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Report No: 32004

IMPLEMENTATION COMPLETION REPORT
(TF-20056 PPFI-Q0950 IDA-30470)

ON A

CREDIT

IN THE AMOUNT OF SDR 25.7 MILLION (US$ 34.7 MILLION EQUIVALENT)

AND A

GEF GRANT

IN THE AMOUNT OF SDR 0.5 MILLION (US$ 0.7 MILLION EQUIVALENT)

TO THE

LAO PEOPLE'S DEMOCRATIC REPUBLIC

FOR A

SOUTHERN PROVINCES RURAL ELECTRIFICATION PROJECT

June 14, 2005

Energy and Mining Sector Unit
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective December 31, 2004)

Currency Unit = Lao Kip
1000 K = US$ 0.09393
US$ 1.00 = K 10,646

ELECTRICAL UNITS AND MEASURES

kV = kilovolt (1,000 volts)
kVA = kilovolt-Amperes
MVA = Megavolt-Amperes (1,000 kVA)
kW = kilowatt (1,000 watts)
MW = Megawatt (1,000 kilowatts)
kWh = kilowatt-hours (1,000 watt-hours)
MWh = Megawatt-hours (1,000 kilowatt-hours)
GWh = Gigawatt-hours (1,000 Megawatt-hours)
km = kilometer (0.6214 miles)

FISCAL YEAR

01 January 31 December

ABBREVIATIONS AND ACRONYMS

CAS	Country Assistance Strategy
DOE	Department of Energy
DSCR	Debt Service Coverage Ratio
EdL	Electricité du Laos
EIRR	Economic Internal Rate of Return
FMAC	Financial Management Adjustment Credit
FIRR	Financial Internal Rate of Return
FRP	Financial Recovery Plan
GEF	Global Environment Facility
GoL	Government of Lao People's Democratic Republic
GS	Gen-set
ICB	International Competitive Bidding
ICR	Implementation Completion Report
IDA	International Development Association
LV	Low Voltage
MIH	Ministry of Industry and Handicraft
MOF	Ministry of Finance
MV	Medium Voltage
NPV	Net Present Value
O&M	Operation and Maintenance
OPS	Off-Grid Promotion Support Office
PAD	Project Appraisal Document
PDO	Project Development Objectives
PDP	Power Development Plan
PESCO	Provincial Electricity Services Companies
PGI	Provincial Grid Integration Project
PHRD	Policy and Human Resources Development
PIP	Project Implementation Plan
PPF	Project Preparation Facility
RE	Rural Electrification
RAP	Resettlement Action Plan
SDR	Special Drawing Right
SHS	Solar Home System
SFR	Self Financing Ratio
SPRE	Southern Provinces Rural Electrification Project
SPRE 2	Second Southern Provincial Rural Electrification Project
SWER	Single Wire Earth Return
VEM	Village Electricity Manager
VH	Village Hydro
WTP	Willingness to Pay

Vice President:	Jemal-ud-din Kassum
Country Director	Ian C. Porter
Sector Manager	Junhui Wu
Task Team Leader/Task Manager:	Jie Tang

LAO PEOPLE'S DEMOCRATIC REPUBLIC
SOUTHERN PROVINCES RURAL ELECTRIFICATION PROJECT

CONTENTS

MAP: IBRD No. 28485R

Project ID: P044973	*Project Name:* LA-SOUTHERN PROVINCE RE
Team Leader: Jie Tang	*TL Unit:* EASEG
ICR Type: Core ICR	*Report Date: June 14, 2005*

1. Project Data

Name: LA-SOUTHERN PROVINCE RE
L/C/TF Number: TF-20056; PPFI-Q0950; IDA-30470
Country/Department: LAO PEOPLE'S DEMOCRATIC REPUBLIC
Region: East Asia and Pacific Region

Sector/subsector: Power (82%); Central government administration (15%); Renewable energy (3%)
Theme: Infrastructure services for private sector development (P); Rural services and infrastructure (P); Regulation and competition policy (P); Legal institutions for a market economy (P); Climate change (S)

KEY DATES		*Original*	*Revised/Actual*
PCD:	07/12/1996	*Effective:*	08/29/1998	08/12/1998
Appraisal:	02/15/1998	*MTR:*	06/30/2001	04/11/2002
Approval:	03/17/1998	*Closing:*	06/30/2004	12/31/2004

Borrower/Implementing Agency: Lao People's Democratic Republic/GoL/MIH/EdL
Other Partners:

STAFF	Current	At Appraisal
Vice President:	Jemal-ud-din Kassum	Jean-Michel Severino
Country Director:	Ian C. Porter	Ngozi N. Okonjo-Iweala
Sector Manager:	Junhui Wu	Yoshihiko Sumi
Team Leader at ICR:	Jie Tang	Veronique Bishop
ICR Primary Author:	Jie Tang; Kurt F. Schenk; Zheng Huang	

2. Principal Performance Ratings

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HL=Highly Likely, L=Likely, UN=Unlikely, HUN=Highly Unlikely, HU=Highly Unsatisfactory, H=High, SU=Substantial, M=Modest, N=Negligible)

Outcome: S
Sustainability: L
Institutional Development Impact: SU
Bank Performance: S
Borrower Performance: S

	QAG (if available)	ICR
Quality at Entry:	S	S
Project at Risk at Any Time:	Yes	

3. Assessment of Development Objective and Design, and of Quality at Entry

3.1 Original Objective:

The project development objectives (PDO) were to (a) expand rural electricity service in seven central and southern provinces of Lao PDR, where economically justified, through grid extension and off-grid electrification; and (b) strengthen Electricité du Laos' (EdL) capacity to plan and implement electrification investments and operate on a commercial basis.

Key performance indicators were (a) increase electrification ratio in project provinces from 11% of households in 1996 to 20% in 2003; and (b) EdL performance vis-à-vis the Project Implementation Plan, and EdL and the Government compliance with technical and financial targets in Performance Contract.

The objectives were broadly defined and responsive to the circumstances and strategy of the Government of Lao PDR (GoL) in the power sector at the time, which included inter alia the expansion of national electrification, with a priority on provincial capitals and tourist sites, where grid extension is feasible, and to develop off-grid electrification methods on a sustainable basis where grid extension is not feasible. The objectives had links to the International Development Association's (IDA) Country Assistance Strategy (CAS Report No. 115284-LA, January 1996) and indeed the Project supported both the development of distribution networks to extend grid-supplied electricity to needy areas, and on the institutional front, the strengthening of the Government's capacity to plan and implement its development program. In addition, the project supported IDA overarching goal of poverty reduction. Resources provided under the IDA Credit supported both the physical and institutional components. Global Environment Facility (GEF) involvement was essential for piloting the off-grid electrification component of the Project.

The objective of improving EdL's capacity to plan and implement electrification investment and to operate on a commercial basis was realistic and in line with Government's recognition for the need to commercialize the power sector to harness private investment and improve efficiency, as well as in support of the Ministry of Industry and Handicraft (MIH) in developing a hydropower power strategy, and building its regulatory capacity to allow the implementation of the Electricity Law. In 2001, MIH published a "Power Sector Policy Statement" which crystallized the priority objectives of the Government at the time of preparing the Project, namely: (i) to expand electrification, (ii) to complete commercialization of EdL, and (iii) to develop a financing strategy for domestic and export power development.

An assessment of the Project's objectives and design needs to consider the fact that EdL was, at the earliest stages of Project appraisal (November 1997), already in default with respect to a number of financial covenants within the by then ongoing Provincial Grid Integration Project (PGI) Credit. Despite promises to improve EdL's financial situation, including an increase of the domestic tariff, the Government was unable to prevent EdL worsening financial situation close to a critical level.

3.2 Revised Objective:

The original objectives of the Project were not revised.

3.3 Original Components:

The Project had three components as defined in the Project Appraisal Document (PAD): (a) ***Distribution Extension*** (refer to Annex 10), aimed at increasing electricity service in seven central and southern Lao provinces, namely: Bolikhamxay, Khammouane, Savannakhet, Champassak, Saravane, Sekong and

Attapeu, and consisting of the construction of about 52 km of high-voltage (HV, 115 kV) transmission lines, 2x20 MVA of 115/22 kV transformer capacity, 1,200 km of medium-voltage (MV, 22 kV) lines, 900 km of low-voltage (LV, 380 V) lines, 34 MVA of 22/0.38 kV distribution transformers and 50,000 metering installations. It would also pilot the use of a low-cost Single Wire Earth Return (SWER) system in rural areas; (b) ***Off-Grid Rural Electrification***, which piloted the use of small-scale, stand alone generation systems such as micro-hydro and diesel mini-grids as well as solar battery charging stations in remote rural communities on a financially sustainable basis. The intention was to benefit about 4,600 households in 46 remote villages; and (c*)* ***Institutional Building*** which provided consultants' services, training and equipment to (i) EdL to further increase efficiency by building its project management and procurement capability, improving its technical planning, and enhancing its commercial focus, and (ii) MIH for legal, regulatory, technical and planning matters, including hydro power planning studies and assisting in the implementation of the electricity law.

Key performance indicators for components (a) and (b) consisted inter alia of the electrification of 50,000 households in 3 provincial capitals/districts and 520 rural villages, and off-grid electrification of about 4,600 households in 46 remote villages electrified, respectively.

The design of the Project is considered to be sound; it was under-pinned by adequate technical studies. The above components directly supported the achievement of the PDOs and were commensurate to the capacity of the Implementing Agency.

The estimated project costs of US$39.3 million was proposed to be financed by an IDA Credit (US$34.7 million), a GEF Grant (US$0.7 million), EdL internal resources (US$3.5 million), and from village resources (US$0.3 million). Project procurement was well packaged into 18 international competitive bidding (ICB) contracts for goods, two of them under supply and installation contracts (for 115 kV transmission lines and substations). It also allowed International shopping and National shopping. There were 18 Contracts for Consulting services procured mainly on the basis of Quality and Cost Based Selection and Fixed Budget procedures.

3.4 Revised Components:

The pilot program of the off-Grid component was more specifically defined during the piloting process and implementation arrangements modified in view of the alignment of the Power Sector Policy Statement and the Project objectives. The physical scope of the Distribution Extension Component was also expanded using cost savings.

For the off-grid component, three key dimensions were developed during the piloting process, namely (a) quality assurance, to establish a mechanism to assure reliability and customer satisfaction in the long term; (b) majority uptake, to ensure that most households in each village (as opposed to a small elite of better-off families) receive electricity supply as a result of their village subscribing to the off-grid program; and (c) social and economic benefits, to ensure that off-grid electricity help its subscribers to become better off, in terms of quality of life, and economic opportunity. This was accomplished by paying particular attention to the design of payment schedules under the hire-purchase arrangement, and the delivery model.

For the implementation of the off-grid program, realignment was made through amendment of the IDA Credit Agreement and the related Subsidiary Loan Agreement in late 2001 to include a lead role at the national level for Department of Energy (DoE) of MIH, thus transferring primary responsibility for this component from EdL to MIH, and relieving EdL from the financial pressure of the off-grid investments that would be taken out from the on-lending arrangements. During the transition period EdL's Off-Grid Unit maintained its critical implementation role.

Cost savings allowed IDA to consider a request from EdL in August 2001 to include a new activity under the Distribution Extension component to the Project. Approved by IDA in August 2001, the contract for the new activity was signed in November 2002, in the amount of US$3.902 million. The new activity consisted of (i) upgrading of the 115/22 kV Paksan substation with 2x16 MVA transformers; and (ii) constructing a new 115/22 kV outdoor substation at Thakhek with 2x30 MVA transformers and the erection of a 3 km double circuit steel lattice 115 kV transmission line between the existing 115 kV Mekong River crossing and the substation site. The new substation and transmission lines were required to supply the load to be connected to the project, to increase security of supply and to allow for future load growth, supporting achievement of the PDO.

In addition to the above, other adjustments were made during Project implementation through the use of project cost savings, including: (i) establishment of a Project Office at Thakhek substation in late 2003 to expedite construction of the new activity; (ii) procurement of an additional 800 solar home systems (SHS), to enhance the sustainability and building capacity of the off-grid program, and (iii) additional goods and services in support of the off-grid program.

3.5 Quality at Entry:

On balance the Quality at Entry is rated ***satisfactory.*** The objectives were consistent with the Government's goal and CAS electrification strategy to extend EdL's grid, concentrating in the seven central and southern provinces, and to connect additional households with off-grid technologies in rural villages which were unlikely to receive grid access in the next 10-15 years. GoL's stated goal at the time was to increase the electrification for the entire country from about 30% to 90% by 2020. On the institutional side the Project was in line with Government recognition of the dire need for commercializing the sector to improve the financial situation as well as technical capacity of EdL. The appraisal team also insisted that the signing of the Performance Contract ("Contract Plan") between EdL and MIH, which was a condition of release of the second tranche of IDA's Structural Adjustment Credit, would be a condition of negotiation.

The Project was also in line with IDA safeguard policies. As the Project did not cause any significant adverse environmental impact, this Implementation Completion Report (ICR) concurs with the selection of Environmental Category B for this Project. The design of the Project was sound and it included clearly stated on-grid and off-grid rural electrification targets and key performance indicators. An ambitious goal for Lao PDR is to connect 75% of rural families to the grid by 2020, and to help at least another 15% to receive off-grid electricity by that time. Given that many off-grid villages in Lao PDR are highly inaccessible and most households generally can afford only about 2 dollars per month for electricity, the achievement of this goal remains very challenging.

The PAD recognized many of the risks associated with the Project, and considered such risks to be modest. In retrospect, these risks turned out to be substantial. Implementation of the grid extension component suffered delays of about 16 months mainly due to delays in the delivery of goods, delays in civil works due to much rain, as well as land acquisition/resettlement issues. Resettlement implementation encountered several problems including inter alia, the disparity in compensation rates actually paid from those approved in the Resettlement Action Plan (RAP), which reflects the fact that it was the first time for EdL to implement a resettlement program based on an approved RAP.

In addition, there are two issues for which risk profiles and mitigations measures were not fully developed at appraisal. First, the Government's commitment to take action to resolve EdL's critical financial situation was over estimated, and hence the appraisal team did not include this factor as a critical risk for

the project. Although financial covenants were included in the PAD, this did not help in nurturing Government's commitment to resolve EdL's financial crisis. The financial restructuring of EdL, which the appraisal team should have insisted at the time of project appraisal and which finally was approved in principle in March 1999, did not get underway till 2000. By the completion of the Project, increasing arrears by Government departments and agencies were deteriorating EdL's financial position.

Second, the appraisal team did not thoroughly analyze the inability of some villagers to pay grid connection charges. This "connection charge hurdle" risk turned out to be appreciable during project implementation. Despite this hurdle, EdL managed to achieve and even surpass the households electrified under the Project by electrifying more villages than expected at the appraisal, during the time of the extension of the Credit closing date.

4. Achievement of Objective and Outputs

4.1 Outcome/achievement of objective:

The overall outcome of the Project is rated as satisfactory. Despite the impact of the regional crisis and EdL financial crisis during project implementation, the Project objectives were substantially achieved and the Project resulted in benefits to the rural population, both grid connected and off-grid electrified, as demonstrated by the results of a rural electrification socioeconomic survey carried out in preparation of the follow-on Second Southern Provincial Rural Electrification (SPRE 2) Project.

To gauge the impact of electrification, this socioeconomic survey (November 2004) noted that in monetary terms, the use of electricity reduces considerably the monthly energy expenses of households, with low income households saving up to 10,000 Kip per month, representing about 10% of their total income. But although electrified households do not have a problem in paying the monthly energy bills (10,000-20,000 Kip), many could not afford the connection charge (about 800,000-1,300,000 Kip). As regards poverty alleviation, the survey found that the low income classes take little advantage of electrification due to a shortage of dispensable income, and hence the gap between the poor and the more wealthy households increases with time. The survey sampled about 4,000 households in four groupings and was based on the parameters used in the survey to gauge poverty reduction (percentage of average income of the poor to the middle classes' average income, and percentage of the poor class' average income to their total energy expenses).

A. Objective: Expand rural electricity service in seven central and southern provinces of Lao PDR, where economically justified, through grid extension and off-grid electrification.

This objective has been satisfactorily achieved. Through successful implementation of the Grid Extension and Off-grid Rural Electrification Components, the targets for the number of households electrified exceeded the original targets--50,000 targeted vs. 51,805 actual for the on-grid component, and 4,600 vs. 4,910 actual for the off-grid component. The electrification ratio in project provinces, a key performance indicator set in the PAD for measuring this objective, was 38.7% in 2003 and 42% by project completion, far exceeding the PAD target of 20% in 2003.

The construction of the 115 kV transmission lines and substations as well as the 22 kV, and 0.4 kV lines, including the additional components, were successfully implemented (albeit with some delays) and commissioned before Credit Closing. The target for the number of villages electrified was also exceeded (number of villages 520 in the PAD vs. 721 actual).

The pilot program for installation of low-cost SWER systems in rural areas as designed at the appraisal was successful, with technical standards finalized and conditions for application determined, but it fell below expectations in terms of length of SWER lines and capacity of SWER transformers connected to the grid. Only 78 km (target 117 km) of 12.7 kV SWER distribution lines, and 1.5 MVA (target 2.4 MVA) of SWER transformer capacity were commissioned. The main reason for this shortfall was due to the fact that as the villages increased in size from the time of appraisal up to the time to implement the SWER system, villagers and EdL did no longer deem adequate to supply the increased demand of the village by SWER lines. Villagers preferred instead to have the standard 22/0.38 kV distribution system.

Under the off-grid component, a key objective was the connection of 4,600 households, using a participatory approach. In addition to exceeding this physical target, this design allowed for a careful choice by villagers of which individual in the village would become the electricity business managers, the establishment of a village electricity committee, and individual households to freely choose either opt out of the program or to become subscribers. This participatory approach yielded an average uptake rate close to 60%. The default rate turned to be zero, that is, no villagers refused payment, although they were instances of late payments (the aggregate repayment performance rating is about 90%). A recent report (September 2004) on Renewable Energy Assessment in preparation of the follow-on SPRE 2 Project, confirmed that solar power and mini-micro hydropower have the highest potential applicability in Lao PDR. The uptake of village hydro (VH) systems, and diesel gensets (GS) fell short of expectations.

B. Strengthen EdL's capacity to plan and implement electrification investments and operate on a commercial basis

This objective was satisfactorily achieved. The institutional building component of the Project provided consulting services to EdL and MIH in the areas of project management, commercialization and sector regulation developments. These institutional studies provided the underpinning for the development of a Lao Power Sector Policy issued in 2002, and for improving project management, supervision, and planning capabilities of EdL.

Significant achievements in the commercialization of the sector include:

- Successful implementation of EdL's Financial Recovery Plan (FRP) with the achievement of substantial increase of tariff levels, which enhanced financial sustainability of EdL and the power sector as a whole;
- Improved financial and operating performance of EdL;
- Reduced losses in the distribution networks over the period 1998-2003, from 19% in 1998 down to about 16.4% in 2003, but back to 19% in 2004, partially due to fast growth of load;
- Improved capacities for system planning and design, and project implementation at both headquarters and branch offices;
- Some integration of headquarters and branch operation through information technology and communication systems.

In addition to the original objectives, the project was instrumental in providing preparatory support for the Nam Theun 2 project (approved on 31 March 2005) in the amount of about US$3.9 million. Project cost savings supported mainly Legal advisory services, and a Dam Safety and Environmental Panels of Experts for the Nam Theun 2 project.

At the earliest stages of Project implementation in late 1998, the worsening EdL's financial situation had reached a critical level. This in fact did have a negative impact on this PDO, which was downgraded to unsatisfactory in mid 1999. Subsequent actions by both GoL and EdL, including compliance with the

appraisal requirements of financial management and accounting, followed by the decision on April 10, 2002 to increase electricity tariffs beginning in May 2002 for 36 months, and the revaluation of EdL's fixed assets, did much to defuse the issue, and the PDO was upgraded to satisfactory in mid June 2002 in view of the substantial actions undertaken for GoL to fully implement the FRP of EdL.

4.2 Outputs by components:

Distribution Extension. This component was successfully implemented, despite implementation delays, and ***is rated as highly satisfactory.*** It achieved or surpassed all the targets, in particular connecting 51,805 new households to the grid as compared to a target of 50,000 set at appraisal, as shown in the Table below. Implementation problems were mainly due to late delivery of equipment and mobilization delays by contractors, heavy rains which delayed civil works, delays with resettlement implementation where provincial staff did not fully understand the requirements of the RAP or were unaware of its existence, and weak implementation capacity of contractors.

Key Performance Indicators Projected in PAD	**Key Performance Indicators Actual/Latest Estimate****
• 52 kmc of 115 kV lines • 1,200 km of MV (22 kV) lines • 900 km of LV (380 V) lines • 2x20 MVA 115/22 kV transformer capacity • 34 MVA 22/0.38 kV transformer capacity • 50,000 household connections	• 53.43 kmc of 115 kV lines • 1,554 km of MV (22 kV) lines • 1,566 km of LV (380 V) lines • 132 MVA 115/22 kV transformer capacity • 44.88 MVA 22/0.38 kV transformer capacity • 51,805 household connections*

* end of Project

** it includes the additional components not included in the original project scope and procured from credit cost savings, i.e. upgrading of 115 kV Paksan and new Thakhek substations

Through cost savings, the output of this component was expanded beyond appraisal estimates with additional ones. The 115/22 kV Paksan substation was upgraded with 2x16 MVA transformers; a new 115/22 kV outdoor substation was installed at Thakhek with 2x30 MVA transformers and associated 2.632 km double circuit steel lattice 115 kV transmission line connecting the substation and the existing 115 kV Mekong River crossing.

Off-Grid Rural Electrification. This Component ***is rated as highly satisfactory*** (para. 4.1), exceeding its physical target of 4,600 households. It provided a successful implementation of stand-alone installations, by means of a hire-purchase arrangement, which allowed villagers who generally cannot afford more than 1 or 2 dollars per month for electricity, and a cost per connection of approximately $300, to avail themselves of solar home systems (SHS). In this arrangement, users could choose to lease systems for 5 or 10 years with an up-front payment of about 20 dollars, becoming owners at the end of the period on condition that all payments have been made. Village Electricity Managers (VEM) investing in VH and/or GS systems, paid off the cost of hardware in a similar way, becoming owners after five or ten years of making hire-purchase payments, which so far has operated reliably. This delivery system involved the private sector--Provincial Energy Service Companies (PESCO) and VEMs--as implementing bodies. It proved to be sustainable on the grounds that it generated surpluses over and above the costs of supervision, management, and the costs of incentives to these intermediary bodies to cover field planning, installation, and maintenance costs.

After the Credit closing, 4,974 households were connected and paying by January 2005. The ongoing installation works in the period up to May 2005 would increase the number to 6,097 by May 2005 according to the current plan and resources available. The cost recovery performance was satisfactory, with prices set at semi-commercial levels, with face-value subsidy at 4%, 14%, 18%, and 29% for 20Wp, 30Wp, 40Wp and 50Wp solar home system respectively, and at 21% and 31% for GS and village hydro respectively. Customer satisfaction was high and reliability of electricity supply was satisfactory, as indicated by the lack of defaults on repayments by customers and interviews of the Task Team's field visit. In the five provinces where private companies were licensed as PESCOs, the overall repayment rate (customers and all intermediary bodies) was 98% with one month. The 2% shortfall was mostly due to permitted postponement of payment to a succeeding month. One PESCO was not performing satisfactorily and its contract was terminated and the customers were taken over by a well performed PESCO.

Institution Building. This component is rated as ***satisfactory***. Under this component consultant services and equipment were provided to EdL to further increase its project management capability, improve its system planning and technical design capacity, and enhance its commercial focus, and to MIH to improve its capacities in hydro power development planning, and the implementation of the electricity law.

Technical assistance to EdL for project management and supervision was satisfactory and allowed EdL to build in-house capabilities which has significantly reduced EdL's dependency on technical assistance (TA) for system planning, project design, preparation and procurement. Financial management capacity building was also considered satisfactory after overcoming difficulties of nonperformance of consultants in early stage. As a result, the FRP was successfully implemented, and a computerized Billing system and an Accounting and Financial Management system were set up, which allowed integration of financial management of EdL's Branch Offices and Headquarters.

Technical assistance to MIH included project implementation support to the Off-grid Promotion Secretariat (OPS). The TA enabled the newly established Secretariat to perform satisfactorily and with installation rates exceeding initial targets. A second component of TA included investment and system planning. These activities are considered highly satisfactory as the recommendations and system tools have been widely adopted in DoE. The failure of Lao PDR to attract private sector interest in the power sector can mainly be attributed to wider macroeconomic conditions and the general shortcomings of the investment climate in Lao PDR. Financial management and procurement were improved with local consultants hired under this component.

The efficiency in project implementation resulted in achievements of expanded physical outputs and considerable cost savings, which allowed additional financial resources to support the various TA activities to advance the preparations of the Nam Theun 2. The Nam Theun 2 Project was approved by the Board in 31 March 2005.

Environment and Resettlement. Although land acquisition was finally implemented successfully, there were some issues that impacted the implementation of the RAP, including (i) delayed mobilization of contractors, (ii) delayed approvals of compensation guidelines by some of EdL's provincial offices (e.g. Savannakhet Province), (iii) insufficient coordination of EdL at headquarters and its Provincial Offices, where some of them had little knowledge of the existing RAP and believed that no compensation was required for paddy fields under the transmission lines, and (iv) disparity between the compensation rates approved in the RAP and that approved by Provincial authorities. Some Provincial Offices were unaware

of the existence of the RAP, and the Provincial and District Governments seemed reluctant to change the current practice with regard to land acquisition and resettlement, which rarely pay compensation for public infrastructure projects.

In light of impending problems, a detailed action plan was drawn out in early 2003 so that resettlement and compensation activities would be completed successfully. By October 2003 compensation agreements of acquiring paddy land, the removal of trees, and other payments to affected houses was signed with each affected family in the presence of EdL's project resettlement staff, district and village officials. An internal Monitoring Report (included as part of the Borrower's Completion Report in Annex 8) prepared independently by a local consultant confirmed that land acquisition and resettlement problems had been satisfactorily worked out.

4.3 Net Present Value/Economic rate of return:

Re-evaluation of the costs and benefits of the Project was carried out along the same lines as in the PAD (see Annex 3). The economic internal rate of return (EIRR) and net present value (NPV) of accumulated net benefits are estimated as follows:

	EIRR (%)		**NPV** ($ million)	
	PAD	ICR	PAD	ICR
1) Distribution Component	22.80%	60.50%	$25.67	$236.84
2) Off-grid Component (SHS)	14.00%	26.01%	$0.070	$2.84
3) SPRE	22.40%	59.06%	$26.00	$239.69

The EIRR for the Distribution Component is much higher than the estimation at appraisal mainly because the willingness to pay (WTP) obtained from the field survey in 2004 is much higher than the estimations at appraisal (see Annex 3). The EIRR is in line with the economic analysis for the follow-up SPRE 2 project, for which EIRR is estimated at 79% for grid-extension activities in the same provinces.

4.4 Financial rate of return:

The financial internal rates of return (FIRR) and NPV of accumulated net cashflows are estimated as follows (see Annex 3):

	FIRR (%)		**NPV** ($ million)	
	PAD	ICR	PAD	ICR
1) Distribution Component	3.01%	6.52%	-$10.43	-$1.07
2) Off-grid Component (SHS)	13.00%	-15.94%	$0.056	-$1.18
3) SPRE	3.60%	6.04%	-$10.20	-$2.25

The FIRR for the off-grid SHS activity at ICR departed largely away from estimation at appraisal mainly because (i) the actual operational cost for future years of this program was much higher than estimation at appraisal; and (ii) project cost was about 10% higher than estimation at appraisal. The business model for the off-grid electrification by SHSs was set-up and refined during the piloting process, and the operational cost of the supply chain (from MIH to PESCOs to VEMs to customers) could not possibly be well estimated at appraisal, nor the cost of international consultants for technical assistance in setting up and implementation of this business model, which was proved successful in achieving the PDO.

The reason for the much higher economic rates of return than those financial rates is due largely to the consumer surplus. Basically, only the supplier surplus is captured in the financial benefit.

4.5 Institutional development impact:

Overall, the Project's institutional development impact is rated as high. The Project made it possible for EdL and GoL to make more effective use of their resources, to improve efficiency of their operations, and to push EdL and GoL towards commercialization of the sector. Specifically, the following was carried out under the Project: (i) GoL Statement of Power Sector Objectives issued as a Policy Statement which assisted GoL strategy to advance economic and social development, including developing and enhancing the legal and regulatory framework to effectively direct and facilitate power sector development, and maintaining and expanding affordable and reliable electricity supply; (ii) Hydropower Development Strategy Study which provided inputs for the Power Sector Policy and its implementation plan; (iii) significant domestic tariff increases were made effective in February 1999 and subsequently readjusted placing EdL on a more solid financial footing; (iv) implementation of EdL's FRP which made it possible for EdL to meet its financial covenants pertaining to self-financing ratio, debt service coverage ratio and debt equity ratio for the first time in 2003; (v) implementation of a Performance Contract ("Contract Plan") to be renewed every three years, with the first Contract Plan of FY01-03 approved on August 2001, binding EdL to performance targets as well as obligations of the State, which are instrumental in the commercialization of the sector; and (vi) preparation of EdL's Power Development Plan (PDP) for investments till 2010, as required by the FRP.

5. Major Factors Affecting Implementation and Outcome

5.1 Factors outside the control of government or implementing agency:

Macroeconomic instability at the time of Project commencement became a serious threat to the PDO, with GoL being unable to implement the FRP early in the Project. The end result was the financial situation for EdL became very critical and continued to deteriorate till the FRP was finally implemented in late 2002. There was a fast depreciation of Kip vs. USD in the early stages of the project implementation; however, since 76% of the project cost was foreign and 24% local, the total cost of the originally designed components was still under-run.

5.2 Factors generally subject to government control:

EdL's critical financial situation at the beginning of Project commencement and GoL delay in implementing the FRP for EdL caused the PDO rating of the Project to be downgraded from Satisfactory to Unsatisfactory in mid-1999, which caused IDA to issue a message warning of suspension of disbursements. The Project was upgraded to Satisfactory in mid 2002, only when substantive actions were taken by GoL regarding tariff increases and the implementation of the FRP. The high devaluation of the Kip at the beginning of the Project and its effect on Government cast some doubt at the time about Government's commitment to support an effective commercialization of EdL, and strongly impacted EdL's financial situation. There was an apparent lack of leadership and decision making capacity within Government during 1998/1999 which caused delays in the implementation of the FRP. However Government commitment resumed and the FRP was finally implemented in 2002. Counterpart funds were sufficient to implement the Project. Staffing by GoL was satisfactory. The Government took over the implementation of the off-grid program and achieved beyond its original households electrification targets.

EdL's financial problems could not be addressed by EdL alone, and were in fact linked to the worsening macroeconomic environment and GoL financial support. The country suffered a massive depreciation of its currency in 1997, linked to the financial crisis in the region, with inflation at triple-digit levels. By January 1999, the value of the Kip had fallen to less than 30% of its July 1997 value, and inflation had shot up over 150% on an annual basis. It was noted at the time that the situation was aggravated by the lack of leadership and decision making in GoL for a period of time in late 1998 and early 1999. A complete revamping of the Ministry of Finance (MOF) took place in mid 1999. In response to the lack of progress at the time to implement the FRP, IDA informed both the Government and EdL of its intention to consider the Government and EdL in default of its financial obligations and would take measures to suspend further disbursement from the Credit.

5.3 Factors generally subject to implementing agency control:

Good Project Management. Despite the economic crisis and EdL's financial difficulties, the MIH and EdL, supported by the Project's Consulting Engineer, did a reasonably good job in coordinating various activities and the work of the contractors, even in the face of great uncertainty, financial difficulties, and implementation delays. The management effectiveness ensured achievements beyond the on- and off-grid electrification targets through the effective use of cost savings.

Procurement Performance. Procurement was carried out satisfactorily in line with World Bank guidelines. However, delays in procurement and delivery of off-grid equipment resulted in delayed completion of the off-grid program, which required the extension of the Credit closing date by six months. During the IDA credit extension period, MIH successfully undertook the first ICB procurement with assistance from the Association. This task, not envisioned at the time of Project Appraisal, was essential in building the procurement capacity within MIH and in managing future procurement activities for up-scaling the off-grid electrification program.

Good Beneficiary Participation in Off-grid Electrification. Beneficiary participation in the off-grid program was significant, with implementation primarily driven by the beneficiary. The beneficiary also had choices of sizes of system and options of hire-purchase contracts. The beneficiary also participated in supply of spare parts, maintenance of operational SHS, and collection of re-flows under the hire-purchase contracts.

5.4 Costs and financing:

The estimated total Project cost at appraisal, excluding taxes and interest during construction, was US$39.30 million equivalent. The latest estimate of the actual project costs is US$40.81 million, 105.39% of the cost estimated at the appraisal. Including interest during construction, total actual project financing was US$41.41 million, as compared to US$39.3 million at appraisal. The IDA Credit provided US$34.38 million, compared to US$34.68 million at appraisal. GEF provided US$0.74 million as originally planned.

Significant cost savings (25.6%) were achieved during Project implementation mainly due to (i) a reduction in the costs of materials and equipment against appraisal budgets due to efficient and effective ICB/International Shopping procurement; and (ii) benign macroeconomic condition for procurement as a consequence of the Asia crisis. This cost saving allowed expansion of the Grid Extension and Off-grid Electrification Components as described in Section 4, and provided resources to support Nam Theun 2 preparatory work.

6. Sustainability

6.1 Rationale for sustainability rating:

On balance the project sustainability is rated as likely. The Project has been constructed in a technically sound manner and it is expected that EdL would operate and maintain it effectively, and that MIH would continue to support the off-grid component. The physical sustainability of the Project is considered assured in view of the nature of the investments in transmission lines and substations. EdL's designs and construction practices have evolved with expatriate consulting experience and are considered best practice for network development. The same holds true for the off-grid component whose technologies are proven, and the hire-purchase model derived a very high rate of reflows from operational customers--almost 100% collection within about two months. The physical component of the project forms part of EdL's least cost development plan and has robust returns. The Project would, therefore, be economically sustainable. The Performance Contract between Government and EdL would continue to monitor and strengthen EdL performance, and the completion of the implementation of the Billing and Accounting system and Financial Management system under the Project would assist EdL in its commercialization efforts. The institutional building measures under the Project which include financial management and commercialization support are already bearing fruit.

Financial Sustainability. At Project completion, most of the financial covenants were complied with except for EdL's accounts receivable. After years of effort, the Project was on sound footing by end 2004: the Self Financing Ratio (SFR) was above 30%, Debt Equity Ratio remained less than 1.5, and the Debt Service Coverage Ratio (DSCR) kept above 1.5.

However, sustainability of the project would be impaired if EdL's receivables continue to be unsatisfactory. EdL's accounts receivable were at about 5 months in 2004 compared to the covenanted target of 2 months. This was particularly due to past due arrears of various Government ministries and agencies, more than US$12 million, representing about 19 months' receivables. At the recommendation of IDA, an Action Plan for Efficiency and Sustainability which included recommended actions for settlement of Government arrears was proposed to GoL and GoL's response was positive. A successful resolution of the government arrears has been set as a condition for the Board Presentation of SPRE 2.

It is also foreseen that starting in 2005 the SFR and DSCR of EdL would drop below the covenanted levels if EdL invests in generation and transmission projects according to EdL's PDP formulated in August 2004. At negotiations of SPRE 2, agreement would be reached that the Government would take all necessary measures including but not limited to raising electricity tariffs, to ensure that EdL meet the financial covenants as follows: (a) maintain a self-financing ratio of no less than 30% of three-year average planned capital expenditures; (b) maintain net revenues of no less than 1.5 times annual projected debt service payments; and (c) maintain the ratio of its long-term debt to no more than 1.5 times its equity.

The Action Plan addresses Government arrears as well as the tariff issue and loss reduction in an integrated approach. GoL's endorsement and implementation of the Action Plan will be critical for achieving a stronger financial position of EdL and sustainability of the power sector as a whole, within which the Project is being operated. Given the prospects of ensuring commitments on the above measures through a follow-on operation, the probability of the Project's maintaining the achievements generated so far is likely.

6.2 Transition arrangement to regular operations:

All the facilities under the Project are now fully operational and became part of EdL managed power systems spread over the country. There is a strong institutional framework within the provinces for the operation and management of EdL's distribution network. The general day to day operational management of the network has been devolved to EdL's Provincial Offices, which are well staffed, adequately trained and equipped to carry out this task. It is expected that EdL would provide sufficient resources in its budget to operate and maintain its system safely and reliably. The signing of the new Performance Contract for 2004-2006 with GoL would also ensure EdL continued good performance. In addition, agreement has been reached with IDA for future monitoring of the Project (Annex 9) for both the on grid and off-grid components. This monitoring can be undertaken during the supervision of the follow-on SPRE 2 project.

7. Bank and Borrower Performance

Bank

7.1 Lending:

The Association performance in lending was ***satisfactory***. At the identification stage the task team ensured that the project objectives and scope were consistent with both the Government priorities and the IDA CAS. Bank assistance during Project preparation as well as appraisal was satisfactory. IDA provided adequate expertise in assisting EdL in the technical preparation of the Project. In view of the deteriorating operating performance of EdL, which at the time of project preparation was already in default with respect to a number of financial covenants agreed under the previous PGI Credit, the appraisal team wisely insisted that the signing of a Performance Contract between EdL and MIH ("Contract Plan") be made a condition of negotiations. The Association maintained a substantial dialogue with EdL, MIH and MOF on measures to improve EdL's financial health and to restore compliance with financial covenants and agreements.

7.2 Supervision:

The Association performance in supervision was ***highly satisfactory.*** Although the project task managers changed four times during Project implementation, Bank supervision performance was consistent and satisfactory. The team established a very close and effective working relationship with GoL/MIH and EdL. The frequency, timing, duration and skill mix of the supervision missions are considered adequate. Identification of critical issues and actions to overcome them were timely and effective. The supervision aide-memoires were well prepared with detailed findings and recommendations recorded. Follow-up letters were sent to the borrower on a timely basis. Project Status Reports were updated regularly and were reasonably comprehensive.

In view of the critical situation facing EdL at the early stages of implementation coupled with the severe impact of the foreign exchange devaluation on EdL operating performance, and the Government delay in implementing the FRP, the task team was reasonably responsive and urged the Government to implement the FRP. The technical assistance provided was timely, including providing assistance in developing a financial model so that EdL could prepare more realistic financial projections. In addition, while the task team was reluctant to downgrade the PDO to Unsatisfactory right at the start of implementation, it acted in late 1999 in view of the continuing macroeconomic instability and persistent deteriorating financial situation of EdL. It kept close track of the situation, and the Government and EdL was put on notice that the Association would consider declaring them in default of their financial covenants and consequently suspending further disbursements from the Credit till the FRP is implemented.

Resettlement and Land Compensation was one aspect of the Project that did not work initially as smoothly as envisaged at appraisal. Information about the RAP was not transmitted to Provincial Offices by EdL as anticipated and as had been agreed between EdL and the Association. When the situation became evident, the supervision team intensified its efforts on this matter to make certain that all Provincial Offices were aware of the requirements of the RAP and these efforts proved to be successful at the end.

The Task Team was responsive to extension of the credit closing date by six months to pick up the apparent slack in household connections in electrified villages and install additional SHS. The Task Team worked closely with counterparts on preparation, implementation and monitoring of work plans for the extended implementation period.

7.3 Overall Bank performance:

On balance the Association's overall performance is ***satisfactory***.

Borrower

7.4 Preparation:

The Borrower's performance in preparation was ***satisfactory***. There was close cooperation during preparation between the Government, EdL and the Association. The strong commitment of the Government and EdL to promoting energy services to the project areas was key to gaining IDA credit and GEF support for the project. The extensive and effective support provided by the counterpart was essential to the successful completion of the project design and readiness for implementation.

7.5 Government implementation performance:

On balance, the Borrower's performance in implementation was ***satisfactory***. Despite unforeseen changes in implementing agencies for the off-grid program, the Government maintained strong policy support and continued leadership of the project. But the FRP was substantially delayed as no action was taken during the 1998/99 period. However, after reorganization, Government made timely and effective responses and actions regarding key implementation issues, including mainly implementation of the FRP and Performance Contract with EdL, change of implementing agency and policy and regulatory decisions for the off-grid program, allocation of adequate resources for implementation, and extension of credit closing date.

Settlement of Government arrears remains a pending issue, which has resulted in the covenanted account receivable unsatisfied so far.

7.6 Implementing Agency:

The implementation performance of both implementing agencies, namely, EdL and MIH was ***highly satisfactory.*** They both worked closely with the task teams and consulted with Bank staff regularly regarding major issues. They both remained committed to the Project, despite initial problems with the macroeconomic situation and EdL's financial performance. They showed flexibility when it was deemed expedient to realign the off-grid component to transfer primary responsibility for this component from EdL to MIH, which eventually did facilitate orderly planning and expansion of the off-grid activities and contributed in no small measure to its success. The required audits of the Project and associated GEF Grant Project Financial Statements, Special Accounts, and statements of expenditures were given unqualified opinions by the auditor, PriceWaterhouseCooper. Their actions against delays and the compensation issue associated with the Grid Extension were effective and satisfactory. They planned and requested extension of the credit closing date on time and achieved beyond targets of project outputs and the PDO within the agreed period with significant cost savings.

7.7 Overall Borrower performance:

Overall, the performance of Borrower is rated as ***satisfactory***. EdL, MIH and Government showed commitment to the project and followed through to ensure its successful implementation and operation.

8. Lessons Learned

(a) Over-optimism regarding Government commitment to EdL's financial restructuring caused a delay in the Government proposing and implementing the FRP for EdL. For future projects, a more comprehensive risk assessment must analyze this aspect thoroughly;

(b) The elasticity of the connection rates to the up-front house-wiring costs is highly negative, and needed to be taken into account in the Project's design. A House Wiring Affordability Action Plan, which would reduce prices faced by customers through increasing competition and price regulation, and make provisions of term payments by the poorest 20% of customers for house wiring costs, has been introduced in SPRE 2;

(c) Charges by private firms to connect households to EdL grid after electrification villages need to be regulated;

(d) Cost savings are achieved with optimized grid-extension designs, good Project Management and efficient procurement;

(e) Investments in loss reduction are effective; enhanced measures, including inter alia use of state-of-the-art software and hardware and project evaluation technologies for reducing technical losses, have been introduced in SPRE 2;

(f) The use of SWER system needs to match better the demand growth, so that the system is well tailored to the demand need when commissioned. Rural electrification with SWER is a cost effective method of extending the electricity grid to rural areas;

(g) As regards implementation of the RAP, it is important that all stakeholders, including project affected people, be involved in the consultation process so that everyone including district and provincial authorities are fully informed about the RAP requirements;

(h) Problems which largely arose out of OPS's position as a government office, such as delay in centralized procurement, lack of effectiveness in management of non-performing PESCOs, could be overcome through contracting out the OPS' daily operational functions for the off-grid program. This lesson has been incorporated in the design of SPRE 2;

(i) The existing delivery model for off-grid electrification could be further improved with a streamlined middle-man arrangement to reduce associated cost, and introduction of a monitoring and evaluation system for quality of services, and incentives based on performance;

(j) Financially, the off-grid component has found that the private sector in Lao PDR is unwilling to make long-term capital investments, although it will contribute working capital;

(k) The strong bias towards the use of SHS technology should be countered by a more aggressive effort towards technology diversity in off-grid solutions;

(l) Some income generation activities linked with SHS electrification were found in remote villages, including family business for the supply of spare parts, sewing shops working in evening hours etc. More aggressive efforts, including inter alia demonstration projects, awareness campaigns, towards income generation would promote affordability thus enhance financial sustainability and social benefits of rural electrification projects.

9. Partner Comments

(a) Borrower/implementing agency:

The Borrower's comments were incorporated in the ICR. The Borrower accepted the findings and assessments of the ICR.

(b) Cofinanciers:

The GEF also rated the project as satisfactory. The Interim Review carried out in December 2003 under the GEF program concluded that ***"Overall, the project is assessed as Satisfactory…; the project is assessed as Satisfactory as regards its sustainability"***.

The Interim Review also pointed out that the off-grid component has performed well against the GEF evaluation criteria. It has developed a successful model for rural electrification in Lao PDR that has learnt from and built on the experience of previous projects and the early stages of the component. The model has been successful in building stakeholder participation and ownership. It has delivered a large expansion in electrification, exceeding target levels, and provides a strong basis for the future expansion of this program. It has also created a base of skilled and trained staff and institutions. Well-developed and effective procurement, monitoring, management and financial systems are in place, although there are some problems, largely arising out of OPS' position as a government office, in their practical implementation--this concern is addressed under the SPRE II project through contracting out the OPS' daily operational functions for the off-grid program.

(c) Other partners (NGOs/private sector):

Not applicable.

10. Additional Information

Additional information about outputs and outcomes of the GEF financed off-grid piloting program is provided in the attached reports:

1. Interim Evaluation of Off-Grid Renewable Energy Electrification Pilot Demonstration Project, December 30, 2003;
2. GEF MSP Project Completion Report, April 2005.

End Notes:

[1] The SHS in stock procured under the Project are sufficient for connecting 1,187 additional households. With assistance from a GEF grant (Project Development Facility B) under the proposed SPRE 2 project to cover continued installation of these SHSs following the Credit closing on December 31, 2004, the total number of households electrified under the Off-grid Rural Electrification Component would achieve 6,097 by the end of May 2005, out of which 5,888 households would be with SHSs.

Annex 1. Key Performance Indicators/Log Frame Matrix

Outcome / Impact Indicators:

Indicator/Matrix	Projected in last PSR[1]	Actual/Latest Estimate
Increase electrification ratio in project provinces increase from 11% in 1996 to 20% in 2003.	42% in January 2005	38.71% in December 2003; and 42% in April 2005
EdL performance vis-a-vis Project Implementation Plan (PIP) timetable.	PIP performed.	PIP performed.
EdL and Government compliance with technical and financial targets set in Performance Contract: 1. EdL System Loss: less than 16%. 2. Government Payment: Ensure that Government arrears to EdL do not exceed 75 days for 1998 and 60 days from 1999 onward. 3. Tariff Increase: Raise EdL's tariffs for sales within Lao PDR as follows: at Least 50% by January 1999 and quarterly indexation commencing in January 1, 1999.	1. EDL System Loss: 20.71% in 2004; 2. Government Payment: Government arrears about 19 months; 3. Tariff Increase: The GoL agreed to increase the Electricity Tariff, effective May 2002. A new Tariff increased at an average of implementation (excluding category 2 "Diplomatic-International Organization") over a period of 36 months (or up to FY05), however, these Tariff adjustments were suspended in June 2004.	1. EdL System Loss will remain about 20% in 2005. It is expected to be reduced to 14 - 12% with a comprehensive Loss Reduction Program to be implemented under the follow-up project SPRE 2; 2. Government Payment: Government arrears about 19 months in 2004. It is expected to be reduced to within the covenanted 60 days under the implementation of the SPRE 2 project. 3. Tariff Increase: The GoL and IDA are discussing the implementation of an Action Plan for Efficiency and Sustainability of Power Sector based on findings of the recently completed (December 2004) EdL Tariff Study by international consultants. Government agreed in principle in implementing the agreed Action Plan over the SPRE 2 project period, June 2005 to June 2011, with the first tariff increase in mid 2005. The Plan under discussion now aims at a gradual tariff increase of 1.6% per year, to achieve a 4% of rate of return on re-valued assets of EdL up to end 2011 and to minimize cross-subsidies among consumer categories.

Output Indicators:

Indicator/Matrix	Projected in last PSR[1]	Actual/Latest Estimate
No. of households electrified through grid extension: 50,000 households (changed to 51,770 at Credit effectiveness) in 3 provincial/district capitals and 520 rural villages.	51,805 households in 721 rural villages.	51,805 households in 721 rural villages.
No. of households electrified and off-grid systems installed: cumulative 4,600 households	4,974 households.	6,097 households by May 2005
Improved financial and operating performance of EdL: a. Account receivable turnover declines from 4.7 months in 1996 to 2 months in 2000 and thereafter; b. System Loss from 30% in 1996 to 20% in 2000; c. Return on net revalued fixed assets in operation of 8%.	a. 5 months by end 2004. b. 20.71% in 2004. c. 4.7% in 2004.	a. about 5 months now. b. about 20% in 2005. c. 4.8% projected for 2005.
Installation of: a. 52 km of 115kV lines; b. 1,200 km of MV (22kV) lines; c. 900 km of LV (0.38 kV) lines; d. 2x20 MVA 115/22 kV capacity; e. 34 MVA distribution capacity.	Installation achieved by end 2004 a. 53.43 km of 115-kV line b. 1,554 km of MV line; c. 1,566 km of LV line; d. 2x20, 2x30 and 2x16 MVA 115/22 kV capacity; e. 44.88 MVA 22/0.4 kV and 1.282 MVA 12.7/0.23 kV distribution capacity.	Installation achieved finally: a. 53.43 km of 115-kV line b. 1,554 km of MV line; c. 1,566 km of LV line; d. 2x20, 2x30 and 2x16 MVA 115/22 kV capacity; e. 44.88 MVA 22/0.4 kV and 1.282 MVA 12.7/0.23 kV distribution capacity
Implementation of: a. financial auditing procedures; b. cost accounting systems; c. appropriate billing and collection methods; and d. nontechnical loss reduction.	a. implemented on yearly basis; b. implemented with a computerized accounting system; c. a computerized billing and collection management system under roll-out to branch offices; d. System installed and operational, TA on training completed.	a. implementation on yearly basis; b. implementation with a computerized accounting system; c. a computerized billing and collection management system under rolled out to all branch offices by 2005; d. become EdL routine practice, with a much more aggressive action plan under the follow-up SPRE 2 project.

[1] End of project

Annex 2. Project Costs and Financing

Project Cost by Component (in US$ million equivalent)

Component	Appraisal Estimate US$ million	Actual/Latest Estimate US$ million	Percentage of Appraisal
A. Distribution Extension	27.30	31.22	114.35
B. Off-grid RE	2.00	2.21	110.45
C. Institutional Building	5.00	7.39	147.8
Total Baseline Cost	34.30	40.82	
Physical Contingencies	2.00		
Price Contingencies	3.00		
Total Project Costs	39.30	40.82	
Interest during construction		0.60	
Total Financing Required	39.30	41.42	

Project Costs by Procurement Arrangements (Appraisal Estimate) (US$ million equivalent)

Expenditure Category	Procurement Method[1] ICB	NCB	Other[2]	N.B.F.	Total Cost
1. Works	0.00	0.00	0.08	3.50	3.58
	(0.00)	(0.00)	(0.04)	(0.00)	(0.04)
2. Goods	28.76	0.00	1.10	0.07	29.93
	(28.72)	(0.00)	(1.07)	(0.00)	(29.79)
3. Services	0.00	0.00	4.77	0.71	5.48
	(0.00)	(0.00)	(4.42)	(0.00)	(4.42)
4. Land Acquisition and Project Management	0.00	0.00	0.00	0.31	0.31
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
5. Refinancing of PPF	0.00	0.00	0.00	0.00	0.00
	(0.04)	(0.00)	(0.39)	(0.00)	(0.43)
6. Miscellaneous	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Total	28.76	0.00	5.95	4.59	39.30
	(28.76)	(0.00)	(5.92)	(0.00)	(34.68)

Project Costs by Procurement Arrangements (Actual/Latest Estimate) (US$ million equivalent)

Expenditure Category	Procurement Method[1]				
	ICB	NCB	Other[2]	N.B.F.	Total Cost
1. Works	0.00 (0.00)	0.00 (0.00)	6.42 (0.04)	0.00 (0.00)	6.42 (0.04)
2. Goods	25.11 (25.11)	1.44 (1.30)	0.38 (0.38)	0.00 (0.00)	26.93 (26.79)
3. Services	7.90 (7.39)	0.15 (0.12)	0.00 (0.00)	0.00 (0.00)	8.05 (7.51)
4. Land Acquisition and Project Management	0.00 (0.00)	0.00 (0.00)	0.02 (0.00)	0.00 (0.00)	0.02 (0.00)
5. Refinancing of PPF	0.00 (0.04)	0.00 (0.00)	(0.00)	0.00 (0.00)	0.00 (0.04)
6. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Total	33.01 (32.54)	1.59 (1.42)	6.82 (0.42)	0.00 (0.00)	41.42 (34.38)

[1/] Figures in parenthesis are the amounts to be financed by the IDA Credit. All costs include contingencies.

[2/] Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, technical assistance services, and incremental operating costs related to (i) managing the project, and (ii) re-lending project funds to local government units.

Project Financing by Component (in US$ million equivalent)

Component	Appraisal Estimate			Actual/Latest Estimate			Percentage of Appraisal		
	Bank	Govt.	CoF.	Bank	Govt.	CoF.	Bank	Govt.	CoF.
A. Distribution Extension	28.54	3.88		25.60	6.30		89.7	162.4	
B. Off-grid Rural Electrification	1.00		0.74	1.39		0.74	139.0		100.0
C. Institutional Building	5.14			7.39			143.8		
Total	34.68	3.88	0.74	34.38	6.30	0.74	99.1	162.4	100.0

Annex 3. Economic Costs and Benefits

1 Distribution Extension Component

1.1 Summary of Benefits and Costs

Economic benefits: the sum of both consumer surplus and supplier surplus. The estimate of consumer surplus is based on conclusions of the Japan Policy and Human Resources Development Fund (PHRD) supported Social and Economic Survey of households in the project area – the seven southern provinces. The survey was completed in November 2004 for studying the economic and social benefits of the follow-up project SPRE 2. The net difference of the electricity sales revenue and cost of energy supply is taken as a proxy of supplier surplus. Other social and environmental benefits are not quantified under this study.

Economic cost: (a) project investment costs during the period 1999-2004; (b) incremental operation and maintenance costs due to the Project, as recorded for the period 1999-2004 and best estimated for future operational years; and (c) the long-run marginal cost as the best estimated cost of energy for future operational years.

Financial benefits: incremental sales revenue to EDL, i.e. average household consumption times the tariff level applicable to that level of consumption.

Financial costs: (a) project investment costs during the period 1999-2004; (b) incremental operation and maintenance costs due to the Project, as recorded for the period 1999-2004 and best estimated for future operational years; and (c) costs of energy (generation and HV transmission) as recorded by the Borrower for the period 1999-2004 and best estimated for future operational years.

1.2 Economic Rate of Return

1.2.1 Main Data and Assumptions

The economic rate of return was calculated on the basis of incremental economic cost and benefit streams associated with the Project, as compared to a "without project" case.

(a) Tariff. According to conclusions of the PHRD financed EdL Tariff Study [EDL Tariff Study Final Report, Electrowatt-Ekono Ltd. (Switzerland) and Fichtner Engineering Service (Germany), December 2004]for preparation of the SPRE 2, EdL was providing electricity services below cost recovery level and the residential consumers were heavily cross-subsidized by other categories of consumers. IDA recommended an Action Plan for Efficiency and Sustainability of the Power Sector (see Annex 7), which suggested a gradual tariff adjustment to achieve a rate of return on re-valued assets of 4% at the end of a six-year implementation period 2005-2011 and minimize cross subsidies among consumer categories. This results in a 1.6% increase in real terms of EdL's average tariff, which was 514 Kip/kWh or US$0.0483/kWh in 2004 (see Table 1).

Table 1 EdL Tariff and Recommended Adjustment under SPRE 2

Average EdL Tariff	2003	2004	2005	2006	2007	2008	2009	2010	2011	Ave. Annual increase, real
1) Residential		380	401	423	447	472	500	528	557	5.6%
2) Non-residential		649	640	632	624	616	608	600	592	-1.3%
EdL Total	290	**514**	522	531	540	548	557	567	575	1.6%
EdL Total (USC/kWh)		**4.83**	4.90	4.99	5.07	5.15	5.23	5.33	5.40	1.6%

Note: exchange rate: US$1 = Kip 10,646

(b) Energy Consumption and Load Growth. According to statistic data, monthly energy consumption by households electrified under the Project was increased by 58.9% from 39.1 kWh in 2003 to 62.2 kWh in 2004 (see Table 2). It was estimated at the appraisal that monthly consumption would increased to 98 kWh per household in 2007, after which electricity consumption was assumed to increase only as a functional of income levels. The estimation is reasonable at current country context. In the ICR analysis, the monthly household consumption is assumed to increase by about 16.35% from 62.2 kWh in 2004 to 98 kWh in 2007, after which by about 5% (see Table 3).

Table 2 Statistics on Energy Consumption of All Consumers Served by SPRE

No.	Description	2001	2002	2003	2003	2004	2004
1	Residential (MWh)	2316	4024	19457	63.2%	38638	53.5%
2	Commercial (MWh)	356	465	2407	7.8%	9312	12.9%
3	Public Service (MWh)	18	131	1829	5.9%	2937	4.1%
4	International office (MWh)	2	44	123	0.4%	260	0.4%
5	Agriculture (MWh)	84	594	2515	8.2%	10999	15.2%
6	Industries (MWh)	51	312	4474	14.5%	10121	14.0%
	Grand Total (MWh)	2826	5571	30805	100%	72267	100%
	No. of households (HH)			41444		51805	
	Consumption per a.n.(kWh/HH)			469.47		746	
	Consumption per month (kWh/HH)			39.1		62.2	

(c) Consumer Surplus. The economic analysis for the SPRE 2 indicated that in the southern provinces, which was covered by the Project Grid Extension Component, the consumers' willingness and ability to pay for grid electricity was very high. Based on field survey data, it was concluded that gross consumer surplus for grid electricity was estimated at 6,126,374.20 Kip or US$575.46 per household per year *[Project Appraisal Document, Second Southern Provincial Rural Electrification Project, May 9, 2005]*. The WTP is significantly higher than estimations at appraisal: US$0.7836/kWh at ICR vs. US$0.2252/kWh to US$0.1997/kWh as projected at appraisal for the period 1998 to 2003. In reality, tariffs are not differentiated according to each consumer's willingness to pay resulting in a significant consumer surplus. The WTP by rural households is assumed as the WTP for all consumers in this analysis.

Table 3 Rural Household Consumer Surplus and Willingness to Pay

	Monthly consump. per HH (kWh)	Annual consump. per HH (kWh)	Expenditure per HH per year ($)	Surplus per HH per year ($)	WTP by HH per year ($)	WTP by HH per kWh ($/kWh)
Survey in 2004	63.3	760	9.2	**575.46**	584.7	0.7697
Statistic data in 2004	62.2	746	9.0	575.46	584.4	**0.7836**
Projections in 2005	72.3	868		575.46	584.4	0.6735
Projections in 2006	84.1	1010		575.46	584.4	0.5788
Projections in 2007	**97.9**	**1175**		575.46	584.4	0.4975
Consumption increase (2005-2007)	16.35%	16.35%				
PAD-projection at appraisal (2007)	**98.0**	**1176**				
PAD-projection at appraisal (1998)						**0.2252**

Note:
(i) Residential tariffs were 113 Kip/kWh for 0-50 kWh monthly, and 189 Kip/kWh for 50-100 kWh monthly in 2004;
(ii) Exchange rate: US$1=Kip 10,646.
(iii) Surplus was US$546.75 per HH per a.n. in the PAD of SPRE 2. Difference is due to different exchange rates.

(d) Cost of Energy. Total supply cost is based on the average cost (capacity and energy cost) of electricity supply to all categories of consumers. The EdL Tariff Study calculates that incremental cost per kWh sold is 652 Kip or US$0.061 at year 2004 prices, excluding cost of MV and LV distributions. This is taken as an approximate energy cost in the economic analysis.

Table 4 Incremental cost of Electricity Supply to Consumers
Breakdown into Cost of Generation, Transmission and Distribution
(Kip per kWh sold; real at prices of 2004)

		Generation	Transmission (HV)	Distribution (MV & LV)	Total Incremental Cost of Supply
1	**LV Consumers**				
	Residential	496	261	246	1003
	Non-residential	408	148	140	696
	Total LV supply	458	212	200	870
	in %	52.6%	24.4%	23.0%	100%
2	**MV Consumers**	357	118	79	554
	in %	64.4%	21.3%	14.3%	100%
3	**Total EdL**	449	203	189	841
	in %	53.4%	24.1%	22.5%	100%
4	**Total EdL**				
	Generation and	**652**	Kip/kWh		
	HV Transmission	**0.061**	US$/kWh		

Note: exchange rate: US$1 = Kip 10,646

(e) Project Investment Cost. The recorded financial investment cost for MV and LV distribution grid is US$25.15 million for the Grid Extension Component, excluding interests during construction of US$0.6 million, about US$19.54 million (76%) in foreign cost and US$6.22 million (24%) in local cost. For economic analysis, no shadow pricing is used since (i) most of the investment cost (76%) for this component was foreign costs for goods and services; most of the local cost invested by EdL was for concrete poles and steel cross arms, for which cement and steel were also imported; and local labor cost consisted a very small portion of the local cost; and (ii) the exchange rate during the project construction period was set by the market.

(f) Operation and Maintenance Cost. Incremental operation and maintenance (O&M) cost was estimated as 2% of accumulated Project investment cost, 1% for operation and maintenance respectively.

(g) Tax. Import tax was free for IDA financed procurement.

(h) Number of Households Electrified. In total 51,805 households were electrified under the Grid Extension Component by end 2004 (PAD target: 50,000 households).

In summary, the basic data and assumptions are as follows:

Table 5 Distribution Extension: Basic Data and Assumptions for Economic Analysis

1)	Annual energy consumption growth (i) 2005-2007(monthly HH consumption in 2007 would reach PAD assumed 98 kWh) (ii) 2008 and future years	 16.4% 5%
2)	Project life after completion by end 2004	20 years
3)	EdL average tariff in 2003 (US$/MWh)	37.80
4)	EdL average tariff in 2004 (US$/MWh)	**48.28**
5)	Average annual EdL tariff increase in 2005-2011 (in real terms)	1.62%
6)	Annual EdL tariff increase after 2011	0%
7)	Long-run Marginal Cost of energy generation and HV transmission (2004 prices, US$/MWh)	61.24
8)	Operational & maintenance cost as percentage of accumulated investment cost	2%
9)	Other social and environmental benefit/cost (US$)	0
10)	Discount rate for calculation of NPV (interest rate, real)	7%

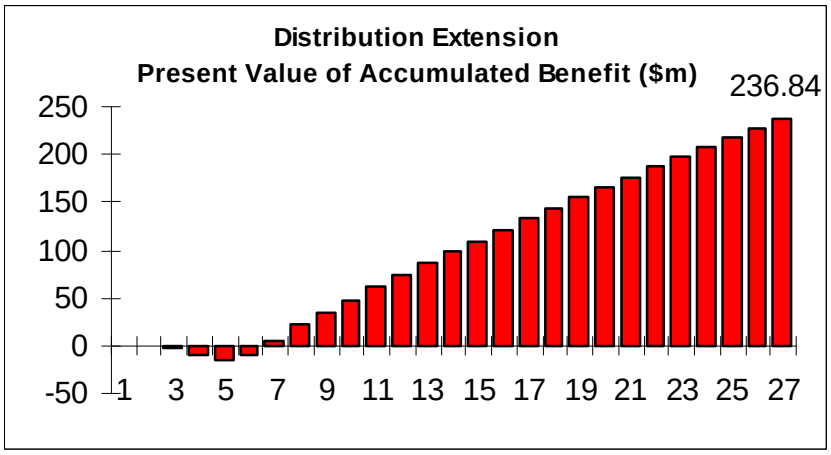
1.2.2 Conclusion

With adjustment of tariffs as recommended by IDA in its Action Plan, the EIRR for the Distribution Extension Component is estimated 60.5% and NPV US$237 million at a 7% discount rate. It is much higher than the estimation at appraisal (22.80%) mainly because the WTP concluded based on data of the field survey in 2004 is much higher than the estimations at appraisal. The EIRR is in line with the economic analysis for the follow-up SPRE 2 project, for which EIRR is estimated 79% for grid-extension activities in the same provinces.

Lao PDR: Southern Provinces Rural Electrification Project
Economic Internal Rate of Return
Distribution Extension Component
(in constant 2004 prices)

EIRR 60.5% **NPV** $237 million

Year	Energy sales (GWh)	WTP by HH ($kWh)	Cons. surplus ($ m)	Energy sales tariff ($/MWh)	Energy sales benefit ($ m)	Invest. cost exl.I DC ($ m)	Unit energy cost ($/MWh)	Energy cost ($ m)	O&M cost ($ m)	Total cost ($ m)	Supplier benefit ($ m)	Total net benefit ($ m)	PV of net benefit ($ m)	PV of accumul. benefit ($ m)
			a		**b**					**c**	**e=b-c**	**f=a+e**		
1998									0			0.00	0.00	0
1999						0.11			0.002	0.11	-0.11	-0.11	-0.09	-0.09
2000						4.21			0.09	4.30	-4.30	-4.30	-3.51	-3.60
2001						6.98			0.23	7.21	-7.21	-7.21	-5.50	-9.10
2002						7.36			0.37	7.73	-7.73	-7.73	-5.51	-14.62
2003	30.80	0.78	12.28	37.80	1.16	5.60	61.24	1.89	0.49	7.97	-6.81	5.47	3.65	-10.97
2004	72.27	**0.78**	28.41	**48.28**	3.49	0.89	**61.24**	4.43	**0.50**	5.82	-2.33	26.08	16.24	5.27
2005	84.08	**0.67**	28.07	49.03	4.12		61.24	5.15	0.50	5.65	-1.53	26.54	15.45	20.72
2006	97.83	**0.58**	27.67	49.88	4.88		61.24	5.99	0.50	6.49	-1.62	26.05	14.17	34.89
2007	113.83	**0.50**	27.19	50.72	5.77		61.24	6.97	0.50	7.47	-1.70	25.49	12.96	47.85
2008	119.52	0.50	28.50	51.47	6.15		61.24	7.32	0.50	7.82	-1.67	26.83	12.75	60.59
2009	125.49	0.50	29.87	52.32	6.57		61.24	7.69	0.50	8.19	-1.62	28.25	12.54	73.13
2010	131.77	0.50	31.30	53.26	7.02		61.24	8.07	0.50	8.57	-1.56	29.74	12.34	85.48
2011	138.36	0.50	32.81	54.01	7.47		61.24	8.47	0.50	8.98	-1.50	31.30	12.14	97.61
2012	145.27	0.50	34.45	54.01	7.85		61.24	8.90	0.50	9.40	-1.55	32.89	11.92	109.54
2013	152.54	0.50	36.17	54.01	8.24		61.24	9.34	0.50	9.85	-1.61	34.56	11.71	121.24
2014	160.16	0.50	37.98	54.01	8.65		61.24	9.81	0.50	10.31	-1.66	36.31	11.50	132.74
2015	168.17	0.50	39.87	54.01	9.08		61.24	10.30	0.50	10.80	-1.72	38.16	11.29	144.03
2016	176.58	0.50	41.87	54.01	9.54		61.24	10.81	0.50	11.32	-1.78	40.09	11.08	155.11
2017	185.41	0.50	43.96	54.01	10.01		61.24	11.36	0.50	11.86	-1.84	42.12	10.88	166.00
2018	194.68	0.50	46.16	54.01	10.51		61.24	11.92	0.50	12.43	-1.91	44.25	10.69	176.68
2019	204.41	0.50	48.47	54.01	11.04		61.24	12.52	0.50	13.02	-1.98	46.49	10.49	187.18
2020	214.63	0.50	50.89	54.01	11.59		61.24	13.15	0.50	13.65	-2.06	48.84	10.30	197.48
2021	225.37	0.50	53.44	54.01	12.17		61.24	13.80	0.50	14.31	-2.13	51.30	10.11	207.59
2022	236.63	0.50	56.11	54.01	12.78		61.24	14.49	0.50	15.00	-2.21	53.89	9.93	217.52
2023	248.47	0.50	58.91	54.01	13.42		61.24	15.22	0.50	15.72	-2.30	56.61	9.75	227.27
2024	260.89	0.50	61.86	54.01	14.09		61.24	15.98	0.50	16.48	-2.39	59.47	9.57	236.84
Total			856.22			25.15					-64.84	791.38	236.84	



1.3 Financial Rate of Return

The Project's financial viability deteriorated by the 1997 economic/financial crisis which led to a rapid devaluation of the Kip, but this deterioration was counteracted by the later implementation of the FRP of EdL. Under the FRP the tariff was increased at an average of 2.3% per month over a period of 26 months since May 2002. This tariff adjustment was suspended in June 2004 due to complaints of consumers with monthly consumption of about 100 kWh and above, and the PHRD financed EdL Tariff Study which was about to deliver recommendations at the time of suspension. Based on conclusion of the tariff study, IDA recommended an Action Plan for Efficiency and Sustainability of the Power Sector for discussion among EdL and other Government agencies. The Action Plan recommended a gradual EdL tariff increase by about 1.6% over a six-year period 2005-2011 to achieve over the period a 4% rate of return on re-valued assets and minimize cross-subsidies among consumer categories. Implementation of an agreed Action Plan will be a condition for Board presentation of the proposed SPRE 2 project, and will certainly improve the financial performance of the SPRE and EdL.

The financial rate of return was calculated on the basis of incremental financial cost and benefit streams associated with the project, as compared to a "without project" case.

1.3.1 Main Data and Assumptions

Basic data and assumptions used for the financial analysis are summarized below:

Table 6 Distribution Extension: Basic Data and Assumptions for Financial Analysis

1	Annual energy consumption growth (i) 2005-2007(monthly HH consumption in 2007 would reach PAD assumed 98 kWh) (ii) 2008 and future years	 16.35% 5.0%
2	Project life after completion by end 2004	20 years
3	EdL average tariff in 2003 (US$/MWh)	37.80
4	EdL average tariff in 2004 (US$/MWh)	**48.28**
5	Annual EdL tariff increase in real terms (2005-2011)	**1.62%**
6	Annual EdL tariff increase after 2011	0%
7	Cost of energy in 2004 (US$/MWh)	32.00
8	Operational & maintenance cost as percentage of accumulated investment cost	2%
9	Other social and environmental benefit/cost (US$)	0
10	Discount rate for calculation of NPV (interest rate, real)	7%

(a) Energy Consumption Growth. Same data and assumptions as for economic analysis.

(b) Energy Cost. Consumption by the SPRE electrified consumers is largely marginal to import of electricity from the Thailand grid. The import cost was averaged at US$0.0354 per kWh. Based on its data on electricity import, and generation and distribution, EdL calculated the average financial cost of energy for SPRE consumers at 0.032 US$/kWh in 2004. The average cost for import of energy is calculated based on the following:

Table 7 Average Cost for Import of Energy

Lines	Rate
(a) At 115 kV (Vientiane/Xeset) Peak (at 18.00 – 21.30) Off-peak (at 23.30 – 18.00)	(a) Time of the Day rate 0.0320 US$/kWh 0.0302 US$/kWh
(b) At 22 kV (Savannakhet /Khammoun) Peak (at 18.00 – 21.30) Off-peak (at 23.30 – 18.00)	(b) Time of Day rate 0.0320 US$/kWh 0.0302 US$/kWh
(c) At 35 kV (Houaphanh, Sepone/Savannakhet)	(c) Flat rate 0.060 US$/kWh
(d) At 22 kV (Bokeo and Kenthao/Xaiyabury) Peak (at 18.00 – 21.30) Off-peak (at 23.30 – 18.00)	(d) TOU rate 0.080 US$/kWh 0.0325 US$/kWh

(c) Tariff. Same tariff levels and recommended adjustment by IDA as for the above economic analysis are used for the financial analysis.

(d) Other Costs. Operation and maintenance costs, and project investment costs are assumed the same as for the economic analysis. The interests paid during project constructions is excluded from the calculation.

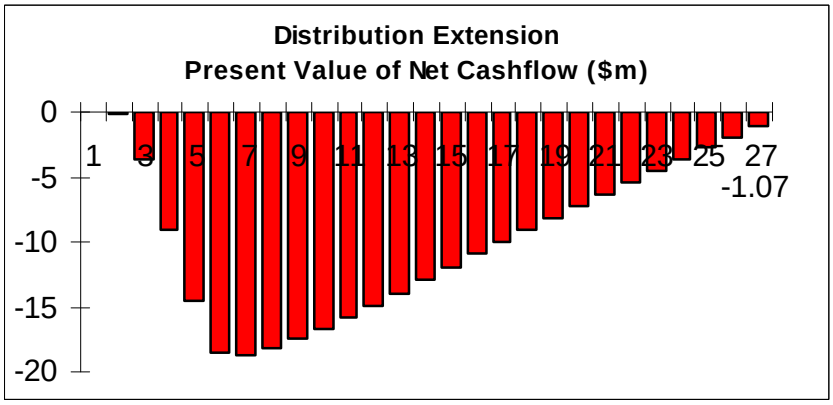
1.3.2 Conclusion

The FIRR of the Distribution Extension Component is estimated 6.5%, higher than the 3.01% estimated at appraisal. The NPV is estimated -$1.07 million.

Lao PDR: Southern Provinces Rural Electrification Project
Financial Internal Rate of Return
Distribution Extension Component
(in constant 2004 prices)

FIRR 6.5% NPV -$1.07 million

Year	Energy sales	Energy sales tariff	Energy sales revenue	Invest. cost excl. IDC	Unit energy cost	Energy cost	O&M cost	Total cost	Net cashflow	PV of net cashflow	PV of accumul. cashflow
	GWh	$/MWh	($ m)	($ m)	$/MWh	($ m)	($ m)	($ m)	($ m)	($ m)	($ m)
			a					b	c=a-b		
1998							0		0	0.00	0
1999				0.11			0.002	0.11	-0.11	-0.09	-0.09
2000				4.21			0.09	4.30	-4.30	-3.51	-3.60
2001				6.98			0.23	7.21	-7.21	-5.50	-9.10
2002				7.36		0.000	0.37	7.73	-7.73	-5.51	-14.62
2003	30.80	37.80	1.16	5.60	32.00	0.99	0.49	7.07	-5.91	-3.94	-18.56
2004	72.27	**48.28**	3.49	0.89	**32.00**	2.31	**0.50**	3.71	-0.22	-0.13	-18.69
2005	84.08	49.03	4.12		32.00	2.69	0.50	3.19	0.93	0.54	-18.15
2006	97.83	49.88	4.88		32.00	3.13	0.50	3.63	1.25	0.68	-17.47
2007	113.83	50.72	5.77		32.00	3.64	0.50	4.15	1.63	0.83	-16.64
2008	119.52	51.47	6.15		32.00	3.82	0.50	4.33	1.82	0.87	-15.78
2009	125.49	52.32	6.57		32.00	4.02	0.50	4.52	2.05	0.91	-14.87
2010	131.77	53.26	7.02		32.00	4.22	0.50	4.72	2.30	0.95	-13.91
2011	138.36	54.01	7.47		32.00	4.43	0.50	4.93	2.54	0.99	-12.93
2012	145.27	54.01	7.85		32.00	4.65	0.50	5.15	2.69	0.98	-11.95
2013	152.54	54.01	8.24		32.00	4.88	0.50	5.38	2.85	0.97	-10.99
2014	160.16	54.01	8.65		32.00	5.13	0.50	5.63	3.02	0.96	-10.03
2015	168.17	54.01	9.08		32.00	5.38	0.50	5.88	3.20	0.95	-9.08
2016	176.58	54.01	9.54		32.00	5.65	0.50	6.15	3.38	0.94	-8.15
2017	185.41	54.01	10.01		32.00	5.93	0.50	6.44	3.58	0.92	-7.22
2018	194.68	54.01	10.51		32.00	6.23	0.50	6.73	3.78	0.91	-6.31
2019	204.41	54.01	11.04		32.00	6.54	0.50	7.04	4.00	0.90	-5.41
2020	214.63	54.01	11.59		32.00	6.87	0.50	7.37	4.22	0.89	-4.52
2021	225.37	54.01	12.17		32.00	7.21	0.50	7.71	4.46	0.88	-3.64
2022	236.63	54.01	12.78		32.00	7.57	0.50	8.08	4.71	0.87	-2.77
2023	248.47	54.01	13.42		32.00	7.95	0.50	8.45	4.97	0.86	-1.92
2024	260.89	54.01	14.09		32.00	8.35	0.50	8.85	5.24	0.84	-1.07
Total			185.62	25.154				148.48	37.14	-1.07	



2. Off-Grid Rural Electrification Component

2.1 Summary of Benefits and Costs

Economic benefits: the sum of both consumer surplus and supplier surplus. The estimate of consumer surplus is also based on conclusions of the PHRD supported Social and Economic Survey. The supplier surplus is calculated according to the net benefit to MIH. Other social and environmental benefits are deemed minor and negligible.

Financial benefits: Incremental project re-flows paid by the consumers to MIH.

Economic and financial costs: (a) project investment costs during the period 1999-2004; (b) incremental operation and maintenance costs--payments to PESCOs and VEMs for services--calculated according to the agreements signed between the MIH and PESCOs.

2.2 Economic Rate of return

2.2.1 Main Data and Assumptions

Number of Households Electrified and Consumer Surplus. About 5,888 households were electrified with SHSs under the Off-grid Component and numbers of households electrified by VH and GS were negligible. According to conclusion of the PHRD Survey and the economic analysis conducted for the SPRE 2, the gross consumer surplus for SHS ranges from US$78 to US$110 per household per annum depending on sizes of the SHS. Based on mix of different sizes of the SHSs installed, the weighted average consumer surplus is US$90.95 per household per annum (see Table 8).

Table 8 Consumer Surplus of Off-grid Electrification

Year	10Wp	20Wp	30Wp	40Wp	50Wp	Total	Cumulative
1998							
1999	27	119	64			210	210
2000						0	210
2001						0	210
2002		301	52	10	93	456	666
2003	-27	945	271	180	861	2230	2896
2004		865	268	149	586	1868	4764
2005		398	233	142	351	1124	**5888**
Total	0	2628	888	481	1891	5888	
Percentage	0	44.63%	15.08%	8.17%	32.12%	100%	
Consumer surplus per a.n. ($/HH)		78.15	82.10	97.88	110.01		
Weighted average at prices of 2004 ($/HH)				**90.59**			

Note: exchange rate: US$1 = Kip 10,646

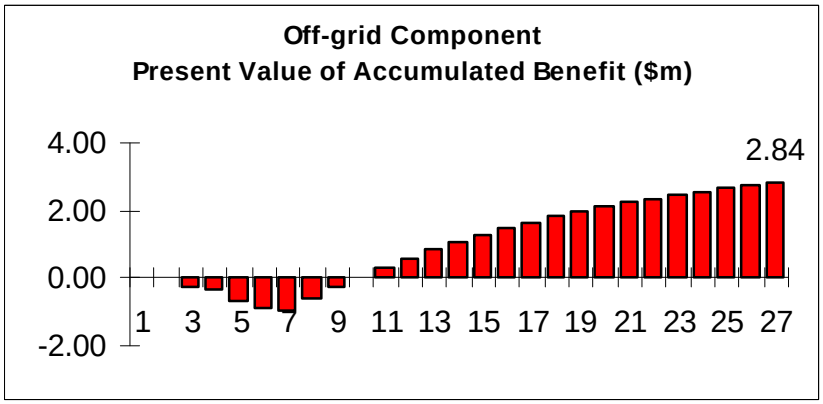
2.2.2 Conclusion

The EIRR of the Off-grid Rural electrification Component is estimated 26.0% and NPV US$2.84 million at a 7% discount rate.

Lao PDR: Southern Provinces Rural Electrification Project
Economic Internal Rate of Return
Off-grid Rural Electrification Component
(in constant 2004 prices)

EIRR 26.0% **NPV** $2.84 million

Year	Number of households	Weighted ave. consumer surplus ($)	Total consumer surplus ($)	Supplier benefit ($)	Total benefit ($)	Total cost ($)	Net benefit ($ m)	PV of net benefit ($ m)	PV of accumulative benefit ($ m)
	a	b	c=a*b	d	e=c+d	f	g=e-f		
1998						0	0.00	0.00	0.00
1999	210					0	0.00	0.00	0.00
2000	210					-350104	-0.35	-0.29	-0.29
2001	210	90.59	19024		19024	-90583	-0.07	-0.05	-0.34
2002	666	90.59	60332	14440	74772	-522576	-0.45	-0.32	-0.66
2003	2896	90.59	262343	78520	340863	-638203	-0.30	-0.20	-0.86
2004	4764	**90.59**	431562	101320	532881	-678640	-0.15	-0.09	-0.95
2005	5888	90.59	533383	123224	656607	-49536	0.61	0.35	-0.60
2006	5888	90.59	533383	106290	639673	-41156	0.60	0.33	-0.27
2007	5888	90.59	533383	106290	639673	-41156	0.60	0.30	0.03
2008	5888	90.59	533383	106290	639673	-41156	0.60	0.28	0.32
2009	5888	90.59	533383	105521	638904	-40772	0.60	0.27	0.58
2010	5888	90.59	533383	104442	637825	-40232	0.60	0.25	0.83
2011	5888	90.59	533383	104442	637825	-40232	0.60	0.23	1.06
2012	5888	90.59	533383	104442	637825	-40232	0.60	0.22	1.28
2013	5888	90.59	533383	94411	627794	-36888	0.59	0.20	1.48
2014	5888	90.59	533383	39361	572744	-16360	0.56	0.18	1.66
2015	5888	90.59	533383	6116	539499	-2587	0.54	0.16	1.82
2016	5888	90.59	533383		533383		0.53	0.15	1.96
2017	5888	90.59	533383		533383		0.53	0.14	2.10
2018	5888	90.59	533383		533383		0.53	0.13	2.23
2019	5888	90.59	533383		533383		0.53	0.12	2.35
2020	5888	90.59	533383		533383		0.53	0.11	2.46
2021	5888	90.59	533383		533383		0.53	0.11	2.57
2022	5888	90.59	533383		533383		0.53	0.10	2.67
2023	5888	90.59	533383		533383		0.53	0.09	2.76
2024	5888	90.59	533383		533383		0.53	0.09	2.84
Total					12636028	-2670414	9.97	2.84	



2.3 Financial Rate of Return

2.3.1 Main Data and Assumption

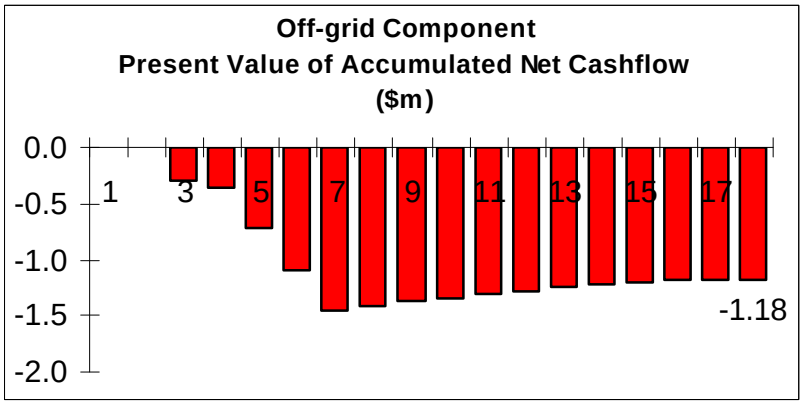
For the Project as a whole, the FIRR is estimated 6.04% and NPV -US$2.25 million. The financial analysis for the Off-grid Component only covers future 10 years. This is mainly because the hire-purchase contracts will be due by 10 years the latest, and no cash flow generated after the year 2015. All financial cost and incomes are calculated according to various contracts signed under this component.

The FIRR is estimated -15.9% and NPV -$1.05 million at a 7% discount rate. The Off-grid program was providing access to electricity to poor rural households in remote village with charges below cost recovery level, and was receiving Government subsidies.

Lao PDR: Southern Provinces Rural Electrification Project
Financial Internal Rate of Return
Off-grid Rural Electrification Component
(in constant 2004 prices)

FIRR -15.9% **NPV** -$1.18 million

	Revenue	Cost							Income			
Year	Project revenue	Pay.to VEM ESCO	Invest. cost	Operat. cost	Startup Support	Local Admin	Int'l advisor	Wkshop training	Total cost	Net cashflow	PV at 7%	PV of accumul. cashflow
	($)	($)	($)	($)	($)	($)	($)	($)	($)	($)	($m)	($m)
1998		0	0	0	0	0	0	0	0	0	0.00	0
1999		0	0	0	0	0	0	0	0	0	0.00	0.00
2000			-68140	0	0	-25248	-243095	-13621	-350104	-350104	-0.29	-0.29
2001			0	0	0	-42914	-47669	0	-90583	-90583	-0.07	-0.35
2002	14440	-3852	-343532	-1061	-5066	-54081	-102656	-12328	-522576	-508137	-0.36	-0.72
2003	78520	-34030	-437827	-14017	-12979	-63966	-71880	-3505	-638203	-559684	-0.37	-1.09
2004	101320	-36723	-445003	-21605	-14457	-95658	-52362	-12832	-678640	-577321	-0.36	-1.45
2005	123224	-46440	794	-3891					-49536	73688	0.04	-1.41
2006	106290	-41156							-41156	65134	0.04	-1.37
2007	106290	-41156							-41156	65134	0.03	-1.34
2008	106290	-41156							-41156	65134	0.03	-1.31
2009	105521	-40772							-40772	64749	0.03	-1.28
2010	104442	-40232							-40232	64210	0.03	-1.25
2011	104442	-40232							-40232	64210	0.02	-1.23
2012	104442	-40232							-40232	64210	0.02	-1.20
2013	94411	-36888							-36888	57523	0.02	-1.18
2014	39361	-16360							-16360	23001	0.01	-1.18
2015	6,116	-2,587							-2587	3529	0.00	-1.18
Total	1188992	-459229	-1293707	-40574	-32501	-281867	-517663	-42286	-2667827	-1478835	-1.18	



3. SPRE - Both Grid Extension and Off-grid Rural Electrification Components

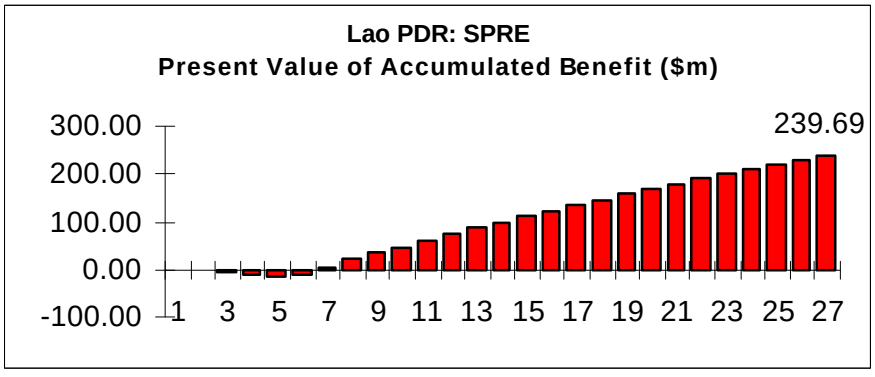
3.1 Economic Rate of Return

For the Project as a whole, the EIRR is estimated 59.1% and NPV US$239.7 million.

Lao PDR: Southern Provinces Rural Electrification Project
Economic Internal Rate of Return
(in constant 2004 prices)

EIRR 59.1% **NPV** $239.7 million

Year	On-grid total benefit	On-grid total cost ($ m)	On-grid net benefit ($ m)	Off-grid total benefit ($ m)	Off-grid total cost ($ m)	Off-grid net benefit ($ m)	Total Net Benefit ($ m)	PV of net benefit ($ m)	PV of accumulative benefit ($ m)
1998	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1999	0.00	0.11	-0.11	0.00	0.00	0.00	-0.11	-0.09	-0.09
2000	0.00	4.30	-4.30	0.00	-0.35	-0.35	-4.65	-3.80	-3.89
2001	0.00	7.21	-7.21	0.02	-0.09	-0.07	-7.28	-5.55	-9.44
2002	0.00	7.73	-7.73	0.07	-0.52	-0.45	-8.18	-5.83	-15.28
2003	13.45	7.97	5.47	0.34	-0.64	-0.30	5.18	3.45	-11.83
2004	31.90	5.82	26.08	0.53	-0.68	-0.15	25.93	16.15	4.32
2005	32.19	5.65	26.54	0.66	-0.05	0.61	27.15	15.80	20.12
2006	32.55	6.49	26.05	0.64	-0.04	0.60	26.65	14.50	34.62
2007	32.96	7.47	25.49	0.64	-0.04	0.60	26.09	13.26	47.88
2008	34.65	7.82	26.83	0.64	-0.04	0.60	27.43	13.03	60.91
2009	36.43	8.19	28.25	0.64	-0.04	0.60	28.84	12.81	73.72
2010	38.31	8.57	29.74	0.64	-0.04	0.60	30.34	12.59	86.31
2011	40.28	8.98	31.30	0.64	-0.04	0.60	31.90	12.37	98.68
2012	42.29	9.40	32.89	0.64	-0.04	0.60	33.49	12.14	110.82
2013	44.41	9.85	34.56	0.63	-0.04	0.59	35.15	11.91	122.72
2014	46.63	10.31	36.31	0.57	-0.02	0.56	36.87	11.67	134.40
2015	48.96	10.80	38.16	0.54	0.00	0.54	38.69	11.45	145.84
2016	51.41	11.32	40.09	0.53	0.00	0.53	40.62	11.23	157.08
2017	53.98	11.86	42.12	0.53	0.00	0.53	42.65	11.02	168.10
2018	56.68	12.43	44.25	0.53	0.00	0.53	44.78	10.82	178.91
2019	59.51	13.02	46.49	0.53	0.00	0.53	47.02	10.61	189.53
2020	62.48	13.65	48.84	0.53	0.00	0.53	49.37	10.41	199.94
2021	65.61	14.31	51.30	0.53	0.00	0.53	51.84	10.22	210.16
2022	68.89	15.00	53.89	0.53	0.00	0.53	54.43	10.03	220.19
2023	72.33	15.72	56.61	0.53	0.00	0.53	57.15	9.84	230.03
2024	75.95	16.48	59.47	0.53	0.00	0.53	60.00	9.66	239.69
Total			791.38			9.97	801.35	239.69	



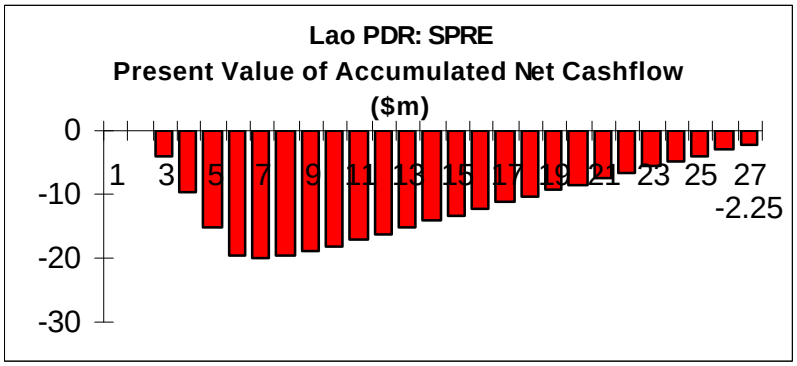
3.2 Financial Rate of Return

For the Project as a whole, the FIRR is estimated 6.04% and NPV -US$2.25 million.

Lao PDR: Southern Provinces Rural Electrification Project
Financial Internal Rate of Return
(in constant 2004 prices)

FIRR 6.04% **NPV** -$2.25 million

	Grid-extension			Off-grid			SPRE		
Year	Energy sales revenue	Total cost	Net cashflow	Project revenue	Total cost	Net cash flow	Net cashflow	PV of net cashflow	PV of accumulated. cashflow
	($ m)	($ m)	($ m)	($ m)	($ m)	($ m)	($ m)	($ m)	($ m)
1998								0.00	0
1999		0.11	-0.11		0.000	0.000	-0.11	-0.09	-0.09
2000		4.30	-4.30		-0.350	-0.350	-4.65	-3.80	-3.89
2001		7.21	-7.21		-0.091	-0.091	-7.30	-5.57	-9.46
2002		7.73	-7.73	0.014	-0.523	-0.508	-8.24	-5.88	-15.34
2003	1.16	7.07	-5.91	0.079	-0.638	-0.560	-6.47	-4.31	-19.65
2004	3.49	3.71	-0.22	0.101	-0.679	-0.577	-0.79	-0.49	-20.14
2005	4.12	3.19	0.93	0.123	-0.050	0.074	1.00	0.58	-19.56
2006	4.88	3.63	1.25	0.106	-0.041	0.065	1.31	0.71	-18.84
2007	5.77	4.15	1.63	0.106	-0.041	0.065	1.69	0.86	-17.98
2008	6.15	4.33	1.82	0.106	-0.041	0.065	1.89	0.90	-17.08
2009	6.57	4.52	2.05	0.106	-0.041	0.065	2.11	0.94	-16.15
2010	7.02	4.72	2.30	0.104	-0.040	0.064	2.36	0.98	-15.17
2011	7.47	4.93	2.54	0.104	-0.040	0.064	2.61	1.01	-14.16
2012	7.85	5.15	2.69	0.104	-0.040	0.064	2.76	1.00	-13.16
2013	8.24	5.38	2.85	0.094	-0.037	0.058	2.91	0.99	-12.17
2014	8.65	5.63	3.02	0.039	-0.016	0.023	3.05	0.96	-11.21
2015	9.08	5.88	3.20	0.006	-0.003	0.004	3.20	0.95	-10.26
2016	9.54	6.15	3.38				3.38	0.94	-9.32
2017	10.01	6.44	3.58				3.58	0.92	-8.40
2018	10.51	6.73	3.78				3.78	0.91	-7.48
2019	11.04	7.04	4.00				4.00	0.90	-6.58
2020	11.59	7.37	4.22				4.22	0.89	-5.69
2021	12.17	7.71	4.46				4.46	0.88	-4.81
2022	12.78	8.08	4.71				4.71	0.87	-3.95
2023	13.42	8.45	4.97				4.97	0.86	-3.09
2024	14.09	8.85	5.24				5.24	0.84	-2.25
Total			37.14			-1.48	35.66	-2.25	



Annex 4. Bank Inputs

(a) Missions:

Stage of Project Cycle	No. of Persons and Specialty (e.g. 2 Economists, 1 FMS, etc.)		Performance Rating	
Month/Year	Count	Specialty	Implementation Progress	Development Objective
Identification/Preparation				
2/25/97	*4*	MISSION LEADER (1); SR POWER ENGINEER (1); FINANCIAL ANALYST(1); RENEWABLE ENERGY SPEC (1)		
Appraisal/Negotiation				
12/16/97	*4*	MISSION LEADER (1); FINANCIAL ANALYST(1); ENERGY ECONOMIST (1); ENVIRONMENTAL SPEC (1)		
02/11/98	*1*	TASK TEAM LEADER		
Supervision				
10/13/98	*3*	ENERGY ECONOMIST (1); FINANCIAL ANALYST (1); RENEWABLE ENERGY SPECIALIST (1)	S	S
02/12/99	*2*	ENERGY ECONOMIST (1); FINANCIAL ANALYST (1)	S	S
05/24/99	*2*	TASK MANAGER (1); ENGINEER (1)	S	U
11/11/99	*3*	TASK MANAGER (1); FINANCIAL ANALYST (1); POWER ENGINEER (1)	S	U
03/17/00	*4*	TASK TEAM LEADER (1); RESETTLEMENT SPECIALIST (1); RENEWABLE EGY.SPECLST. FINANCIAL ANALYST (1)	S	U
09/28/00	*2*	TASK TEAM LEADER (1); FINANCIAL ANALYST (1)	S	U
02/02/01	*3*	TASK TEAM LEADER (1); RENEWABLE ENERGY SPEC. (1); RURAL ENERGY SPEC. (1)	S	U
04/11/02	*5*	TASK TEAM LEADER (1); HYDROPOWER ENGINEER (1); POWER ENGINEER (1); FINANCIAL ANALYST (1); RENEWABLE ENERGY SPEC. (1)	S	S
02/14/03	*6*	TASK TEAM LEADER (1); SR.OPERATIONS OFFICER	S	S

			(1); FINANCIAL ANALYST (2); ENVIRONMENT SPECIALIST (1); RESETTLEMENT/LAND ACQ. (1)		
	10/03/03	*4*	SR. POWER ENGINEER (1); FINANCIAL SPECIALIST (1); RESETTLEMENT SPECIALIST (1); ALTERNATIVE ENERGY SPEC.	S	S
	05/11/04	*7*	TASK TEAM LEADER (1); POWER ENGINEER (1); ALTERNATIVE ENERGY SPEC. (1); RESETTLEMENT SPEC. (1); ENERGY SPEC. (1); FINANCIAL ANALYST (1); PROCUREMENT ASSISTANT (1)	S	S
	10/04/04	*3*	TASK TEAM LEADER (1); PROCUREMENT SPEC. (1); ENERGY SPECIALIST (1)	S	S
ICR	01/24/05	*3*	TASK TEAM LEADER (1); PROCUREMENT SPEC. (1); ENERGY SPECIALIST (1)	S	S

(b) Staff:

Stage of Project Cycle	Actual/Latest Estimate	
	No. Staff weeks	US$ ('000)
Identification/Preparation	42.5	250.0
Appraisal/Negotiation	14.7	86.3
Supervision	82.9	487.9
ICR	6.3	32.5
Total	146.4	856.6

*Regional direct to full costs mark-up is 25% for prior fiscal years up to 1999.

Annex 5. Ratings for Achievement of Objectives/Outputs of Components

(H=High, SU=Substantial, M=Modest, N=Negligible, NA=Not Applicable)

	Rating				
☐ *Macro policies*	○ *H*	○ *SU*	○ *M*	○ *N*	● *NA*
☐ *Sector Policies*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☐ *Physical*	● *H*	○ *SU*	○ *M*	○ *N*	○ *NA*
☐ *Financial*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☐ *Institutional Development*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☐ *Environmental*	○ *H*	○ *SU*	● *M*	○ *N*	○ *NA*
Social					
☐ *Poverty Reduction*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☐ *Gender*	○ *H*	○ *SU*	○ *M*	○ *N*	● *NA*
☐ *Other (Please specify)*	○ *H*	○ *SU*	○ *M*	○ *N*	● *NA*
☐ *Private sector development*	○ *H*	○ *SU*	● *M*	○ *N*	○ *NA*
☐ *Public sector management*	○ *H*	● *SU*	○ *M*	○ *N*	○ *NA*
☐ *Other (Please specify)*	○ *H*	○ *SU*	○ *M*	○ *N*	● *NA*

Annex 6. Ratings of Bank and Borrower Performance

(HS=Highly Satisfactory, S=Satisfactory, U=Unsatisfactory, HU=Highly Unsatisfactory)

6.1 Bank performance	*Rating*			
☐ *Lending*	○ *HS*	● *S*	○ *U*	○ *HU*
☐ *Supervision*	● *HS*	○ *S*	○ *U*	○ *HU*
☐ *Overall*	○ *HS*	● *S*	○ *U*	○ *HU*

6.2 Borrower performance	*Rating*			
☐ *Preparation*	○ *HS*	● *S*	○ *U*	○ *HU*
☐ *Government implementation performance*	○ *HS*	● *S*	○ *U*	○ *HU*
☐ *Implementation agency performance*	● *HS*	○ *S*	○ *U*	○ *HU*
☐ *Overall*	○ *HS*	● *S*	○ *U*	○ *HU*

Annex 7. List of Supporting Documents

1. Project Appraisal Document for SPRE, February 24, 1998.
2. Country Assistance Strategy for Lao PDR, March 30, 1999, World Bank.
3. Loss Reduction Program – Recommendation of Action to Reduce Distribution Losses, August 2001, Meritec.
4. Lao Power Sector Policy – Strategy for Implementation of Proposed Reforms, Draft of 17 November 2002.
5. Contract-Plan for EdL for the Period 2001-2003
6. Initial Environmental Examination and Social Assessment for SPRE, December 2002, Lahmeyer International.
7. Information Technology Strategic Plan, March 2000, ESBI International.
8. EdL Annual Reports
9. Quarterly Progress Reports for SPRE (on-grid), Meritec.
10. Quarterly Progress Reports for SPRE (off-grid), MIH.
11. Power System Development Plans for Lao PDR, August 2004, Maunsell, Lahmeyer International.
12. Village Energy and Electricity – Best Practice in Lao PDR, February 2004, Off-Grid Promotion and Support Office, MIH
13. Borrower's Completion Report, January 2005
14. Evaluation of Rural Electrification Socio-Economic Survey – Establishment of Database for Rural Electrification Planning in Lao PDR, November 2004, Systems-Europe
15. Study on Economically Justified Levels of Support for Off-Grid Electricity Supply, W. Teplitz-Sembitzky, EASEG
16. Social Impacts and Management for SPRE I (SPRE 1/1 and SPRE 1/14), February 5, 2005, EdL
17. EdL Tariff Study, Electrowatt-Ekono Ltd., Switzerland, Fichtner, Germany, December 2004
18. Action Plan for Efficiency and Sustainability of the Power Sector, IDA, April 22, 2005

Additional Annex 8. Summary of Borrower Completion Report for the Project

BORROWER'S PROJECT COMPLETION REPORT
LAO PEOPLE'S DEMOCRATIC REPUBLIC
SOUTHERN PROVINCES RURAL ELECTRIFICATION PROJECT (SPRE 1)
(CREDIT Nº 30470-LA)

Executive Summary

This is the Borrowers Completion Report (BCR) for the Southern Provinces Rural Electrification Project (SPRE 1) in the Lao People's Democratic Republic (PDR), for which Credit Nº 30470-LA in the amount of SDR 25.7 million was approved on 29 April 1998 and made effective on 11 August 1998. The credit was closed on 31 December 2004, six months after the original closing date. Final disbursements took place on 31 December 2004 at which time a balance of USD 195,063.74 was cancelled. Included as a component of the funding was grant assistance from the resources of the Global Environment Facility ("GEF") Trust Fund.

The Project as defined in the World Bank's PAD dated February 24, 1998 included three parts, namely:

Part A: "Distribution Extension" whose local costs were borne by Electricité du Laos as Implementing Agency.

Part B: "Off-Grid Rural Electrification" that was financed partly by GEF and by the Ministry of Industry and Handicrafts as Implementing Agency.

Part C "Institution Building" whose local costs were borne by the Ministry of Industry and Handicrafts as Implementing Agency."

Part A: The Distribution Extension Component achieved its objectives with an implementation record exceeding the key performance targets set at appraisal. This component has increased service in the seven provinces of Bolikhamxay, Khammouane, Savannakhet, Saravane, Champassak, Attapeu, and Sekong, and has electrified 721 villages and 51,805 households, exceeding 50,000 household target set in the Project Appraisal Document (PAD).

The key performance indicators targets defined in the PAD were equaled or exceeded. The Project commissioned (i) the extension of the existing 115 kV Pakbo substation; (ii) a 50.798 km 115 kV transmission line between Pakbo and Kengkok substations and a short 2.632 km 115 kV line between the 115 kV Mekong crossing and the Thakhek substation (from project cost savings); (iii) 2x20 MVA 115/22kV substation at Kengkok and from project cost savings the upgrading of the 115 kV substation at Paksan from a 1x5MVA 115/22 kV transformer bank to a 2x16MVA transformer bank, and a new 2x30 MVA 115/22 kV substation at Thakhek; (iv) 1,554 km of 22 kV lines; (v) 114 Km of Single Wire Earth Return (SWER); (vi) 1,566 km of 0.4kV low-voltage lines to households; and (vii) 44.88 MVA 22/0.4 kV substation transformers; (viii)1.282 MVA 12.7/0.23 kV substation transformer and (ix) installation of 51,805 consumer meters.

The key economic/financial ratios for the project were as follows,

	Economic Analysis	Financial Analysis
	Appraisal	Latest estimatesAppraisalLatest estimates
Benefits/Costs	EIRR=22.4%	EIRR= 23.4% FIRR=3.6% FIRR= 11.3%

Part B: The Off-Grid Component achieved its objectives with an implementation record exceeding the key performance target set at appraisal. The number of household connections made in January 2005 was 4,910 exceeding the target figure of 4,600. The Project has in hand stock procured under SPRE 1, sufficient to connect 1,187 additional houses, all of which are expected to be connected by April 2005, with assistance form a GEF grant (PDFB) for the proposed SPRE 2 project to cover for continuing service following the Credit closing at the end of December 2004. By the end of April 2005 the total volume of connection achieved through SPRE 1 procurement will therefore be 5,874

Part C: The Institution Building Component achieved it objectives. Under this component consultant services and equipment were provided to EdL to further improved efficiency by building its project management capability, improving its system planning and technical design capacity, and enhancing its commercial focus, and to MIH to improve its capacities in hydro power development planning, and the implementation of the electricity law.

Technical assistance to EdL for project management and supervision was satisfactory and allowed EdL to build in-house capabilities which has significantly reduced EdL's dependency on TA for project design, preparation and procurement. Financial management capacity building was also considered satisfactory after overcoming difficulties of non-performing consultants in early stage. As the results, the Financial Recovery Plan was successfully implemented, and a computerized Billing system and an Accounting and Financial Management system were set up, which allowed integration of financial management of EdL's Branch Offices and Headquarters.

Technical assistance to MIH included project implementation support to the Off-grid Promotion Secretariat. The TA has enabled the newly established Secretariat to perform satisfactorily and with installation rates exceeding initial targets. A second component of TA included investment and system planning. These activities are considered highly satisfactory as the recommendations and system tools have been widely adopted in DOE. The failure of Lao PDR to attract private sector interest in the power sector can mainly be ascribed to wider macroeconomic conditions and the general shortcomings of the investment climate in Lao PDR.

The efficiency in project implementation resulted in achievements of expanded physical outputs and considerable cost savings, which allowed additional financial resources to support the various TA activities to advance the preparations of the Nam Theun 2 to the final stages with expected financial closure in 2005.

Note: This BCR was prepared by Gnanhkham Douangsavanh, Manager, Project Office, Development Department of Electricité du Laos (EdL) with input from the client and data prepared by Bounkeua Xayasone, Project Engineer. The BCR was reviewed by Gnanhkham Douangsavanh, and cleared by Hatsady Sysoulath, Deputy General Manger (EdL Development Department).

Summary on Resettlement and Environment Management

Project Scope. The Project scope which impacted resettlement and environmental issues consisted essentially of these components:

SPRE 1/1 Contract	• 52 km 115 kV Transmission line from Pakbo to Kengkok • Extension of existing Substation in Pakbo in order to accommodate the new Substation in Kengkok • New Substation in Kengkok
SPRE 1/14 Contract	• 2.8 km 115 kV Transmission line in Thakhek • New Substation in Thakhek

For the Pakbo-Kengkok transmission line the original RAP identified 242 potential affected persons with a compensation budget of about US$1,812. After a detailed survey and census inventory before beginning of construction begin, only 97 households along the transmission line were identified, in which 4 houses have been relocated away from right of way by several meters.

In summary, a total of 54,833,842 Kip was spent by EdL for land acquisition and compensation to affected people in those two projects in Savannakhet and Khammouane Provinces.

Compensation principles

For the SPRE, the following principles were followed in land acquisitions and compensation of losses of properties.

- Project Affected Persons will be provided compensation for their lost assets affected in full or in part, at full replacement cost.
- In case of compensation for the affected type of land (agriculture, residential or commercial), it will be through provision of "land to land" arrangement of equivalent size or productivity and at the location acceptable to the Affected Persons. If the land is not available, cash compensation at full replacement cost is applied.
- If the house or structure is partially affected by the project but the remaining structure is rendered unviable or area less than the minimum house size, the Affected Persons will be entitled to full compensation.
- In the case that the Affected Persons suffer a partial loss of a structure and the remaining structure is still viable, assistance shall be given in the form of cash or material to restore the structure.
- In case of temporary impact caused by the project, there will be full compensation of the net loss of income. If the temporary use of the assets is less than 6 months there will be compensation of 10% of the replacement cost of the affected assets. But if the temporary impacts are more than 6 months, compensation should be negotiated with the owner of the assets.
- In case of Persons leasing the house or structure, compensation equivalent of 3 months rental allowance shall be granted. The Affected Persons will also be assisted in finding the alternatives for rental accommodation.
- For Affected Persons without any legal title or ownership right to affected land or assets they occupy, the Affected Persons should be compensated and be provided with assistance to ensure they are not worse-off due to project.
- All previous claims and unresolved issues relating to tenure status and ownership of land and other assets on each sub-project or components will be resolved before land acquisition.

Project Implementation Office

At Savannakhet, Mr. Gnanhkham Douangsavanh carried out the role of Site Manager of the Project for Pakbo and Kengkok substation and transmission line. Mr. Taykeo Sengchanh was his assistant and was responsible for Environmental and Resettlement issues.

At Khammouane, Mr. Somphouvieng Norindr was the Site Manager and Mr. Khamkhien Thammavong was his assistant for Environment and Resettlement issues.

Project Consultation and Awareness

Consultation with local authorities and villages during census inventory was carried out by EdL, as this the most important undertaking which is key for the successful implementation of resettlement. EdL also made public announcements that were published in the newspaper which provided a clear project scope to the public. On 24 October 2002, EdL organized a consultation workshop with the representative villagers along the line, district and provincial authorities in Savannakhet Province. Meetings at the village level with the village chief and affected peoples were also held by the Coordinating Committee with the village chief and affected people. At the meetings, villagers were encouraged to raise nay their concerns they might have.

Evaluation of RAP Implementation

In general the affected people had been satisfied with compensation and the work of the Coordination Committee, they were happy with the benefits that had been derived from electricity which is making their life better than before. In addition electricity is more stable than before.

From the survey, no relocated households reduced their living level or got poorer because of land requisition or relocation; after land acquisition, the living quality of the resettled person was better than before. Land acquisition was basically in line with the policy goal of resettlement.

Conclusion and recommendation for the next projects

- Good preparation during design and planning;
- Avoid project construction delays to minimize the impact on the schedule for compensation and relocation of affected people;
- Misunderstandings by the Coordination Committee of commitments made to the WB that led to paying compensation to affected peoples not in line with official RAP;
- First time for EdL Branch participation in Environmental and Resettlement Management, and limited training;
- Formulation of Environmental and Social Management regulations and guidelines need to be fully developed in Lao PDR;
- Support for the Environmental Office of EdL.

Additional Annex 9. Monitoring Performance Indicators for Future Operation

Indicator	Original performance 1996	Target 2004	Actual Performance 2004	Future performance
Debt Service Coverage	1.2x	1.5x	1.2x	>1.5x
Self-financing ratio	20%	30%	31%	>30%
Accounts receivable turnover		< 2 months	5 months	< 2 months
EdL O&M Budget (Kip) and percentage of total Budget		515,381,427 11%	629,505,994 9%	871,356,992 6% (2005)
EdL Staffing (total number)	1997	2998	2979	3181
Distribution Losses (include technical and estimate of NT losses)	23%	16.1%	19.0 %	15%
Number of grid and off-grid connected households	134,392 268	364,263 4910	411,762 4910	429,386 6097 (May 2005)

Additional Annex 10. Additional Details on the Project Description of EdL Components

For the seven southern Provinces, the Project included:

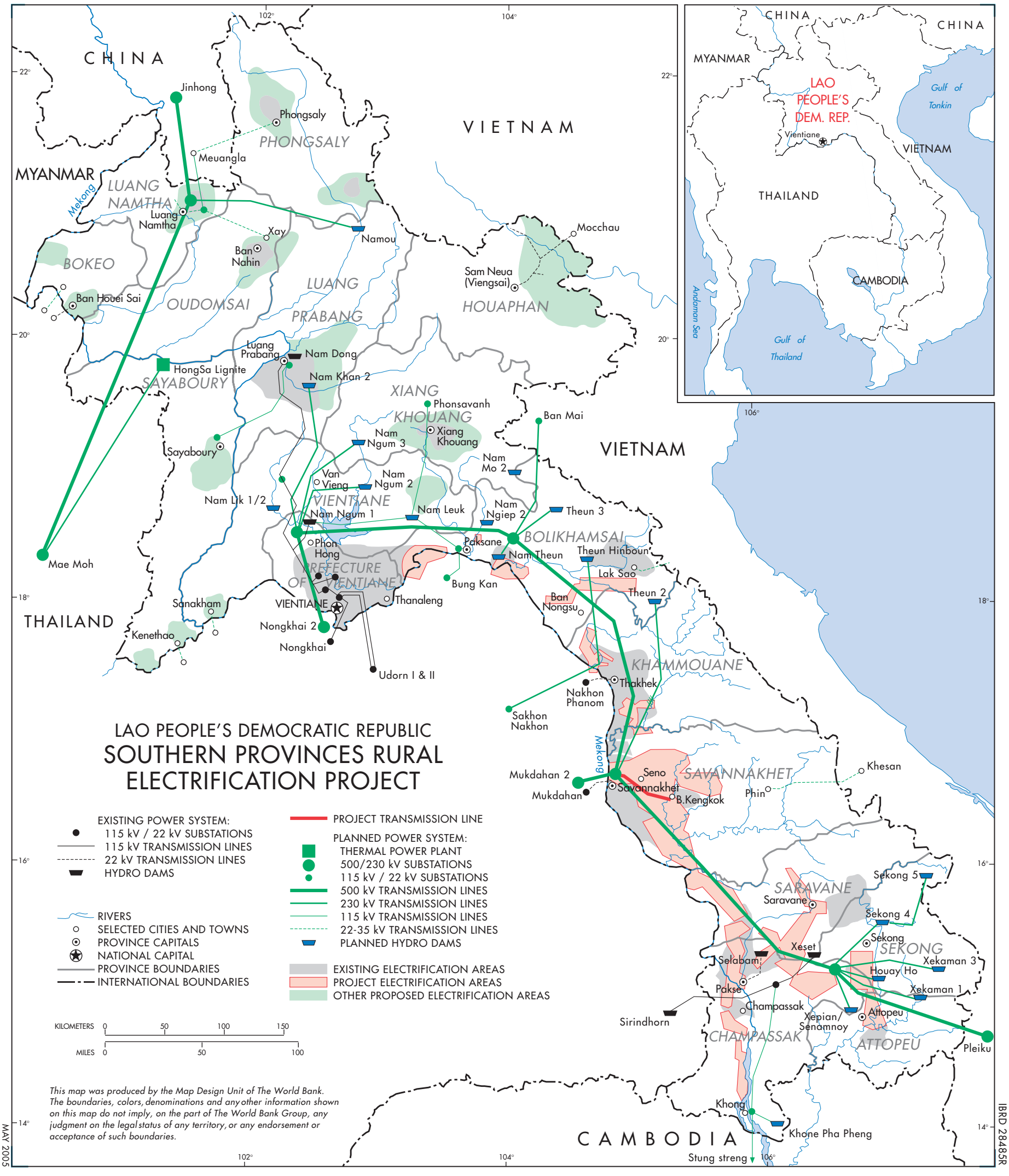
Bolikhamxay Province. Electrification of approximately 6,000 households in 5 areas of about 200- 3000 households each. Construction of a distribution grid in the area around the new Theun Hinboun hydroelectric station (Commissioned in 3/98) along road 8. Extension of the Distribution network to the East and West of the Pakxan substation along road 13 and to the North in Borikhan.

Khammouane Province. Electrification of approximately 7,000 households through extension of the distribution grid from Thakhek substation to 16 small areas of about 70-1,350 households each. Distribution extension will be primarily through construction of branch lines using single - phase and SWER technology.

Savannakhet Province Electrification of approximately 13,000 households in 5 areas of about 460 – 3,700 households each through the extension of the Savannakhet distribution grid. Construction of at a new 115 kV transmission line from Pakbo substation near Savannakhet eastward to Kengkok, and a new 115/22 kV low-cost design substation in Champhone to increase system capacity and the quality of supply. The capacity of existing 22 kV lines is insufficient for further load development in the rural area of Savannakhet.

Champassack Province Electrification of approximately 14,000 households in 9 areas of about 450 – 4,550 households each. Extension of the distribution grid from Pakse southward along the Mekong river to the Khone area, where the tourist development is expected, and eastward to the area around Pakxong to the Boleven Plateau, where the new village has been established for the resettlement of people displaced by the construction of the Huayho dam.

Saravane, Sekong and Attapeu Province Electrification of approximately 11,400 households in 70 villages in 6 areas of about 800-3,500 households each. Extension of the distribution grid to about 1,900 households around Saravan and northward along road 13 from Selabam hydro power plant. Electrification of about 500 households in the provincial capital Sekong and nearby village through construction of single phase distribution grid supplied from the future Huay Ho hydro power station. Electrification of about 500 households in the provincial capital Attapeu and district capital Xaisetha through construction of distribution grids, also to be supplied from the new Huay Ho power station.



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