the distribution component; (iv) economic and financial evaluations of the transmission and generation/distribution components; (v) linkage between economic growth, electricity supply and poverty reduction, including affordability to the poor; and (vi) technical project design.

10. The consultants will review and update the previous studies relating to a transmission link between Phnom Penh and the Vietnamese border and other proposed transmission lines in the southern region of Cambodia. The outline design (footnote 6) including route, substation facilities, technical specifications, etc. will be adopted to the extent possible. The consultants will investigate the feasibility of supplying electricity to people living along the route of the transmission line. Conventional methods of supply will be compared to "shieldwire distribution" and "single-wire-earth-return" techniques and the most appropriate system to implement will be recommended.

11. To ensure compliance with ADB's safeguard policies for the environment and involuntary resettlement, field surveys will be made to confirm environmental impacts, to update the resettlement plan (footnote 6), and to prepare a full inventory of all affected land and project households for the distribution component. Necessary mitigation measures, most suitable implementation arrangements, and costing of the mitigation measures will also be prepared. A full resettlement plan will be prepared since the temporary and permanent loss of productive means for affected persons could be significant. The project's impacts are not expected to cause any cultural or socially specific impact, or exclude any socioeconomic group, including indigenous people, from benefiting from the proposed investment project. Therefore, no indigenous peoples' plan is required. The summary initial social and poverty analysis is in Appendix 1. Planning for the transmission component of the Project (footnote 6), particularly route selection, has sought to minimize environmental impacts and is consistent with technical and economic objectives. Other effects will be minimized as far as practicable and economical, and compensation measures provided where impacts cannot be mitigated. Experience gained with implementing Loan 1794-CAM (footnote 1) indicates that social and environmental impacts for the generating and distribution components will be minor. The project has been classified as environmental category B. An initial environmental examination (IEE) report and its summary (SIEE) will be prepared in accordance with the guidelines and regulations of ADB and the Government of Cambodia.

12. The economic analysis will review and update the feasibility study (footnote 6) for the transmission component. In addition, it will evaluate the feasibility of supplying electricity to

⁸ Staff Consultant's Report: Financial Advisory Review of Private Sector Participation in Electricity Supply, December 2002.

households along the transmission route. Such provision will benefit households that otherwise may not benefit from the project but may be adversely affected by the construction of the transmission line. An economic evaluation will also be conducted for the feasibility of each subproject under the distribution component.

13. To analyze the way in which the proposed investment project is linked to poverty reduction, a detailed poverty analysis will use existing studies and data combined with field consultations. Particular attention will be paid to the affordability of upfront connection charges and monthly bills.

14. Before fielding of the consultants for part 2, EDC will prepare preliminary cost estimates of the necessary rehabilitation works, together with preliminary forecasts of load growth for the long list of Government-nominated towns (Appendix 2). The consultants will make an initial assessment of the economic, social, and environmental impacts of the generation and/or distribution rehabilitation projects on the long list and prioritize the subprojects. The towns for inclusion in the TA will be selected at the first tripartite meeting. For each selected town, the consultants will carry out a detailed physical and socioeconomic survey and produce load forecasts, preliminary layouts, and cost estimates of the works to rehabilitate the generation and/or distribution systems.

C. Cost and Financing

15. The total cost of the TA is estimated at \$910,000 equivalent comprising \$658,000 in foreign exchange and \$252,000 in local currency equivalent. ADB will provide \$730,000 equivalent to finance the entire foreign exchange cost plus \$72,000 equivalent of the local currency cost. The TA will initially be financed on a grant basis by ADB's TA funding program. The Government has agreed to finance \$180,000 for office accommodation, counterpart staff, office supplies and other miscellaneous costs. Details of the cost estimates and financing plan are given in Appendix 3. The Government has been advised that approval of the TA does not commit ADB to finance the ensuing project.

D. Implementation Arrangements

16. MIME has designated EDC as the Executing Agency (EA) for the TA. EDC has been the EA for two previous ADB loans⁹ and loans for similar works from other lenders. The executive director of the Corporate Planning and Projects Department of EDC will have overall responsibility for EDC's contribution to the TA, and will set up a unit suitably staffed with counterpart personnel for day-to-day coordination and to work with the TA consultants' personnel and other stakeholders, particularly the local governments of Phnom Penh, Kandal, and Takeo.

17. The TA will be implemented for 12 months starting in February 2003 and will require about 33 person-months of consulting services: 23 international and 10 domestic. The outline TOR for the international consultants are in Appendix 4. Tripartite meetings will be held after the receipt of the inception, interim and draft final reports.

18. Early implementation of the transmission link is essential for the financial well-being of EDC, and important to meet the country's economic growth targets. The loan has therefore

⁹ ADB. 1994. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to Cambodia for the Power Rehabilitation Project*. Manila; and Loan 1794-CAM in footnote 1.

been included in the 2003 project pipeline. Consulting services relating to the transmission link component of the loan (which represents about 75% of the loan amount) will consist of updating an existing feasibility study (footnote 6). The consulting firms that successfully undertook that study are the most qualified to undertake the update efficiently and effectively, and will therefore be engaged by direct selection methods (ref. PAI 2.04, para. 10). ADB will engage the consulting firms in accordance with its *Guidelines on the Use of Consultants* and other arrangements satisfactory to ADB for engaging domestic consultants. The consultants will procure equipment to be financed under the TA in accordance with ADB's *Guidelines for Procurement*.

IV. THE PRESIDENT'S DECISION

19. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$730,000 to the Government of Cambodia for preparing the Power Distribution and Greater Mekong Subregion Transmission Project, and hereby reports this action to the Board. The technical assistance, initially financed as a grant, will be subject to the reimbursement arrangements set forth in *Technical Assistance Operations* (ADB, R51-77, 20 May 1997) and *Streamlining of Technical Assistance Operations* (ADB, R44-88, 21 March 1988). If the technical assistance results in an ADB loan, ADB may charge against the loan, and recover from it, the portion of the initial grant that exceeds \$250,000 equivalent.

SUMMARY INITIAL POVERTY AND SOCIAL ANALYSIS

A. Linkages to the Country Poverty Analysis

Sector identified as a national Priority in country poverty analysis?	Yes	Sector identified as a national priority in country poverty partnership agreement?	Yes
<p>Contribution of the sector/subsector to reduce poverty in Cambodia :</p> <p>Cambodia's power sector was severely damaged by years of civil war and neglect. The sector is very small and is in the early stages of development. The main organized electricity supply system comprises 23 small isolated networks, of which 14 are public and 9 private. The networks serve the main capital towns in the provinces and Phnom Penh, which has by far the largest system.</p> <p>The power sector in Cambodia is highly inequitable and the electrification ratio is among the lowest in Asia. Less than 13% of households and only 7% of rural household have access to electricity. Consumption patterns are also skewed in favor of non-poor with per capita consumption rates ranging from 328 kilowatt-hours (kWh)/month in Phnom Penh, where poverty incidence is 11%, to 9 kWh/month in other urban towns, where poverty is considerably higher, 30%. Inequities in the connection ratios and power consumption patterns have strong implications for the distribution of economic growth.</p> <p>Most provincial supply systems are in a severe state of disrepair and environmentally hazardous. Voltage drops are excessive. Voltage fluctuations destroy electrical appliances and reduce incentives to invest further in appliances for productive purposes. With unreliable supply that operates for only a few hours a day, consumers diversify energy sources with consequent costs. For the poor quality of supply, consumers pay the highest tariffs in Southeast Asia, ranging from about \$0.22 to \$0.51 per kWh. While willingness to pay for electricity is high, even among the poor who face high costs for alternative but deficient energy sources such as kerosene,¹ high tariffs reduce the ability to use electricity for purposes beyond basic lighting. Moreover, the quality of supply usually drops during peak hours, the time during which the poor use electricity for lighting. Thus, despite potential large impacts, there is little incentive for the poor to connect even if the electricity grid was available.</p> <p>The tariff levels are largely determined by the cost of generation, losses, and number of consumers (economies of scale). Tariff levels tend to be higher for towns situated in provinces with higher incidence of poverty. Given the Government's limited fiscal capacity and the low access to electrification among the poor, subsidized tariffs would incur high opportunity costs and would be poorly targeted. The solution to providing affordable and reliable electricity is to promote employment opportunities in urban areas outside Phnom Penh. For equitable economic growth and to directly target the urban poor, tariffs will be reduced by reducing the cost of generation and reducing losses. Sufficient and affordable power is key to promoting commercial and industrial activities to provide for off-farm employment opportunities in provincial towns and reduce migration to Phnom Penh.</p>			

B. Poverty Analysis

Proposed Classification:

Beneficiary non-specific intervention

Thematic Classification:

Economic growth

What type of poverty analysis is needed?

Poverty analysis will make use of existing surveys and provincial data combined with consultations in the field, and will include a poverty profile for project areas and an assessment on three levels: (i) direct, (ii) indirect, and (iii) macroeconomic impacts. Mechanisms through which the poverty and vulnerability of the near poor are reduced will be identified and assessed qualitatively and quantitatively. The type and extent of effects and the mechanisms through which they take place, together with key assumptions and risks, will be summarized in a matrix to give an overview of the distributional impacts across key socioeconomic groups. Poverty analysis will comprise an assessment of the transmission project, with shield wiring, as the direct poverty targeting component, and an

¹ The cost of 1 kWh using kerosene is approximately \$0.73 in provincial towns.

assessment of the impacts of the distribution project on existing and new consumers. The analysis will also determine the affordability of connection costs and other up-front charges² and tariffs.

Direct Effects on Poverty:

The analysis will establish a poverty profile, examine the impacts of direct access to electricity, and assess the affordability of up-front charges and tariffs. The study will be based on a review of existing data and studies, complemented by consultations with consumers in the proposed project areas.

Indirect Effects on Poverty:

The study will include a review of the impact on development aspects, interlinking the project effects of increased power supply with sectoral growth patterns and employment on poverty in the identified target provinces. It will make use of provincial data, sectoral data, and socioeconomic surveys. It will examine the impact potential of sectoral growth patterns, absorption of unskilled versus skilled labor, and implications for income and income source diversification for households across socioeconomic groups. It will particularly pay attention to sectoral shifts in production activities, agricultural productivity, the ability of the poor to benefit from job opportunities, the unskilled labor intensity of job opportunities, migration, and the sustainability of poverty reduction effects.

Macroeconomic Effects on Poverty:

The study of the macroeconomic effects will focus on the impact of the project on power consumption patterns, on the type of economic growth that the proposed project supports, its effects on geographic income/expenditure disparities, and the sustainability of poverty reduction. It will include an analysis of the constraints that specific groups of the poor and vulnerable may face in benefiting from economic growth. The analysis will be based on geographic growth patterns across sectors and other relevant key macroeconomic variables over time, combined with poverty and social indicators derived from socioeconomic surveys.

C. Participation Process

Stakeholder analysis:

A stakeholder analysis will be an integral part of the economic (distributional assessment), poverty, and resettlement assessments. The stakeholder analysis under the economic and poverty assessments will be mainly descriptive and qualitative to assess the distribution of expected costs and benefits. For transmission and distribution line routings, information and consultations with people and local communities in affected areas will be undertaken.³ The project preparatory technical assistance (PPTA) will include a design for a full participation strategy to be undertaken before and during the construction period. The strategy will include the design of public information disclosure about the project scope, schedule, impacts and entitlements, grievance procedures, and consultation and participation during resettlement planning and implementation. Local authorities have committed to assign counterpart staff to work with the consultants during the PPTA.

Participation strategy required: Yes – for resettlement and compensation measures.

D. Potential Issues

Subject	Significant, Not Significant, Uncertain, None	Strategy to Address Issues	Plan Required
Resettlement	Significant	Line routes and towers will be designed in consultation with local authorities (provinces, districts, and communes) and people residing in affected areas to avoid sensitive areas such as settlements, national parks,	Full

² Under Loan 1794-CAM: Provincial Power Supply Project, approved in 2000, Electricité du Cambodge (EDC) has committed to establish a program addressing the initial costs of connections for low-income residential consumers. The project preparatory technical assistance will examine the progress and adequacy of the proposed program.

³ The resettlement plan for the transmission component will be based on the Resettlement and Rehabilitation Action Plan conducted by the World Bank in 2001.

		dense forests and high-tree areas, holy places, etc. To assess the project impacts, a 100% inventory of all land and project-affected households will be carried out during the feasibility study. The resettlement study will include (i) number of affected households; (ii) area of impact, (iii) impact on livelihood as a share of total, (iv) type of crops affected, (v) housing, and (vi) affected trees by type and number.	
Gender	None		No
Affordability	Yes	Affordability of connection costs and other up-front charges will be examined. Due to high tariffs, their affordability will be analyzed.	Yes
Labor	None		No
Indigenous People	None	<ol style="list-style-type: none"> 1. No indigenous people have been identified to be adversely affected by the transmission component (World Bank and Electricité du Cambodge). Assessment of the distribution component will include a socioeconomic and cultural profile. If indigenous people will be affected by resettlement, impacts will be mitigated through the resettlement plan. 2. The expected impacts will not cause any cultural or social specific impact on or exclude any socioeconomic group, including indigenous people, from benefiting from the proposed project. 	Not expected, but the likelihood of impacts on ethnic minorities will be assessed.
Other Risks/ Vulnerabilities	None		No

LONG LIST OF POTENTIAL SUBPROJECTS FOR THE DISTRIBUTION COMPONENT

1. Siem Reap
2. Sihanoukville
3. Battambang
4. Kampong Cham
5. Kampong Chhnang
6. Kampong Thom
7. Kep
8. Kratie
9. Mondul Kiri
10. Odor Meanchey
11. Pailin
12. Preah Vihear
13. Pursat

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
Asian Development Bank Financing^a			
1. Consultants			
a. Remuneration and Per Diem			
i. International Consultants	530	0	530
ii. Domestic Consultants	0	12	12
b. International and Local Travel	45	4	49
c. Reports and Communications	6	0	6
2. Workshops	2	8	10
3. Surveys			
a. Technical	0	15	15
b. Socioeconomic	0	10	10
4. Other Services			
a. Vehicle Hire	0	14	14
b. Local Office Support	0	2	2
5. Representative for Contract Negotiations	5	0	5
6. Contingencies	70	7	77
Subtotal (A)	658	72	730
Government Financing			
1. Office Accommodation	0	35	35
2. Counterpart Staff	0	90	90
3. Office Supplies	0	30	30
4. Contingencies	0	25	25
Subtotal (B)	0	180	180
Total	658	252	910

^a Financed initially by ADB's TA funding program
Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR INTERNATIONAL CONSULTANTS

A. Team Leader (3 person-months)

1. The consulting firm will appoint a team leader from its permanent staff who will be the focal point for all communication with the Government, Executing Agency (EA), and Asian Development Bank (ADB) and will be ultimately responsible for all deliverables. The team leader will be one of the consultants in the outline below and is not a separate position.

B. Regulatory Expert (1 person month)

2. The expert's specific tasks include the following:

- (i) Review the ADB staff consultant's work entitled Financial Advisory Review of Private Sector Participation in Electricity Supply, December 2002.
- (ii) Assess Electricity Authority of Cambodia's (EAC) ability to properly license the private sector operators in a timely and effective manner. Assess EAC's ability to regulate and monitor in the medium term, and the technical assistance that might be required under new forms of private sector participation in Cambodia.

C. Engineers (7 person-months)

3. The consultants will undertake the following tasks including preparing relevant sections of the Report and Recommendation to the President (RRP) of ADB.

- (i) Review the World Bank report on the "Feasibility Study for the First Transmission Link Between Phnom Penh and the Southern Region of Cambodia," March–April 2001, and update it as necessary. Carry out technical studies to compare alternative methods of providing residents along the transmission line route with access to electricity.
- (ii) Assess the unexploded ordnance risk within the right-of-way for the transmission line and access paths to substations. Provide implementation arrangements and cost estimates for clearance to international standards.
- (iii) Review the initial appraisal of the costs by EDC of rehabilitating the generating and/or distribution systems in the long list of towns given in Appendix 2. For the projects selected for further study, plan and supervise street mapping to be undertaken by domestic consultants and make preliminary designs for upgrading and expanding the distribution systems in the urban areas. Select sites for generating stations and other works that will minimize adverse impacts.
- (iv) Prepare detailed lists of materials, equipment, and works necessary for the complete scope of the project. Estimate their costs separated into foreign exchange and local currency components.
- (v) Outline project implementation and procurement arrangements including contract packaging and a project implementation schedule.

D. Financial Analyst/Financial Management Assessor (2 person-months)

4. In accordance with *Guidelines for the Financial Governance and Management of Investment Projects Financed by the Asian Development Bank* (2001), the consultant will make a financial analysis of the proposed project and assess the financial performance of EDC, the EA. The work will include preparing relevant sections of the RRP ADB as outlined below. The consultant will be responsible for these tasks:

- (i) Carry out financial analysis of the proposed investment (and any defined subprojects); calculate the financial internal rate of return and weighted average cost of capital, taking into account all the financial costs and benefits of the proposed project. Identify all risks to project revenue and costs, and conduct relevant sensitivity analyses on the financial results. Prepare an appendix of the project financial analysis to be included in the RRP.
- (ii) Prepare a financing plan for the project, including proposed ADB lending, any prospective cofinancing, and appropriate counterpart funds for local currency expenditures.
- (iii) Review the most current audited or unaudited financial statements of EDC to assess (a) historical financial performance; (b) retail tariff levels; (c) capital structure; and (d) sufficient generation of internal funds to ensure sustainability of ongoing operations (i.e., self-finance a reasonable percentage of capital expenditures and service existing debt). The consultant will also review recent audited statements of EDC project accounts to determine proper accounting and cost control.
- (iv) As an appendix to the RRP, the consultant will briefly summarize past historical and projected financial performance, which will include 10-year proforma financial statements (balance sheet, income statement, statement of cash flows) for EDC. Recommend appropriate financial performance measures or ratios for EDC and assess compliance with such measures or ratios in proforma statements.

E. Economist (3.5 person-months)

5. In accordance with ADB's *Guidelines for Economic Analysis of Projects*, the consultant will undertake the following tasks, including preparation of relevant sections of the RRP of ADB:

- (i) Review and update load forecasts, costs and the economic evaluation undertaken in the existing feasibility study (footnote 1 of the main TA paper) of the transmission component. Assess the load and study the economic feasibility of connecting consumers along the transmission route.
- (ii) Rank the identified subprojects for the distribution component using economic, social, and environmental indicators. Based on initial cost assessments and the ranking, recommend the subprojects to be funded under the proposed project. Prepare a detailed load forecast for each selected subproject.
- (iii) Identify least-cost options for sources of power for approved subprojects. Identify and quantify benefits for new and existing consumers. Conduct an economic

evaluation of subprojects, individually and jointly. Determine the feasibility of and mechanism for implementing a targeted lifeline tariff. Examine possibilities and implications of cross-subsidization across consumers groups.

- (iv) Identify stakeholders and make a distributional analysis of net project benefits in accordance with ADB's *Handbook for Integrating Poverty Impact in Economic Analysis for Projects*. Calculate the poverty impact ratio (PIR) and the cost-effectiveness of the project in reducing poverty. Undertake appropriate risk and sensitivity analysis with respect to the PIR.
- (v) Specify indicators to monitor the project benefits. Establish procedures and provide cost estimates for benefit monitoring and evaluation in terms of ADB's *Guidelines for Benefit Monitoring and Evaluation*.
- (vi) Prepare a project framework, according to ADB standards, that clearly identifies the goals, objectives, and justification of the proposed project components, required inputs, targets or benchmarks, monitoring mechanisms, and potential risks and assumptions.
- (vii) Review the costs and benefits to Electricity of Vietnam (EVN) of the transmission link and exchange of power under the power purchase agreement (PPA) between EVN and EDC.

F. Poverty Expert (2.5 person-months)

6. The consultants will analyze the development impact of the proposed project and its potential impact on poverty reduction in accordance with ADB's *Handbook on Poverty and Social Analysis* and *Handbook for Integrating Poverty Impact in Economic Analysis of Projects*. The consultants will conduct the following tasks, including preparation of relevant sections of the RRP of ADB:

- (i) Develop poverty and social indicators for prioritizing subprojects in the generation/distribution component.
- (ii) From a review of existing studies and data, prepare socioeconomic and poverty profiles of identified project beneficiaries for the transmission component and for subprojects identified for the generation/distribution component. Include gender and local ethnic minorities' profile and their poverty status. Include in the poverty profile an analysis of deprivation and the causes of poverty and vulnerability in the area.
- (iii) Using existing studies and data, complemented by field consultations in project areas, analyze access to electricity, affordability of tariffs and monthly payment, and up-front connection costs, consumption levels, and consumer satisfaction for poor and near-poor households. Review institutional and cost barriers under existing private and public management models. Propose and design measures to deal with barriers to access and affordability of monthly payments.
- (iv) In coordination with the economist, design a benefit monitoring and evaluation system, including poverty indicators, for assessing the benefits to end consumers. Include cost estimates and implementation arrangements.

G. Resettlement/Social Expert (2.5 person-months)

7. In accordance with all relevant policies, handbooks and guidelines of ADB, the consultant will prepare the following, including the relevant sections of the RRP of ADB.

1. Transmission Component

- (i) Review and update the existing feasibility study's Resettlement and Rehabilitation Action Plan (March 2001) of the Cambodia Rural Electrification Project (First Southern Transmission Study) for the transmission component.
- (ii) Update the socioeconomic profile of the project-affected communities in the project areas under the transmission component in terms of household sizes, demographic trends, income sources and levels, occupations, socioeconomic conditions, social service infrastructure, and social organizations, in accordance with relevant ADB guidelines and publications and the requirements of Cambodia. Include the gender and local ethnic minority profiles.
- (iii) Update the census and inventory of lost assets (in terms of loss of homes, agricultural, and other lands; or loss of access to current income-generating activities, including impacts caused by permanent or temporary acquisition) of affected people and baseline socioeconomic survey of the affected population; determine the scope and magnitude of likely resettlement effects; and list likely losses and all losses of households, agricultural lands, business and income opportunities, as well as affected communal assets and public buildings.

2. Generation/Distribution Component

- (i) Identify the project-affected communities in the project areas under the distribution component and prepare the socioeconomic profiles in terms of household sizes, demographic trends, income sources and levels, occupations, socioeconomic conditions, social service infrastructure, and social organizations, in accordance with relevant ADB guidelines and publications and the requirements of Cambodia. Include the gender and local ethnic minority profiles.
- (ii) Undertake a full census and inventory of lost assets (in terms of loss of homes, and agricultural and other lands; or loss of access to current income-generating activities, including impacts caused by permanent or temporary acquisition) of affected people and baseline socioeconomic survey of the affected population; determine the scope and magnitude of likely resettlement effects; and list likely losses and all losses of households, agricultural lands, business and income opportunities, as well as affected communal assets and public buildings.

3. Transmission and Generation/Distribution Components

- (i) Assess the institutional capacity of responsible institutions at provincial and central levels—including the interdepartmental resettlement committee to plan, manage, implement, finance, and monitor effective land acquisition, compensation, and resettlement. Assess risks and identify capacity-building measures to be included in the project.

H. Environmentalist (1.5 person-month)

8. In accordance with the relevant guidelines and policies for environmental assessment the consultant will undertake the following tasks, including preparation of relevant sections of the RRP of the ADB.

- (i) Review and update the environmental assessment for the transmission line and substations at Takeo and West Phnom Penh and all access facilities, taking into account the likely impacts associated with their locations, designs, and construction activities, as well as the long-term impacts during operation. Include in the assessment the likely impacts of supplying electricity to the residents along the transmission line route.
- (ii) Make an environmental assessment of the proposed generating and distribution facilities in each selected provincial town, taking into account the likely impacts associated with their location, design, and construction activities, as well as the long-term impacts during operation.
- (iii) Prepare an initial environmental examination (IEE) report and its summary (SIEE) based on the *Environmental Assessment Requirements* of ADB, ADB's *Environmental Guidelines for Selected Infrastructure Projects*, and any applicable procedures or guidelines for environmental assessment required by the Cambodian Government; ensure that the costs of implementing the recommended environmental management and monitoring plans and any capacity strengthening measures are included in the proposed project's development costs.