

Document of
The World Bank

Report No: ICR2515

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IDA-H2180 TF-96084 TF-56700)

ON AN

IDA GRANT
IN THE AMOUNT OF SDR 7.0 MILLION
(US\$ 10 MILLION EQUIVALENT)

AND A

GLOBAL ENVIRONMENT FACILITY GRANT
IN THE AMOUNT OF US\$ 3.75 MILLION

AND AN

AUSAID GRANT CO-FINANCING
IN THE AMOUNT OF US\$ 9.42 MILLION

TO THE

LAO PEOPLE'S DEMOCRATIC REPUBLIC

FOR A

RURAL ELECTRIFICATION PHASE I PROJECT

OF THE

RURAL ELECTRIFICATION (APL) PROGRAM

January 30, 2013

Southeast Asia Sustainable Development Department
Southeast Asia Country Management Unit
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective November 3, 2012)

Currency Unit = Lao Kip (LAK)

US\$ 1.00 = LAK 7993.30

AUD 1.00 = LAK 8309.83

US\$ 1.00 = AUD 0.9668

FISCAL YEAR

EdL: January 1 – December 31

MEM: October 1 – September 30

ABBREVIATIONS AND ACRONYMS

APL	Adaptable Program Loan	MIH	Ministry of Industry and Handicraft
ASTAE	Asia Sustainable & Alternative Energy Program	MMPS	Material Management and Procurement System
AusAID	Australian Agency for International Development	MOF	Ministry of Finance
BO	Branch Office	MV	Medium Voltage
DoE	Department of Energy	NGPES	National Growth and Poverty Eradication Strategy
DSM	Demand Side Management	Norad	Norwegian Agency for Development Cooperation
EdL	Electricité du Laos	NPV	Net Present Value
EE	Energy Efficiency		
EGAT	Electricity Generating Authority of Thailand	P2P	Power to the Poor
EMP	Environmental Management Plan	PAD	Project Appraisal Document
ERR	Economic Rate of Return	PDEM	Provincial Department of Energy and Mines
ESCOs	Electrification Service Companies	PDO	Project Development Objectives
ESMAP	Energy Sector Management Assistance Program	PESCOS	Provincial Electrification Service Companies
FNPV	Financial Net Present Value	PHRD	Japan Policy and Human Resources Development Fund
GDP	Gross Domestic Product	PIU	Project Implementation Unit
GEF	Global Environment Facility	PMU	Project Management Unit
GEO	Global Environment Objectives	PPA	Power Purchase Agreement
GHG	Greenhouse Gas	QAG	Quality Assurance Group
GIS	Global Information System	QEA	Quality at Entry Assessment
GoL	Government of Laos	RE	Rural Electrification
HHs	Households	REF	Rural Electrification Fund
ICB	International Competitive Bidding	REP I/II	Rural Electrification Phase I/II Project
IEG	Independent Evaluation Group	SHS	Solar Home Systems
IPP	Independent Power Producer	SPRE	Southern Provinces Rural Electrification Project
IREP	Institute of Renewable Energy Promotion	TA	Technical Assistance
IT	Information Technology	T&D	Transmission & Distribution
kV	Kilovolt	VEM	Village Electricity Manager
kWh	Kilowatt Hour	VH	Village Hydro
LPDR	Lao People's Democratic Republic	VOPS	Village Off-Grid Promotion and Support Office
LV	Low Voltage	WACC	Weighted Average Cost of Capital
M&E	Monitoring and Evaluation	WTP	Willingness to Pay
MEM	Ministry of Energy and Mines		

Vice President: Mr. Ulrich Zachau, Acting Vice President, EAP

Country Director: Ms. Annette Dixon, EACTF

Sector Manager: Ms. Julia Fraser, EASTS

Project Team Leader: Mr. Veasna Bun, EASTS

ICR Team Leader: Mr. Veasna Bun, EASTS

LAOS
Rural Electrification Phase I Project

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MAP: IBRD 33431

DATASHEET

A. Basic Information			
Country:	Lao People's Democratic Republic	Project Name:	Rural Electrification Phase I Project of the Rural Electrification (APL) Program
Project ID:	P075531,P080054, P119715	L/C/TF Number(s):	IDA-H2180,TF-96084,TF-56700
ICR Date:	01/30/2013	ICR Type:	Core ICR
Lending Instrument:	APL, APL	Borrower:	LAO PDR (GOL)
Original Total Commitment:	XDR 7.00M,USD 3.75M, USD 9.42M	Disbursed Amount:	XDR 6.98M,USD 3.70M, USD 9.413M
Environmental Category: B, B, B		Focal Area: M	
Implementing Agencies: Electricité du Laos (EdL) Ministry of Energy and Mines (MEM)			
Cofinanciers and Other External Partners: Global Environment Facility Norwegian Agency for Development Cooperation (Norad) Australian Agency for International Development (AusAID)			

B. Key Dates				
Rural Electrification Phase I Project of the Rural Electrification (APL) Program - P075531				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	06/09/2003	Effectiveness:	08/30/2006	08/30/2006
Appraisal:	07/19/2004	Restructuring(s):		02/07/2011, 03/21/2012
Approval:	04/27/2006	Mid-term Review:		
		Closing:	03/31/2010	03/31/2012

Rural Electrification Phase I Project of the Rural Electrification (APL) Program - P080054				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	06/09/2003	Effectiveness:	08/30/2006	08/30/2006
Appraisal:	07/19/2004	Restructuring(s):		02/07/2011, 03/21/2012
Approval:	04/27/2006	Mid-term Review:		
		Closing:	03/31/2010	03/31/2012

C. Ratings Summary	
C.1 Performance Rating by ICR	
Outcomes	Satisfactory
GEO Outcomes	Satisfactory
Risk to Development Outcome	Moderate
Risk to GEO Outcome	Moderate
Bank Performance	Satisfactory
Borrower Performance	Moderately Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)			
Bank	Ratings	Borrower	Ratings
Quality at Entry	Satisfactory	Government:	Moderately Satisfactory
Quality of Supervision:	Satisfactory	Implementing Agency/Agencies:	Satisfactory
Overall Bank Performance	Satisfactory	Overall Borrower Performance	Moderately Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Rural Electrification Phase I Project of the Rural Electrification (APL) Program - P075531			
Implementation Performance	Indicators	QAG Assessments (if any)	Rating:
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	Satisfactory
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA)	None
DO rating before Closing/Inactive status	Satisfactory		

Rural Electrification Phase I Project of the Rural Electrification (APL) Program - P080054			
Implementation Performance	Indicators	QAG Assessments (if any)	Rating:
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA)	Satisfactory
Problem Project at any time (Yes/No):	No	Quality of Supervision (QSA)	None
GEO rating before Closing/Inactive Status	Satisfactory		

D. Sector and Theme Codes		
Rural Electrification Phase I Project of the Rural Electrification (APL) Program - P075531		
	Original	Actual
Sector Code (as % of total Bank financing)		
Energy efficiency in Heat and Power	5	3
General energy sector	2	1
Other Renewable Energy	15	19
Transmission and Distribution of Electricity	78	77
Theme Code (as % of total Bank financing)		
Climate change	17	20
Regulation and competition policy	17	9
Rural policies and institutions	16	8
Rural services and infrastructure	33	54
State-owned enterprise restructuring and privatization	17	9

Rural Electrification Phase I Project of the Rural Electrification (APL) Program - P080054		
	Original	Actual
Sector Code (as % of total Bank financing)		
Central government administration	55	55
Energy efficiency in Heat and Power	9	9
General energy sector	36	36
Theme Code (as % of total Bank financing)		
Regulation and competition policy	20	20
Rural policies and institutions	20	20
Rural services and infrastructure	40	40
State-owned enterprise restructuring and privatization	20	20

E. Bank Staff		
Rural Electrification Phase I Project of the Rural Electrification (APL) Program - P075531		
Positions	At ICR	At Approval
Vice President:	Ulrich Zachau	Jeffrey S. Gutman
Country Director:	Annette Dixon	Ian C. Porter
Sector Manager:	Julia M. Fraser	Junhui Wu
Project Team Leader:	Veasna Bun	Jie Tang
ICR Team Leader:	Veasna Bun	
ICR Primary Author:	Xiaoping Wang	

Rural Electrification Phase I Project of the Rural Electrification (APL) Program - P080054		
Positions	At ICR	At Approval
Vice President:	Ulrich Zachau	Jeffrey S. Gutman
Country Director:	Annette Dixon	Ian C. Porter
Sector Manager:	Julia M. Fraser	Junhui Wu
Project Team Leader:	Veasna Bun	Jie Tang
ICR Team Leader:	Veasna Bun	
ICR Primary Author:	Xiaoping Wang	

F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document)

The objectives of REP I Project are to: (i) increase access to electricity of rural households in villages of targeted provinces; and (ii) improve financial performance of the power sector.

The PDO set forth in the Development Grant Agreement dated June 2, 2006 was different from the PDO from the PAD and reads as “the objective of the Project is to assist the Recipient to implement, in the Project Provinces, Phase I of the Program which is designed to improve the living standards and increase the income of rural households by providing access to electricity.”

This is of higher level and not consistent with key performance indicators defined in the PAD. In addition, the PDO set forth in the PAD, the Project Paper for AusAID additional financing and the Development Grant Agreement of REP II is the same as that in the PAD of REP I. For these reasons, the evaluation of this ICR uses the PAD version as the reference point.

Revised Project Development Objectives (as approved by original approving authority)

Global Environment Objectives (from Project Appraisal Document)

Global environment objectives are: (i) substantial adoption of off-grid renewable energy in Government's rural electrification program; and (ii) increased efficiency of energy supply by EdL and consumption by customers, resulting in greenhouse gas emission reductions as increased hydropower exports substitute for thermal power production in Thailand.

Revised Global Environment Objectives (as approved by original approving authority)

(a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1:	Number of villages and households electrified			
Value (quantitative or Qualitative)	About 428,000 by the end of 2004	Increase villages and HHs electrified by about 250 and 52,000 respectively	65,250 HHs (=52,000 original + 8,000 P2P AusAID + 5,250 SHS/hydro AusAID) in 540 villages	671 villages and 66,879 HHs electrified by grid and off-grid
Date achieved	06/01/2006	03/31/2010	3/21/2010	07/31/2012
Comments (incl. % achievement)	For household connections, the results exceeded the original target by 29% and the revised target by 3%.			
Indicator 2:	Implementation status of the Sustainability Action Plan			
Value (quantitative or Qualitative)	Tariff adjustment initiated in July 2005	Satisfactory implementation of the Sustainability Action Plan: 1) tariff adjustment; 2) EdL system loss below 17%; 3) DSM&EE EDL Cell established; 4) Settlement of Government Arrears.		1) Tariff Reform for 2005-2010 endorsed by the GoL in 2005 was fully implemented; 2) 10.45% system losses; 3) DSM&EE EDL established and operational; 4) GoL agencies arrears were LAK 109 billion as of June 2012, equivalent to 10.9 months of the bill.
Date achieved	06/01/2006	03/31/2010		07/31/2012
Comments (incl. % achievement)	Implementation of the Financial Sustainability Action Plan was largely achieved except for the continued government payment arrears that could not be prevented due to insufficient budget allocations by MOF.			

(b) GEO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1:	Measurable increase in awareness and adoption of energy efficiency technologies			

	and practices by Government agencies and other EDL customers			
Value (quantitative or Qualitative)	A complete lack of awareness by EDL customers	100% central government agencies, 20% of domestic & 33% of commercial customers aware of energy efficiency		76% public sector, 46% residential, 66% commercial and industrial
Date achieved	06/01/2006	03/31/2010		11/2008
Comments (incl. % achievement)	These results were reported in DSM/EE Phase 1 - Baseline on EE Awareness Report in Nov. 2008. No additional surveys were done, so the end-of-project achievement is unknown.			
Indicator 2:	"Market share" of off-grid renewable HHs under REP I			
Value (quantitative or Qualitative)	8% "Market share" of off-grid renewable HHs during SPRE	19% of newly electrified HHs have solar/VH		19.7% based on SHS installed; 9.5% after the return of 5,338 SHSs
Date achieved	06/01/2006	03/31/2010		07/31/2012
Comments (incl. % achievement)	Under REP I, some 10,246 SHSs were installed and additional 5,000 SHSs purchased (to be installed). However, some 5,338 SHSs were returned to MEM after a couple of years of operation, due to fast grid extension to the villages by EdL.			

(c) Intermediate Outcome Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Indicator 1:	Grid extension: Incremental number of villages and HHs electrified			
Value (quantitative or Qualitative)	428,000 HHs in about 35% of villages	Add 42,000 HHs in 540 villages in the 7 central provinces	50,000 HHs (=original 42,000 + 8,000 P2P under AusAID)	57,039 HHs in 570 villages
Date achieved	06/01/2006	03/31/2010	3/21/2010	03/31/2012
Comments (incl. % achievement)	36% over the original target and 14% over the revised target.			
Indicator 2:	Financial performance: Rate of return on revaluated asset (RRRA), Debt service coverage ratio (DSCR), Self-financing ratio (SFR), Accounts receivable (AR)			
Value (quantitative or Qualitative)	2004 financial performance indicators	RRRA > 4% DSCR > 1.5 times SFR > 30% AR < 2 months		RRRA 1% DSCR 1.26 times SFR 6% AR 2.2 months

				overall
Date achieved	12/31/2005	03/31/2010		07/31/2012
Comments (incl. % achievement)	Targets were not met mainly due to spin-off EdL's generation assets (and subsequent changes of baseline values for measuring these indicators). Before the spin-off of EdL-Gen in late 2009 when the baseline values were comparable with those at appraisal, the first three indicators were largely met.			
Indicator 3:	Overall System losses			
Value (quantitative or Qualitative)	About 22% in 2005	System losses below 17%		Distribution losses were 10.45% in 2011, the latest data available.
Date achieved	12/31/2005	03/31/2010		03/31/2012
Comments (incl. % achievement)	Target far exceeded. Taking into account actual transmission losses, estimated to be around 2%, overall system loss reduction is about 9.5%.			
Indicator 4:	Establishment of DSM cell and implementation of pilot DSM/energy efficiency & awareness building programs			
Value (quantitative or Qualitative)	No DSM cell; no program to build efficiency or awareness	Energy audit and other pilot programs implemented		Cell established and operational. 50 central government agencies received energy audits and no-cost and low cost efficiency measures were taken in 4 pilot buildings.
Date achieved	06/01/2006	03/31/2010		12/08/2010
Comments (incl. % achievement)	Fully achieved.			
Indicator 5:	Off-grid: number of villages and HHs electrified			
Value (quantitative or Qualitative)	6,000 HH in 7 provinces	Add 10,000 HHs over 200 villages in 17 provinces	15,250 HHs with AusAID co-financing (=10,000 HHs original + 5,000 HHs with SHS by AusAID + 250 HHs with VH by AusAID)	10,246 HHs electrified with SHS in 230 villages 5,000 SHS purchased with AusAID co-financing under REP I are being installed under REP II
Date achieved	06/01/2006	03/31/2010	3/21/2010	07/31/2012
Comments (incl. % achievement)	Original target was exceeded during the project implementation, but 5,338 SHSs had been dismantled and returned. Revised target is expected to be largely met after the installation of AusAID-financed SHS is completed in CY2013.			
Indicator 6:	Village hydro (VH) share in HHs electrified through off-grid			
Value (quantitative or Qualitative)	Only 150 out of the 6,000 HHs not SHS	1,000 (10%) HHs through VH	1,250 HHs with AusAID	0

Qualitative)			co-financing	
Date achieved	12/31/2005	03/31/2010	3/21/2010	03/31/2012
Comments (incl. % achievement)	Not achieved. No village hydro was developed due to lack of demand.			
Indicator 7:	Development of alternative delivery model			
Value (quantitative or Qualitative)	Only hire-purchase & MIH delivery	Alternative delivery models developed		Completed
Date achieved	12/31/2005	03/31/2010		12/08/2011
Comments (incl. % achievement)	Achieved. Alternative model based on PPP was prepared and is under tendering for selection of private investors. REP II will continue to improve bid documents.			
Indicator 8:	Development of legal, regulatory and institutional arrangements for the Rural Electrification Fund (REF)			
Value (quantitative or Qualitative)	REF Decree to be issued by the Prime Minister's Office	REF opened to other participants		Completed
Date achieved	12/31/2005	03/31/2010		03/31/2012
Comments (incl. % achievement)	Achieved. Prime Minister's Decree issues and later on updated and enforced to allow private sector participation; institutional arrangement for REF Secretary approved by the Government; and REF Operational Manual updated and operational.			
Indicator 9:	Establishment of RE Master Plan and Database			
Value (quantitative or Qualitative)	No RE Master Plan or Database	Initial version of RE Master Plan Database developed		Completed
Date achieved	12/31/2005	03/31/2010		07/31/2012
Comments (incl. % achievement)	Fully Achieved. The Rural Electrification Master Plan was updated, with updated database operational.			
Indicator 10:	Implementation of the Action Plan for DOE Organizational Strengthening			
Value (quantitative or Qualitative)	Development of the Action Plan was under way	Completion of Action Plan	Action Plan developed and agreed with the Bank fully implemented	Completed
Date achieved	12/31/2005	03/31/2010	03/31/2012	09/01/2010
Comments (incl. % achievement)	Achieved. DOE has been restructured as the Institute for Renewable Energy Promotion (IREP) with five permanent technical staff.			

G. Ratings of Project Performance in ISRs

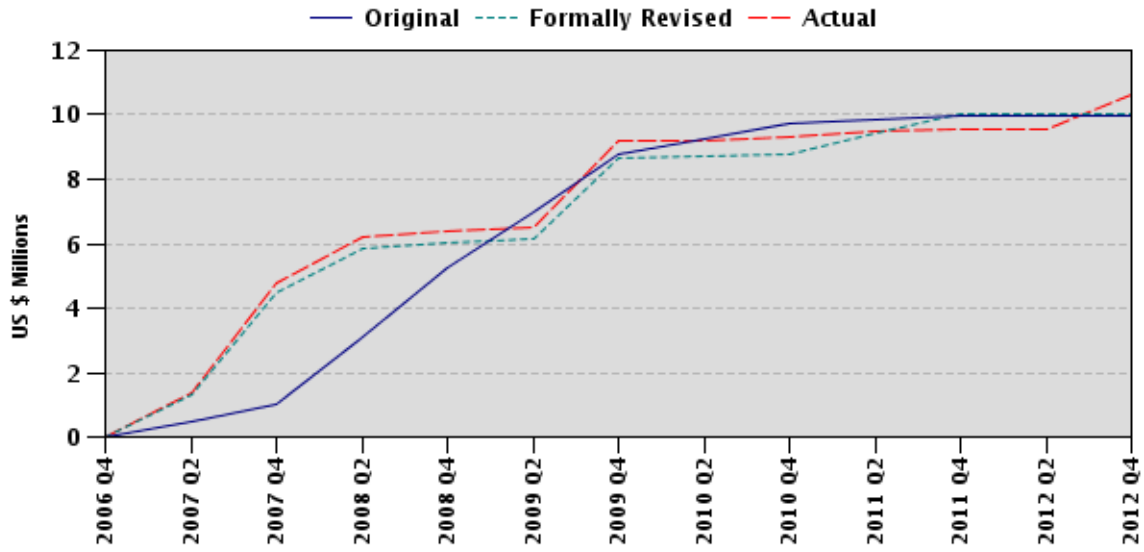
No.	Date ISR Archived	DO	GEO	IP	Actual Disbursements (USD millions)	
					Project 1	Project 2
1	11/20/2006	S	S	S	1.37	0.30
2	01/24/2008	S	S	S	6.19	0.86
3	06/09/2009	S	S	S	7.54	1.76
4	05/29/2010	S	HS	S	9.21	2.91
5	04/13/2011	HS	HS	S	9.50	3.75
6	09/27/2011	S	S	S	9.51	3.75

H. Restructuring (if any)

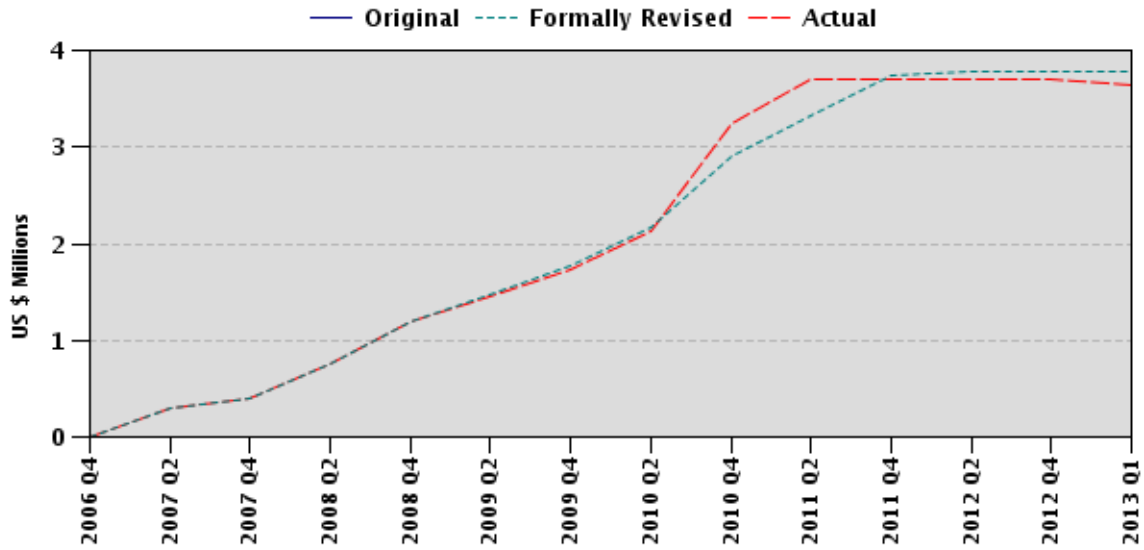
Restructuring Date(s)	Board Approved		ISR Ratings at Restructuring			Amount Disbursed at Restructuring in USD millions		Reason for Restructuring & Key Changes Made
	PDO Change	GEO Change	DO	GEO	IP	Project1	Project 2	
03/21/2012	N		S		S	9.55		The AusAID Trust Fund Grant Agreement (TF096084) co-financing the REP I was amended to (i) extend the closing date from March 31, 2012 to July 31, 2012 to allow sufficient time for final delivery of solar home systems; (ii) align the AusAID Grant Agreement with the approved Project Paper for the AusAID co-financing dated June 18, 2010 to allow disbursements for the Power to the Poor (P2P) program under the EDL grid extension component; and (iii) reallocate funds between the on-grid component implemented by EdL and the off-grid component implemented by MEM.
02/07/2011	N		S		S			Reallocation of IDA grant proceeds

I. Disbursement Profile

P075531



P080054



1. Project Context, Development and Global Environment Objectives and Design

1.1 Context at Appraisal

Country and Economy Background. With a population estimated at 5.7 million in 2004, and growing at a relatively rapid rate of 2.6 percent annually, Lao People's Democratic Republic (Lao PDR) was characterized by a rich cultural and ethnic diversity where almost half of the population belonged to minority groups concentrated in the upland areas. A large majority of the population relied for its livelihood on agriculture, which accounted for over half of GDP. Gross National Income per capita stood at around US\$340 in 2004. Urbanization was relatively low, at 25 percent. The economy had been growing at an average annual rate of 6.5 percent since 2001, driven mostly by increased foreign direct investment in the hydro and mining sectors. Sustained economic growth has enabled significant and steady decline in poverty rates, from 46 percent in 1992-93 to 27 percent in 2007-08.

Rural Electrification and Power Sector Issues. Rural electrification had registered a remarkable achievement in the socio-economic development of Lao PDR, with household connections increased from about 16 percent in 1995 to 46 percent in 2004. However, as electrification moved to increasingly remote areas, on-grid electrification became less viable, which led the Government of Laos (GoL) to promote off-grid models, with emphasis on renewable technologies.

GoL set an ambitious goal of electrifying 90 percent of the households by 2020 (70 percent by 2010 and 80 percent by 2015), and increasing hydropower exports to neighboring countries. Meeting these objectives would require financing from sources other than the traditional concessionary lenders. Novel financing models for non-traditional public and private financiers would need to be identified and the regulatory framework adapted to suit.

Electricité du Laos (EdL) was a state-owned, vertically integrated power utility that covered most of the generation and 100% of transmission and distribution. It was corporatized in 1997, remaining wholly GoL-owned. EdL's financial viability depended on hydropower export revenues, significant GoL equity injections, and soft financing from multilateral and bilateral agencies. EdL's finances were strongly impacted by the dramatic currency devaluations during the East Asia financial crisis of the late 1990s. Since then, significant improvements resulted from the implementation of a Financial Recovery Plan that helped EdL turn in strong financial performances in 2002 and 2003. However, EdL was not able to achieve cost recovery from its core business but rather relied on GoL subsidies from dividends of Government's equity investment in hydropower to maintain financial viability. Further improvements would be necessary in planning, operational efficiency and financing strategy to achieve cost recovery. Loss reduction achievements had been significant, but with transmission and distribution losses above 20%, there was scope for further improvement. Finally, headquarters and branch operations were fragmented and needed to be integrated through information technology and communication systems.

Rationale for Bank Assistance. IDA's added value was three-fold: leverage, concessionary financing and global knowledge. Prior to REP I, IDA had long-term engagement in rural electrification in Laos through the Southern Provinces Electrification Project (closed in December 1994), Provincial Grid Integration Project (closed in June 1999), and Southern Provinces Rural Electrification Project (SPRE, closed in December 2004). Concessionary lending terms such as IDA were vital for electrification, which requires capital subsidies to achieve social objectives. IDA's continued association with rural electrification was necessary for successful implementation of GoL's rural electrification program. As in the previous project SPRE, GEF-funded technical assistance and investment activities under REP I were considered vital to increasing the contribution of renewable energy and energy efficiency (EE) in the overall development of the power sector. IDA's ability to bring global knowledge to sector reform activities added value beyond the provision of grants. The ability to play this role derived from the deep knowledge of the Lao power sector that IDA had gained and the relationship that had developed with GoL/EdL over the previous decade, which merited continuation.

The Project was fully in line with the 2005 Country Assistance Strategy (2005-2008), designed to support GoL's National Growth and Poverty Eradication Strategy, which focused on sustained growth through

improved management of rural and national infrastructure development; and capacity development and partnerships through strengthened key sectoral and provincial capacities and partnership with donors in rural electrification.

1.2 Original Project Development Objectives and Key Indicators (as approved)

This Project was the first phase of a two-phased Adaptable Program Loan (APL) Program (REP I and II). The **objectives of the APL Program** are to: (i) increase access to electricity of rural households in villages of targeted provinces; and (ii) achieve sustainability of power sector development. REP I closed on March 31, 2012 and its additional financing closed on July 31, 2012. REP II was approved in February 2011, became effective in August 2011, and is expected to close on June 30, 2014.

The project development objectives (PDO) for REP I were to: (i) increase access to electricity of rural households in villages of targeted provinces; and (ii) improve financial performance of the power sector.

It should be noted that the PDO set forth in the Development Grant Agreement dated June 2, 2006 was different from the PDO from the PAD and reads as “the objective of the Project is to assist the Recipient to implement, in the Project Provinces, Phase I of the Program which is designed to improve the living standards and increase the income of rural households by providing access to electricity.” This is of higher level and not supported by the key performance indicators defined in the PAD. In addition, the PDO in the PAD, the Project Paper for AusAID additional financing, and the Development Grant Agreement of REP II is the same as that in the PAD of REP I. For these reasons, the evaluation of this ICR uses the PAD version as the reference point.

Key Performance Indicators (KPIs). The Project would provide access to electricity to about 52,000 rural households through grid extension and off-grid electrification and bring about: (i) implementation of a tariff reform that would achieve a 4-percent return on EdL’s revalued assets and minimize cross-subsidies among consumer categories by the end of REP II; (ii) development of procedures for efficient budgetary allocations for utility expenses and timely payment of electricity bills by government agencies to reduce EdL’s account receivables from five months to two months; (iii) development and implementation of loss reduction programs that would reduce EdL’s system losses from around 22 percent to about 17 percent by the end of REP I and 13 percent by the end of APL Program; (iv) development of planning and implementation capacity within EdL for demand side management (DSM) and EE and piloting efficiency programs for scale up in REP II; (v) development of a sector financing strategy for the purpose of scaling up investment in the power sector, and preparation of two small hydropower projects and solicitation documents for piloting concessions to independent power producers (IPPs) for scale up in REP II; (vi) development of rural electrification master planning capacity, and pilot of alternative power generation technologies for scale up in REP II; and (vii) development of the necessary legal, regulatory and institutional arrangements to enable the Rural Electrification Fund (REF) to be accessible to other participants during REP II.

1.3 Original Global Environment Objectives and Key Indicators (as approved).

The global environment objectives (GEO) of the Project were: (i) substantial adoption of off-grid renewable energy in the Government's rural electrification program growing from a 7-10 percent share of all newly electrified households in SPRE to a 19 percent share with REP I; and (ii) increased efficiency of energy supply by EdL and consumption by customers, that in turn would result in increased exports of hydropower to, and reduced imports of thermal power from Thailand, with eventual greenhouse gas (GHG) emission reductions, as thermal power plants would be operated for marginal production in Thailand over the Project period.

Key Performance Indicators. Achievement of the GEO would be measured by: (i) number of villages connected to the medium voltage (MV) grid and households connected to the low voltage (LV) network; (ii) number of households electrified with off-grid renewable technologies; (iii) percentage of households electrified by renewable off-grid technologies in relation to overall number of households electrified through the Project; and (iv) implementation status of the Action Plan of Financial Sustainability for the Power Sector.

1.4 Revised PDO (as approved by original approving authority) and Key Indicators, and reasons/justification

No change.

1.5 Revised GEO (as approved by original approving authority) and Key Indicators, and reasons/justification

No change.

1.6 Main Beneficiaries

The major direct beneficiaries of the Project would be rural households and business receiving access to electricity services through the Project, including the extreme poor and disadvantaged, female-headed families. With the addition of AusAID co-financing, the direct beneficiaries increased over the original project target (see Annex 2 for details). With project support to the rural electrification reform, the beneficiaries would broadly comprise 54% of the rural households and villages that did not have electricity and were expected to receive access to electricity services over the following fifteen years. Other beneficiaries would include EdL customers and consumers of all modern energy types because of energy efficiency (EE) activities, EdL, Ministry of Energy and Mines (MEM), and provincial government agencies because of strengthened capacity in planning, policy making and project management, as well GoL and EdL and its ratepayers because the moderation of the rapid growth in domestic energy consumption would help maintain/enhance export earnings from sales to Electricity Generation Authority of Thailand (EGAT).

1.7 Original Components (as approved)

The Project would have two components, one to be executed by each implementing agency: EdL and MEM (which was Ministry of Industry and Handicraft or MIH at appraisal). These components are summarized below.

- A. The EdL Component** (total cost: US\$30.15 million) would comprise the following sub-components:
 - A.1 Grid Extension** (cost: US\$26.4 million): Extension of the EdL grid to about 42,000 households in some 540 villages in seven central and southern provinces;
 - A.2 Loss Reduction** (cost: US\$2.0 million): Enhancement of EdL loss reduction efforts (covering both technical and non-technical losses) through: (a) development of a Master Plan for Distribution Loss Reduction; (b) implementation of prioritized projects and activities; and (c) preparation of projects for attracting funding from other donors;
 - A.3 IT System** (cost: US\$0.8 million): (a) Integration of EdL Headquarters and Branch Offices (BOs) through rolling out the existing IT System to BOs in the targeted provinces; (b) development of a new Material Management and Procurement System (MMPS); and (c) technical assistance for financial management capacity building;
 - A.4 Tariff Reform** (cost: US\$0.05 million): Implementation of tariff and subsidy policies and associated tariff regime in line with the tariff adjustment defined in the Sustainability Action Plan;
 - A.5 Safeguards Capacity Building** (cost: US\$0.14 million): Enhancing EdL's (also MIH's) capacity in environmental and social assessment and impact management through training, study tours, and acquisition of necessary equipment;
 - A.6 DSM** (cost: US\$0.75 million): Implementing a program of DSM and EE activities, including establishment of a DSM Unit within EdL, building an energy end-use database, and piloting DSM measures targeted to high-priority markets.
- B. The MEM (which was MIH at appraisal) Component** (total cost: US\$6.13 million) would comprise the following sub-components:
 - B.1 Off-grid Investment Program** (cost: US\$2.37 million): Provide electrification by off-grid technologies to about 10,000 households in about 200 villages, in 17 provinces.

- B.2 Institutional Strengthening** (cost: US\$1.1 million): Expand and scale up the MEM off-grid program through improved organization, management outsourcing and performance assurance arrangements, offering a wide range of off-grid technologies;
- B.3 Alternative RE Delivery Models** (cost: US\$0.7 million): (a) Develop alternative delivery models for off-grid RE and financing mechanisms, including setting up and operation of the REF and development of necessary legal, regulatory and institution arrangement to enable the REF to be accessible to other participants during Phase II; (b) assess biomass resources and pilot use of the biomass technologies; and (c) assess income generation linkages with village-level off-grid electrification;
- B.4 Rural Electrification Master Plan and Database** (cost: US\$0.99 million): (a) Develop an initial rural electrification master plan (including distributed generation) and an electrification database (including mini/micro hydropower resource assessment), and institutionalize capacity for periodic updating; and (b) assess mini/micro hydro and biomass resources; and (c) assess rehabilitation of existing mini/micro hydropower plants;
- B.5 Sector Financing Strategy** (cost: US\$0.21 million): Develop a sector financing strategy and prepare two small hydropower projects and solicitation documents for concessioning to independent power producers (IPP);
- B.6 Organization Strengthening of DOE/MEM** (cost: US\$0.75 million): (a) Strengthen organizational and management arrangements within MEM to enable it to undertake its expanded role and regulation of the power sector; (b) support the MEM Project Management Unit (PMU) in implementing the MEM component.

1.8 Revised Components

In June 2010, the Bank approved additional financing equivalent to US\$9.42 million from AusAID and using the PAD version of the PDO. The additional financing was necessary to close a financing gap which occurred due to substantial price escalations for materials in 2006-07. The additional funds aimed to enable the project to meet its grid extension targets, and scale up the project impacts with: (i) technical assistance (TA) for DSM and energy efficiency; (ii) expansion of the “Power to the Poor (P2P)” program which provided no interest credit support to the poorest rural households for upfront payments for connection to the grid; (iii) additional SHS for off-grid electrification; (iv) support for the design, supply and installation of village hydro; (v) TA for construction of pilot village level biomass power plants; and (vi) procurement capacity building to ensure smooth project implementation. The AusAID-financed project components and related costs are shown in the table below. Minor changes were made to the KPIs as discussed in section 2.3 below.

AusAID-Financed Project Components and Related Costs

REP 1 Original Project Components	Additional Financing		
	Activity	Cost (US\$ M)	Remarks
A. EdL Component			
A1. Grid Extension	<ul style="list-style-type: none"> 38 distribution sub-projects P2P * 	6.00 0.84	Fill in financing gap Scale up impact
A6. DSM and EE	<ul style="list-style-type: none"> Hiring Energy coordinator and TA 	0.10	Scale up impact
B. MEM Component			
B1. Off-grid investment	<ul style="list-style-type: none"> Procurement of SHS 	2.00	Scale up impact
B3. Alternative RE Delivery Model	<ul style="list-style-type: none"> Micro Hydro TA to pilot biomass power plant 	0.28 0.10	Scale up impact
B6. Institutional strengthening of DoE	<ul style="list-style-type: none"> Hiring an international consultant Training for DoE’s procurement capacity building 	0.10	Scale up impact
TOTAL		9.42	

*NOTE: * P2P is an activity designed for grid extension to respond to the issue raised during the implementation of REP I but not explicitly defined as an activity in the PAD of REP I.*

1.9 Other significant changes

The closing date for the IDA and GEF Grants was extended for two years, from March 31, 2010 to March 31, 2012, to allow extra time for the completion of the AusAID-supported activities. The AusAID additional financing restructuring was approved by the Country Director in March 2012 to (i) extend the closing date from March 31, 2012 to July 31, 2012 to allow sufficient time for final delivery of SHS; (ii) align the AusAID Grant Agreement with the approved Project Paper for the AusAID co-financing dated June 18, 2010 to allow disbursements for the P2P program under the EDL grid extension component; and (iii) reallocate funds between the on-grid component implemented by EdL and the off-grid component implemented by MEM. A reallocation of GEF grant proceeds was approved on February 10, 2011 upon GoL's request.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

Preparatory Studies. Project design was informed by several studies with financial support from the Japanese Policy and Human Resources Development Fund (PHRD), the Energy Sector Management Assistance Program (ESMAP) and Asia Sustainable and Alternative Energy (ASTAE). The studies included: (i) a socio-economic survey of electrified and non-electrified villages and households and establishment of a rural electrification database; (ii) a tariff study to identify appropriate tariff levels and structure; (iii) a rural electrification framework study including review of existing off-grid delivery models and examining alternatives for scaling up off-grid electrification; (iv) a study to define the overall financing strategy for the sector; and (v) a distribution system loss reduction study. These studies provided a solid technical underpinning for the project design. The extensive social-economic survey data helped establish the project baseline, provided the necessary inputs for a detailed social, economic and financial analysis of the Project, and were considered very valuable to inform two IEG (Independent Evaluation Group) publications: the Welfare Impact of Rural Electrification: A Reassessment of the Costs and Benefits (2008) and Project Performance Assessment Report for Laos Southern Provinces Rural Electrification Project (2008).

Lesson Learned from SPRE and Other Projects. The Project built on cumulative experience and long-term engagement of the Bank in the power sector of Laos, in particular the lessons learned from SPRE in implementation both grid extension and off-grid program, as well as similar projects in other countries. For example, it took into account one of the lessons learned from other GEF-financed projects that (i) in an electrified village, the household connection rate is highly elastic to the connection charges. This was confirmed again with the social-economic survey and encouraged EdL and the Bank to incorporate the Power to the Poor (P2P) program (see next para); (ii) a staffing shortage in MEM was the major reason for serious delays in off-grid electrification under SPRE, and an outsourced management contract was designed under REP I to address this issue; and (iii) electrification, through on- and off-grid, needs to be closely coordinated, and a Master Plan was designed to address this lesson.

Power to the Poor Program. The Project responded swiftly to one of the findings in the 2004 socio-economic survey that approximately 20-40% of the households were still not connected to the grid two years after grid arrival in the village by including a P2P program to increase the percentage of households connected to the grid in a given village. The P2P was designed to provide interest-free credit to the poorest rural households and to rural households headed by women that could not afford the upfront charges for connection to the grid. These families would pay back the credit in monthly installments based on their affordability, into a revolving P2P Fund, which would be used to support other disadvantaged families. The program was piloted at the start of REP I, with IDA and GEF resources and technical assistance under the IDA-supported Gender Action Plan, and was later expanded with EDL's own financial resources and the AusAID additional financing to REP I and IDA resources under REP II.

Risk Assessment. Project appraisal correctly identified and rated most of the important risks, including substantial risk related to GoL's commitments to tariff adjustment and offsetting Government account receivables, as evidenced by the delays in annual tariff adjustment and still-not-resolved Government

arrears during project implementation; and the risk of weak capacity of MEM in managing and implementing the off-grid electrification program. On the other hand, the risk of establishing the REF regulatory framework in a manner that attracts private sector participation in rural electrification and the risk of time and cost overruns were rated moderate and negligible at appraisal and proved to be substantial during project implementation. Due to the decreasing collection rate of the repayments from SHS users, the balance of the REF is running low and its sustainability is at question. This is particularly relevant in view of the issues discussed in Section 2.2 below (under SHS) related to (i) the weak capacity of MEM, and (ii) the much faster-than-expected grid extension making the current SHS scheme more difficult to realize. An unforeseeable problem arose when the Project experienced a financing gap of over 30% of the costs of materials for grid extension due to sharp global increases in the prices of materials, which exceeded the price contingency allowance of 10% of the project costs. Given that the financial gap was subsequently resolved successfully and the government is taking actions to solve problems associated with the REF component under the framework of REP II, the overall risk rating of being moderate at appraisal is deemed appropriate.

Lending Instrument and Project Components: The choice of the Adaptable Program Loan (APL) approach was appropriate as it allows continuous, long-term Bank engagement in sector reform, achieving financial sustainability of the power sector and rural electrification in Laos. The triggers for Phase II of the APL were thorough and reflected the implementation progress needed for preparing Phase II. The Project had two major components each implemented by a different implementation agency, making coordination between the two implementing agencies somewhat challenging. In addition, each component had six subcomponents, which were critical for sector sustainability but posed implementation challenges in a relatively weak capacity environment in MEM.

Quality at Entry Assessment. Quality at Entry of this operation was assessed by QAG as part of the Quality at Entry Assessment (QEAS) done in 2007. The project was rated satisfactory overall, with several dimensions rated highly satisfactory. See Section 5(a) on Bank performance for further details. This ICR agrees with the overall assessment of the QAG. However, this ICR noted that the methodology used in the original economic analysis led to an overestimation of net present value (see Annex 3 for details).

2.2 Implementation

The large number of project components needed to build capacity, achieve financial sustainability in the power sector as well as expand access to rural households—12 subcomponents, with 49 contracts for good and services at appraisal—posed substantial challenges for project implementation. However, all these activities were implemented largely smoothly, efficiently and well ahead of the original closing date of March 31, 2010, by both implementing agencies, even though there were issues and delays in some activities, especially for the off-grid programs funded by the additional financing. As a result, 24 triggers for initiating the Phase II were largely met by June 2009, one and half years before closing, as shown in table 1 of Annex 2.

Grid-extension Program. For grid extension to connect new households, which was the core activity of REP I, EdL took about three years for a bottom-up system planning that required engaging seven provincial branch offices, a village screening process based on social impact indicators and least cost for connections, preparation of bidding documents, completion of International Competitive Bidding (ICB) process for equipment and material supply, processing of Norad co-financing, and installation of 67 grid extension subprojects on the ground, all achieved by September 2009, well ahead of the March 2010 closing date. This left EdL sufficient time to mobilize additional financing to address the financing gap that emerged due to unexpected price escalations on international markets during 2007-2008. In parallel, EdL also completed the project-supported master planning and pilot projects for loss reduction well ahead of schedule, giving EdL sufficient time to mobilize its own resources to implement repeater programs and achieving loss reductions far exceeding the targets for both REP I & II before the closing of REP I. For activities beyond EdL's control, such as settlement of arrears from GoL and tariff reform, EdL followed up closely with the Prime Minister's Offices and Ministry of Finance through MEM and ensured successful implementation of annual tariff adjustments since 2005 in line with the Tariff Adjustment Plan,

and settlement of past arrears of 113 billion kip owed by GoL before appraisal, though there were delays in annual tariff adjustments and new arrears were incurred due to insufficient budget allocations.

P2P Program. To help vulnerable and disadvantaged rural families, EdL was highly efficient in designing, piloting and scaling up the gender sensitive P2P program, with support of the Bank Team. In the villages where it was implemented, P2P helped over 90 percent of the vulnerable and disadvantaged families (which amounted to 20 to 40 percent of the total families in the villages) connect to the grid. One of the major reasons of efficient implementation of grid extension electrification program in Laos is EdL's strong capacity in planning, procurement, project management, financial management and associated safeguard management built up over past 10 years under various capacity building programs supported mainly by IDA. Strong commitment of the Government to the welfare of its people and highly motivated staff of EdL for implementation were crucial to the success of the P2P program and the fast expansion of access to grid-supplied electricity in the country.

Off-grid Program. The SHS program represented less than 20% of the total project cost under REP I and only 2% of the total households electrified under the national electrification program. By September 2009 when the REP II was processed, MEM had completed the hiring of an international management contractor VOPS to assist it in managing the off-grid program. In parallel, MEM had completed most of the other investments and technical assistance activities, notably development and implementation of the legal and institutional arrangements for REF to support private sector participation, biomass resources mapping in Laos, feasibility studies of 14 selected micro hydropower sites, modification of charges reflecting cost of the private sector PESCOs and achieved more than 90% collection rate under the hire-and-purchase SHS program. The major success was mainly due to engagement of the VOPS Contractor to assist MEM in implementation and management of off-grid electrification programs

Major Implementation Issues. Several issues arose during implementation, especially under the off-grid program funded by the additional financing from AusAID.

Serious delays in implementing the SHS program funded by additional financing and poor support to operation and maintenance (O&M) of operational SHS. The achievements of efficient implementation of IDA and Norad funded SHS programs were mainly attributable to the excellent performance of the Management Contractor, who was responsible for the planning, implementation, O&M and reflow collections of the off-grid programs. However, the contract ended before the AusAID-supported off-grid activities started and DoE took over. Thereafter, implementation performance and operation of the off-grid programs deteriorated sharply. The ICB bidding documents for the additional SHSs took more than two years to complete, and put the SHSs at risk (see para below). The performance of PESCOs in reflow collection was not monitored closely and regular visits to customers for services and training on how to operate and maintain their SHSs were not made. DoE management of withdrawal systems for inventory, storage, repairing and maintaining SHS for re-use was poor. As a result spare parts not available on time, solar panels were damaged since users failed to follow instructions, SHSs withdrawal procedures not followed up, and some of the 5,338 SHSs returned to local government offices were not properly maintained for reuse. The collection rate of user payments dropped from 90% before December 2009 to 56% in 2010 and 2011, to only 3% in 2012 because poor collections were not adequately monitored or followed up. Given the significant decrease of the inflow to the REF relative to its outflow to cover project expenditures, the sustainability of REF will be in jeopardy without immediate remedial action under REP II.

High rate of SHS withdrawals. SHSs withdrawal was expected and withdrawal procedures were developed by the Management Contractor to manage the withdrawal process to ensure the returned SHSs could be used again for new customers, at discounted prices. During REP I, some 5,338 systems (including those installed in SPRE and REP I) were withdrawn, most of which had been used for about two years before withdrawal. Withdrawal was mainly due to the rapid roll-out of EdL's on-grid expansion, which exceeded expectations of the project design and the Rural Electrification Master Plan. While the withdrawal was expected, the problem was that the systems were returned incomplete (without controllers and batteries) or were not in good condition. Re-deploying these systems will require acquisition of the missing parts, which represent about 70-80% of the total equipment cost. Guidelines on how to reuse withdrawn SHS are being updated under REP II.

As clearly stated above, the implementation of the current scheme has become flawed, judging from the most recent collection rates of about 3 percent. The reason for this is believed to have more to do with the success of the Government's grid electrification initiative which has effectively limited the areas of operation for the SHS to the most remote, difficult, dispersed and inaccessible areas of the country than with the design of the SHS business model per se. The former, in conjunction with the extension of the repayment schedule from five years to 10 years, to enhance the affordability of SHS, generated insurmountable challenges for SHS sustainability. This may render the current SHS structure ineffective as it would no longer be possible to recover the investment in the equipment due to the extremely high costs of payment collection and maintenance. Going forward, the SHS initiative will have to be targeted to the most remote villages, unlikely to be connected to the grid in the next 10 years. This would require higher subsidies on equipment and installation and aiming at facilitating the creation of local small village suppliers of standardized spare parts to provide maintenance support and ensure the sustainability of the SHS systems.

The AusAID-financed activities for the off-grid component were at risk of not being completed by the closing date due to procurement delays. There were serious delays in procuring the second batch of SHS equipment funded by the AusAID additional financing when DoE took over from the Management contractor. Given the long-standing issues on the implementation of the SHS program, the Bank and AusAID wanted to agree with MEM on the breakdown of SHS by province before the contract was signed as the current allocation was not fully consistent with the Rural Electrification Master Plan nor did it reflect the plans of PESCOs. The 5,000 SHS through the procurement in question were eventually delivered before the closing date of the AusAID additional financing and are to be installed with REP II support.

Processing of Co-financing. The Project raised a significant amount of co-financing from AusAID, EdL, MEM, and users and parallel financing from Norad. However, it was a challenge to meet the administrative requirements of the different donors. One ICB contract scheduled to be financed by Norad was signed and the first delivery of goods took place before the loan structure for Norad financing was finalized. It took the Bank quite a long time to process the AusAID co-financing as well. The framework agreement for the trust fund was signed in May 2009 but the co-financing grant agreement was not signed until October 2010 (17 months later), despite being appraised in October 2009. Delays in availability of funds from AusAID additional financing compressed the time available for implementation. However, EdL managed to mobilize its own resources to fund the activities in advance in absence of the Norad and AusAID funds, such as for the ICB contract supported by Norad and the P2P funded by AusAID financing.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

M&E design. The M&E design of the Project consisted of socio-economic surveys before and after the Project and a results monitoring framework. The indicators included in the results framework are adequate to monitor progress toward PDO/GEO. However, there were discrepancies in terms of the target value for one of the PDO indicators, namely the number of HH electrified, between the results monitoring framework in Annex 3 and the main text of the PAD (the latter, a higher figure, is used in this evaluation). In addition, there were four core GEO indicators in the main text of PAD and only two in the results monitoring framework (this evaluation uses the latter since the other two are repetitive of one PDO indicator and one intermediate indicator).

M&E implementation. The 2004 social economic survey was successfully carried out. A follow-up socio economic survey began after the closing of REP I but the results are not yet available. (They should be available later in 2013 for use under REP II.) In addition, the survey of EdL customers on awareness and adoption of EE technologies was last done in 2008 but no subsequent survey was done. The performance indicators included in the results monitoring framework were monitored and reported to the Bank on a regular basis.

In the Additional Financing Project Paper, small changes were made to the Results Framework to show two indicators pertaining to the P2P program and two indicators for SHS installed and HH served by micro-hydro and biomass.

M&E utilization. The 2004 social economic survey provided an excellent baseline for the monitoring and evaluation of the Project. The key result indicators were adequate for monitoring the project progress and informed the Bank as well as the implementing agencies of issues related to project implementation. For example, key indicators for tracking the financial performance of EdL were constantly tracked and reported, and non-compliance with related financial covenants was timely identified and follow-up actions were discussed between the Bank and the Borrower.

2.4 Safeguard and Fiduciary Compliance

Safeguards: The Project was appropriately assigned “Category B”, as potential impacts were expected to be moderate. Four safeguards policies were triggered by the project (i) Environmental Assessment (OP/BP/GP 4.01); (ii) Involuntary Resettlement (OP/BP 4.12); (iii) Indigenous Peoples (OD 4.20, revised as OP 4.10); and Forests (OP/BP 4.36). All relevant framework documents and management action plans (RPF, EMDS, EMP, RAP), were prepared satisfactorily to IDA, for both on- and off-grid components to address the safeguard issues, and were disclosed locally and on the internet. No major or irreversible environmental and social impacts occurred under the project, and mitigation measures applied adequately mitigated negative impacts. Consultations were carried out adequately and prior to the commencement of civil works with affected people. Impacts on loss of land and other productive assets were adequately compensated as per RAP. Ethnic minorities were given priorities in receiving project benefits within the limits of technical feasibility.

Monitoring of EMP/IPA implementation was regularly undertaken by the Environment Office of EdL on quarterly basis. Environmental impacts were minimal and managed through applying good construction practices. Cutting and trimming of trees or tree branches to facilitate the installation of poles was done and monitored according to the EMP. EdL branch offices made agreement(s) with individual household according to the social safeguard framework and recorded the voluntary contributions. No external review on EMP/RAP implementation was carried under the Project. Limited number of environmental and social safeguards staff at central and branch offices of EdL was a major challenge during project preparation. However, with support of the Bank both EdL and DoE/IREP, managed to assess the environmental and social issues and prepared frameworks on a learning-by-doing basis. The capacity of the EdL and DoE/IREP has gradually been improved under the Project. To date EdL completed the environmental preparation works independently (including implementation monitoring) with limited consultant supports. Further strengthening the capacity of EdL/IREP on safeguard monitoring and reporting is being provided under REP II with Norad financing.

Procurement. There were no major issues regarding compliance with Bank procurement guidelines. Procurement of goods and consultants was carried out conducted at the central level following satisfactory procurement plans and standard procedures. All major equipment and materials were procured through ICB or National Competitive Bidding (NCB).

The procurement activities under each sub-component of the EdL component were carried out by the staff of the respective EdL departments. As a result, there were some delays in procurement for those sub-components due to lack of procurement experience in some of EdL’s units. In addition, frequent EdL staff movement (every 2-3 years) negatively impacted procurement performance. Overall, procurement was carried out satisfactorily. All procurement activities under the MEM component were satisfactorily conducted with the assistance of an international procurement consultant. The services of the international procurement consultant were reduced toward the end of REP I.

Financial Management. The financial management arrangements put in place for both components met the Bank’s minimum requirements as per OP/BP 10.02. Financial management was rated Satisfactory up to 2008 but was downgraded to Moderately Satisfactory in 2009 due to (i) lack of progress in rolling out the Accounting and Financial Management System (AFMS), (ii) an increase in PESCO debts, and (iii) late submission of the interim unaudited financial reports (IFRs) and audit reports. The FM rating remained moderately satisfactory until 2011 when it was downgraded to Moderately Unsatisfactory at the end of the project for reasons because of (i) problems identified with REF operations, (ii) the quarterly IFRs and audit report were submitted late, (iii) the audit opinion for EdL corporate financial statements

had a disclaimer, and (iv) the accounting system needed to be strengthened and a suitable computerized accounting software needed to be implemented. A second Action Plan for Financial Sustainability to improve EDL financial performance is being prepared under REP II and includes specific actions to enhance EDL's financial management, accounting and reporting.

2.5 Post-completion Operation/Next Phase

REP II, currently under implementation, is continuing most of the activities initiated under REP I. REP II consists of a US\$20 million IDA grant, US\$1.818 million GEF grant, US\$4 million Norad loan, and US\$15 million IFC loan. Some 5,000 pieces of SHS equipment which were purchased with AusAID co-financing are expected to be installed under REP II. REP I implementation arrangements, including the EdL and MEM teams, are implementing REP I follow-up and REP II. REP II will continue to monitor EdL's financial performance through a new financial sustainability action plan and is scheduled to work with the Government to develop a new action plan for its financial sustainability. In addition, issues related to the SHS subcomponent, including the sustainability of the REF and the performance of PESCOs, are being addressed through the supervision of REP II. Procurement preparation activities are also being addressed by producing standardized specifications to ensure faster turn-around.

3. Assessment of Outcomes

While the Project has twelve components and two core PDO indicators, the grid extension and off-grid investment subcomponents and related PDO indicator (number of HH and villages electrified) accounted for more than 80% of the total project costs and more than 70% of Bank financing. Therefore they are weighted more heavily in assessing the project outcomes.

3.1 Relevance of Objectives, Design and Implementation

Relevance Rating: High

The Project objectives, design and implementation remain relevant at present given the needs and challenges faced by Laos in national electrification. By supporting rural infrastructure development, targeting especially the poor rural population, and promoting sector-wide reforms and institution building, REP I contributed towards meeting GoL's goal of poverty reduction and establishment of an enabling environment for growth and development as set in the National Growth and Poverty Eradication Strategy. REP I also supports the Country Partnership Strategy (FY12-16) strategic objective of improving competitiveness and connectivity and the overarching IDA goal of poverty reduction.

The Project contributed to removing barriers to achieving global environmental objectives through activities on demand side management and EE and promotion of renewable energy development, which were fully in line with the GoL's Climate Change Strategy.

3.2 Achievement of Project Development Objectives and Global Environment Objectives

Rating of Project Outcome: Satisfactory

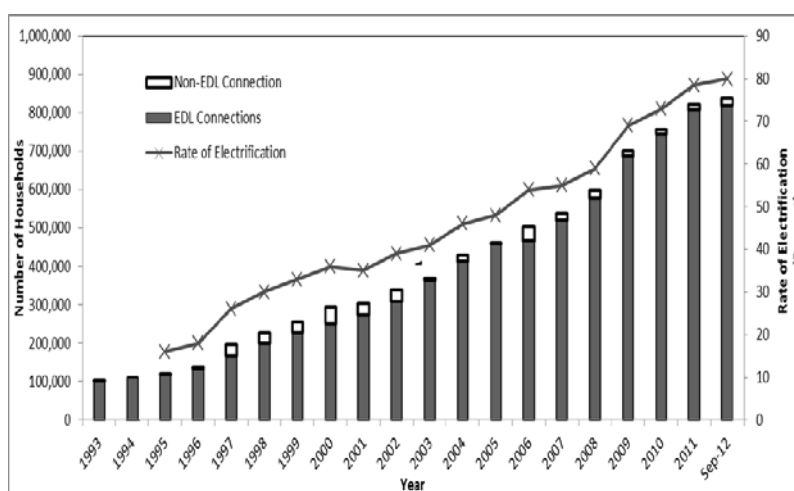
PDO (a): Increase access to electricity of rural households in villages of targeted provinces: Rating: Highly Satisfactory

The Project achieved its first PDO as it electrified 65,897 HHs, exceeding the original target of 52,000 by 29% and the revised target of 65,250 HHs by 3%. Under the grid extension component, the Project brought electricity to 57,039 HHs, including 18,353 HHs under the AusAID financing.

Under the off-grid investment program, the project installed 10,246 SHS, exceeding the original target of providing off-grid electrification to 10,000 HHs. However, 5,338 SHS were withdrawn after the arrival of grid-based electricity.

Overall, the Project contributed to the country’s phenomenal success in expanding the rate of electrification from 46 percent in 2004 to 80 percent as of September 2012 (see Figure 1 below), reaching the country’s goal of an 80 percent coverage by 2015 more than three years in advance. Approximately 20 percent of the total number of households electrified between 2006 and 2012 can be attributed to the financial support of the Project. Although no statistical evidence is available at this time, based on field visits and interviews done during ICR preparation, the impacts of the Project include improving living conditions (better lighting, electric appliances and water pumping) and enabling more electricity-based income-generation activities (such as rice milling, carpentry, handicrafts, convenience shops, better telecommunications, etc.) which have contributed to poverty reduction and economic growth. In some villages, electricity services led to better community planning (cluster of newly built houses, more permanent house structures, and new roads).

Figure 1: Households electrified 1993-2012



The fast rural electrification process is mainly attributable to the strong government commitments, by providing policy and financial support and the strong capacity of EdL in planning, design, procurement, project implementation, system operation and maintenance. This is also the outcome of Bank’s continued support since mid-1990s, in collaboration with Norad and AusAID in the later stage, in not only investment in grid-extension for access expansion but also sector reform and capacity building for implementation, operation efficiency and financial sustainability, through a series of projects including PGI, SPRE, and the REP I. All these efforts are continuing under the on-going REP II.

PDO (b): improve financial performance of the power sector. Rating: Satisfactory.

The second PDO was achieved as evidenced by the power sector/EdL achieved cost recovery (including cost of power generation / purchase, distribution and transmission) in 2007 for the first time in history—excluding dividends from Government stakes in IPP hydropower investment—and remained profitable onwards from its core business, though the indicators for financial performance of EdL at project closing could not be measured on the same basis at appraisal due to the spin-off of the profit-making generation assets in 2009. Turning from losses to profit making of energy services in Laos was mainly due to (i) system loss reduction by about 9.5%, reducing cost of services by the same percentage; and (ii) successful implementation of the Tariff Reform (2005-2010), which was designed to (a) phase out government subsidies through hydropower dividends; (b) minimize cross-subsidies among consumer categories; and (c) achieve cost-recovery first and a 4% return on EdL’s revaluated assets.

The great success in the tariff reform during 2005-2010, with permissible tariff adjustments every year, received strong Government support and little public resistance, and contributed greatly to improving sector financial performance. The success was mainly because (i) it was designed based on the affordability of rural consumers as confirmed by the extensive social economic survey during project preparation; (ii) it provided a life line tariff for the poor; (iii) it took a gradual annual increase approach

over the reform period; and (iv) its design was based on an extensive tariff study that ensured the weighted average of tariff would gradually go above the weighted average of cost of services to different customer categories. As a result, EdL was able to (i) spin off EdL-Gen as one of the two most profitable public firms for initiating the Lao stock exchange market in 2010; and (ii) contribute increased counterpart funding to invest in loss reduction, implementation of the P2P and installation of AusAID-funded subprojects.

In the period 2006-11, EdL made notable reductions in distribution loss, which decreased from 22 percent (including about 2% transmission losses) in 2006 to 10.45 percent in 2011. One percent (1%) loss reduction is equivalent to saving Lao Kip 19.5 billion or US\$2.44 million per annum¹.

However, following the spin-off of EdL-Gen (of which EdL owns 75 percent) in 2010, the parent company EdL experienced a sharp fall in its operating margin and suffered an operating loss in 2011, the first time in more than a decade. To address EdL's deteriorating financial performance, a second 5-year Financial Action Plan (2013-2017) is being prepared under REP-II. Moreover, GoL introduced a new tariff adjustment in March 2012 based on the Tariff Reform (2011-2015) prepared in 2009-2010 by an international consulting firm, by which all tariff categories increased by about 18 percent by end 2012 and is to subsequently increase by 2 percent per year thereafter until 2017. It is expected that with the recent tariff adjustments and introduction of second 5-year Financial Action Plan EdL's operating margin will turn positive again in 2014. In addition, as EdL-Gen is listed in the Lao Stock Exchange, it is expected to attract more private sector investments in developing hydro resources for electricity exports, enabling EdL to provide more sustainable, reliable and affordable electricity services to a larger base of domestic customers.

EdL successfully developed planning and implementation capacity for DSM and EE and is positioned to scale up DSM and EE activities in REP II. The Project also succeeded in developing RE master planning capacity, and laid the preparation work on business models and regulatory framework needed for development of small hydro projects.

Rating of GEF Outcome: Satisfactory

The Project's first GEO was achieved as substantial adoption of off-grid renewable energy in the Government's rural electrification program was met, growing from a 7-10% share of all newly electrified HH (under SPRE) to a 19% share under REP I. The second GEO of increased EE awareness was partially met in 2008 according to survey data from the "Demand-Side Management and Energy Efficiency Phase I Completion Report, June 2008". However EE awareness could not be assessed at project completion for lack of more recent survey data. The Project successfully expanded the dissemination of SHS for rural, remote households using an innovative delivery mechanism and laid the foundation for developing small hydro and biogas technologies at the village levels through IFC investment advisory services. One of the unintended benefits of SHS was that it provided temporary electrification services (pre-electrification) prior to the arrival of the grid. The Project also helped EdL establish a DSM cell to manage EE activities and achieved initial success in increasing the awareness of EdL customers of EE technologies and practices. At least some 46% residential, 66% commercial and industrial customers of EDL have been aware of EE

3.3 Efficiency

Rating: Satisfactory

Both economic and financial analyses show that the Project is viable despite the difference of the NPVs at project appraisal and completion (see Annex 3 for details). At a 10 percent discount rate, the economic benefit of the EdL component is estimated at a net present value (NPV) of US\$33.4 million at project

¹ Based on EDL audited Financial report 2011.

completion compared with an estimated US\$280.8 million at appraisal. The difference is primarily due to a change of the shape of the demand curve for lighting from a linear to more realistic log-linear with a constant price elasticity, which results in a US\$264.5 million downward adjustment to the NPV over the lifetime of the project. Other factors, such as expansion of project scope and appreciation of local currency against US dollar, in combination contribute to a net increase of US\$ 20 million in NPV.

The economic benefit of the MEM (off-grid SHS) component is estimated to range between US\$39 and US\$84 in NPV per system at project completion, compared with an estimated range between US\$84 and US\$109 per system at appraisal. The difference is primarily due to two factors: (i) an increase of upfront costs by US\$111 - 174 per system; and (ii) a correction to the methodology for calculating willingness-to-pay (WTP)² resulting in an upward adjustment to the estimated benefit of US\$22 - 32 per system per year, or US\$80 - 121 in NPV over the lifetime of the project.

At a 10 percent weighted average cost of capital (WACC), the financial NPV (FNPV) of the grid extension component is estimated at US\$13.6 million under the agreed subsidy arrangements and tariff regime at project completion compared with an estimated US\$6.4 million at appraisal. The difference is primarily due to the increased scope of the project with additional co-financing from AusAID. The FNPV of SHS is estimated to range between US\$8 and US\$114 per system at project completion compared with an estimated range between US\$7 and US\$35 per system at appraisal. The difference is primarily due to: (i) an increase of upfront costs by US\$111 - 174 per system; (ii) changes in household repayment schedule from 5 to actual 10 years, and (iii) appreciation of local currency LAK against US dollar.

A related question is that whether the Project-supported investments are cost effective, i.e. whether they are least-cost solutions. While unit connection cost was not an explicit consideration in the Rural Electrification Master Plan, the project established a systematic methodology to select grid extension subprojects based on a screening and prioritization process and least unit connection cost. For example, villages with clinics, schools, churches, irrigation and higher potential for economic growth were given high priority for grid extension through allocating more weight when calculation the unit connection cost of a specific subproject and each subproject was selected based on the least weighted average unit connection cost³. However, in some villages, grid extension either by EdL, provincial authorities, or private sector took place much earlier than expected in villages where SHS were recently installed. Private sector investments in grid extension were difficult to project; often the provinces jump at the private sector's offer for making electrification investments to achieve quick results and to meet or exceed electrification targets. In other villages, even with the anticipation of grid extension in the near future, SHS were provided any way as a means of pre-electrification so that the users can have electricity services immediately. Such pre-electrification for a short period is justifiable for social and equity consideration, but the economic price is high as the reuse value of withdrawn solar PVs was under US\$100 while the total cost of the system (including equipment, installation and administration) was in the range of US\$430 - US\$600 depending of system capacities.

The GEF grants provided incremental values in catalyzing the expansion of off-grid renewable energy technologies for rural electrification and the promotion of energy efficiency. Specifically, GEF provided support for strengthening institutional capacity in managing off-grid program in MEM, integrating off-grid technologies in overall electrification program, and institutionalizing the promotion of EE in EdL

² *At appraisal, the economic analysis equates WTP for lighting to consumer surplus from SHS-based lighting vis-à-vis previous methods of lighting, such as candles, lamps and car batteries. In doing so, the WTP is underestimated due to the omission of the amount paid for SHS-based lighting, which ranges between US\$22 and US\$32 per household annually in 2006 dollar.*

³ *“Yan Li and Jie Tang, Jan 2012, Lao PDR, Power to the Poor: Twenty Years of National Electrification”, p11, for detailed process of selection of sub-project based on least unit connection cost.*

operations. Without GEF support, these activities would not have taken place or have had the same level of efforts invested during the Project life.

3.4 Justification of Overall Outcome and Global Environment Outcome Rating

Overall Outcome Rating: Satisfactory

All key activities financed by IDA, GEF, Norad and AusAID were delivered and the outputs and outcomes are in line with or beyond the original targets. In particular, the number of households electrified by the Project exceeded the original target by 29 percent, and the sector financial performance has improved dramatically. More important, this Project and Bank-financed energy sector activities prior to and following this one have played an irreplaceable role in empowering the people of Laos for more than two decades in terms of both financing, technical assistance and institutional strengthening. Continuous Bank engagement leveraged a total of US\$178 million (nominal value) of project investments, contributed to the dramatic increase of electricity coverage in Laos from 16 percent in 1995 to over 80 percent today while its GDP is relatively low, and provided valuable technical advice and global knowledge in transforming EdL from a poor-performing, high-loss utility to one with moderate losses and a cadre of highly qualified technical and managerial professionals.

It is important to note that the overall outcome of the Project, grid extension and off-grid combined, exceeded the original target in terms of the number of households electrified. This project, together with continued support of the Bank, made critical contribution to the expansion of access to electricity in Laos, one of the low income countries with fastest expansion of rural electrification in the world.

Global Environment Outcome Rating: Satisfactory

The GEF components were implemented in accordance with the project design and the GEO outcomes is rated satisfactory because (i) GHG emission reduction far exceeded the target, due to loss reduction targets achieved far beyond targets and much earlier in time - which is the major contributor to GHG emission reduction; (ii) SHS share also exceeded the targets 19% at the beginning. Withdrawal, which represents better energy service and faster development of rural electrification in Laos did not have negative global environmental impacts.

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

Both the P2P and SHS programs benefited the poorer of the poor with innovative financing mechanisms

Box 1. As one example, **PHONSAAD Village** in southern Laos had 272 households in 2009. The Village was electrified in 2002 under the SPRE. There were still 72 households not connected to the grid by Jan 2009, mostly because they were poor and could not afford the connection charges of about \$85. With the Power to the Poor program, all the 72 households were connected to the grid within 2 months in February – March 2009.

Mrs. Tim lives in a household of eight people, including herself, her husband, and six children. They, like most other rural villagers used to depend on kerosene and candles that supplied a very poor level of household lighting. Now, Mrs. Tim and her family are not only enjoying the better quality lighting and watching their black and white television and are now able to work later into the night to make brooms that are exported to Thailand. Their SHS system allows her to earn an additional \$15 per week



Mrs. Tim and children, Nongsala Village, Champasak Province



Mrs. Tim's 50Wp solar panel

without which, the beneficiary households would be still using candles and kerosene for lighting, spending more on energy, and being deprived of entertainment, cultural and income-generating activities. These families are also very proud of being able to pay for electricity services. Families interviewed by the Project team during field trips reported savings on monthly expenditures on energy after being connected to the grid or acquiring SHS. EdL, despite making records for fast growing grid expansion and household connection during the project period, had advanced the scale-up of the P2P program using its own resources to help vulnerable and disadvantaged families connect to the grid. This brought the expected social benefits to these families ahead of schedule before the expected IDA financing for scaling up the P2P became available. The P2P had extensive consultations with local communities, Lao Women's Union, and targeted disadvantaged families in a gender sensitive approach. Gender was fully integrated in the project activities and all female-headed households were eligible for the P2P support. (In fact, this was praised in the QAG assessment.) The SHS program also carried out extensive consultation with potential users, village chiefs and council members, as well as the private sector. Religious groups and health service providers also benefitted from better electricity services provided through the Project.

(b) Institutional Change/Strengthening

The Project made a lasting institutional impact as evidenced by having: (i) an improved policy environment and regulatory framework, including cost-recovery tariff, reduced cross subsidies, and power sector financing strategy; (ii) a rural electrification master plan in place; and (iii) strengthened human capacities in EdL and MEM in project management, environmental and social impact management, renewable technologies, and English language. (See Annex 2 for more detail)

The Project spent sizable resources on (i) standardizing distribution network design (a design report prepared); (ii) standardizing materials to manage inventories; (iii) bottom-up distribution expansion planning, which allows EdL to make quick copies of work for procurement and funding. These are contributing factors for rapid implementation of grid-extension investment projects and the similarly rapidly growing access rate in Laos.

(c) Other Unintended Outcomes and Impacts (positive or negative)

In some villages after the arrival of the grid, SHS beneficiaries relocated the systems to the rice field for lighting and continue to make monthly payments to PESCOs. As a result, they can work for longer hours in the field after the dark and avail themselves of daytime hours for other productive activities. This way, the Project indirectly supported productive uses for these families.

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

At the stakeholder workshop that took place on September 29, 2012, participants acknowledged that the Project had a significant impact in reducing energy poverty and accelerating the electrification efforts led by EdL and MEM in terms of both investments and capacity building (Laos is expected to achieve its 90 percent electricity coverage target by 2015, five years ahead of schedule). Setting an ambitious target with clearly defined action plan and responsible parties at the central and provincial levels is key to the success. The Project was also commended for promoting renewable energy for off-grid electrification in addition to grid extension. Finally, the participants commented on areas for potential improvement, including:

- Better, regular stakeholder consultation and exchanges on rural electrification
- Stronger commitment needed for off-grid electrification
- Need to review/revise the SHS hire-purchase delivery model
- Need to review/enforce import tax exemption on renewable energy goods
- Need to put more emphasis on energy efficiency
- Need to improve the consultation with prospective SHS users on the size of the SHS, potential uses of the electricity generated by SHS, and the life time of the battery

4. Assessment of Risk to Development Outcome and Global Environment Outcome

Risk to Development Outcome Rating: Moderate

The distribution networks and customers managed by EdL are at low risk as EdL has strong technical capacity and a track record in reducing distribution losses. Moderate risks exist that the tariff adjustment that is in effect for 2012-2016 might be subject to political interference. EdL's government arrears are at substantial risk to rise further; as noted in Section 3.2, the fundamental issue of MoF allocating sufficient budget for irrigation and other public uses remains to be resolved.

Risk to Global Environment Outcome Rating: moderate

The GEF outcome related to off-grid electrification faces moderate risk depending on the availability and quality of maintenance services and such risk may be greater if a more permanent institutional arrangement for maintenance of SHS will not be in place by the closing of the ongoing REP II.

5. Assessment of Bank and Borrower Performance

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Rating: Satisfactory

The Project was well prepared with strong technical underpinning for the proposed sector policy reform and justification for the social-economic viability of the proposed investment activities. The Bank managed to mobilize adequate resources to enable several comprehensive diagnostic and project design studies as well as a large scale socio-economic survey that lent important inputs to the final project design. The Bank team supported MEM in some improvements over the business model for the SHS program that was used in SPRE, such as outsourcing day-to-day management and monitoring of the SHS program to a private firm. In addition to the complexity of the delivery model, the adverse effect of the successful on-grid electrification program has led to serious issues with the SHS program. These risks may have been underestimated at appraisal.

The QAG of the Bank assessed the quality at entry of this project in the QEA8 of 2007. Overall, the project received a satisfactory rating. Strategic relevance and approach, poverty, gender and social development, policy and institutional aspects, and risk assessment all received highly satisfactory ratings. The environmental aspects, fiduciary aspects, and implementation arrangements were rated satisfactory. Bank inputs and processes were rated moderately satisfactory, as were the technical and financial analyses under the technical, financial and economic aspects. The following were assessed as *strong aspects of the design*:

- The project was built upon the achievements of a successful predecessor project;
- It was anchored on strong economic and social objectives, and the basis for economic diversification was well thought out;
- There was strong Government commitment and a strategy for expansion of coverage, with several key reforms taking place even prior to project launch;
- There were good linkages with other donors and with the private sector (the role of which was expected to expand);
- The documentation evidenced excellent attention to social/poverty aspects;
- There was appropriate attention to demand-side management and other EE measures; and
- The economic analysis was very well done. It would have been best practice if conventional sensitivity analysis had been carried out and some of the community level benefits analyzed.

Areas that needed improvement were:

- The financial analysis could have been more thorough, and the sources of data and the assumptions were not spelled out properly in the PAD. The rationale for the financial covenants was not spelled out well;

- There were too many triggers for the second phase of the APL, and it appeared they were not subject to strategic scrutiny;
- Training represented an extremely small share of the total of TA and training. The M&E indicators, while reasonable on outcomes of TA/training, would have benefited from more detail on how the benefits of training in terms of workplace performance would be evaluated and adjusted as implementation of Phase I proceeded.

This ICR agrees with the QAG rating and assessment of strengths and areas for improvement as discussed in Section 2. However, the methodology used in the original economic analysis led to an overestimation of economic benefits of the Project which has been corrected in this analysis (Annex 3).

(b) Quality of Supervision

Rating: Satisfactory

Bank support to project implementation, with two regular missions per year and large number of visits on call by the government agencies to resolve procurement, financial management, social, environmental and technical issues on the ground on a timely manner, which was one of the major reasons of success of the project. The Bank spent tremendous time and resources in trying to provide timely support to the IAs, coordinated with various donors to joint supervisions

The task team extended the supervision to Norad's financed activities, including all technical and fiduciary review of their procurement package to get all packages ready for Norad just to sign off, since Norad did not have supervision budget and HR resources. Also the Bank has uplifted sector issues beyond the Project to donor communities and to other Bank financed projects in trying to achieve solutions, such as the tariff adjustment. In addition, the bank have tremendous SPN budget saving due to piloting and conducting cluster supervision. The quality, timeliness efficiency and effectiveness of Bank SPN are all at high level.

Bank supervision benefited from posting the TTLs in the Bangkok office where they could supervise the Project more closely. In face of a significant financing gap, the Bank actively looked for co-financing instead of reducing the scope of the Project. The Bank team also did an excellent job in facilitating knowledge sharing and transfer between Laos and other countries in rural electrification and documented and disseminated the Project's experience in various media forms. Co-operation between Bank staff and EdL/MEM staff was exemplary which contributed to satisfactory implementation of the Project.

However, there were significant delays in negotiating and signing the AusAID co-financing because of inadequate follow-up by the Bank team for trust fund management. The first negotiated package was sent to the government in March 2010 – it was supposed to be negotiated by exchange of letters. The Bank did not follow up regularly and then it discovered errors in the legal agreements, so the Bank had to send a revised package in July 2010 and it was not signed until October 2010. There were also delays by the Task Team in processing the restructuring and extension of the AusAID co-financing, although the process was completed before the current closing date as required. Much time was spent by the Task Team to get the most critical Power Sector Financial Action Plan, including the detailed Tariff Adjustment Plan for 2006-2011.

Regarding safeguard supervision, environmental and social specialists based in Country Office and in neighboring countries participated in project implementation support missions and had regular communication with environmental and social department of EdL and DoE. They provided inputs to many Aide Memoirs and provided technical guidance when EdL needs clarifications.

Bank supervision performance is rated based on comments/responses and interview with the Government, IAs, and development partners.

(c) Justification of Rating for Overall Bank Performance

Rating: Satisfactory

Although there were a few shortcomings in project design, in particular some underestimation of risks, and delays on the Bank side in processing the AusAID co-financing and its restructuring, the Bank's performance is still considered satisfactory based on solid analysis during preparation, strong

implementation support, mobilization of large amount of co-financing from other development partners to complement limited IDA resources, and the fact that the project was able to achieve its PDO and most of intermediate results.

5.2 Borrower Performance

(a) Government Performance

Rating: Moderately Satisfactory

Government commitment to rural electrification has been generally strong. GoL set a clear vision of rural electrification and mobilized/consolidated financing resources and institutional initiatives by different donors, at the central and provincial levels toward a common target. Because of the strong Government commitment, the P2P program for grid-based rural electrification has achieved impressive social benefits. At times when IDA funding for the P2P Program was not available due to price escalations in other activities, EdL and MEM provided own resources to support the scale up of P2P in selected provinces. Although investing in P2P is not financially rewarding for EdL, both EdL and MEM were committed to helping the vulnerable and disadvantaged families to achieve a greater social impact through rural electrification. Without the strong commitment of GoL to bring the benefits of electrification to its people or the highly motivated staff of EdL for implementation, these rural families would have remained unconnected to the grid and socio-economic development slower.

Annual tariff adjustment for 2005-2010 was implemented satisfactorily starting 2005. The implementation of the revised tariff plan for 2011-2015 which is close to the cost-recovery was delayed but made effective in March 2012. For most of the Project life, key financial performance indicators satisfied covenanted requirements. However, for the last two years of the Project, EdL was in breach of two of the three financial covenants (debt service coverage; and the self-financing ratios).

MoF has still not provided adequate budget to settle GoL arrears which remain significant and settlement of these arrears will further improve EdL's financial performance.

(b) Implementing Agency or Agencies Performance

Rating: Satisfactory

EdL's performance is *highly satisfactory*. EdL was highly efficient in implementing grid extension projects, faster than the original schedule. EdL leadership was and remains very committed to social electrification despite the fact that programs such as P2P are not profit-making business. Staff at EdL headquarters and its branch offices are highly motivated to implementing the Project (and whole Program) and meeting the electrification targets. The branch offices are well supported in project planning, design, procurement and delivery of results. EdL took a bottom-up approach of village screening (based on social impact indicators and least cost connections), preparation of bidding documents, completion of ICB process for equipment and material supply, processing of Norad co-financing, and installation of 67 grid extension subprojects on the ground. These were achieved by September 2009, well ahead of the March 2010 closing date. In parallel, EdL also completed the project-supported master planning and pilot projects for loss reduction well ahead of schedule, giving EdL sufficient time to mobilize its own resources to implement repeater programs and achieving loss reductions far exceeding the targets for both REP I & II before the closing of REP I.

However, there had been some delays in procurement for other EdL-implemented subcomponents due to staff movement and lack of coordination among different management units of EdL. In addition EDL did not undertake a follow-up survey on energy awareness.

MEM's performance is *moderately satisfactory*. The PMU in the MEM has been very committed despite the fact that implementation of the off-grid component is extremely challenging because of geographic remoteness and disperse distribution of project beneficiaries and the complexity of the off-grid delivery mechanism. MEM completed with efficiency the IDA and GEF supported investment and capacity building program, including hiring the Management Contractor, quality supervision contractor, identification of HHs subscribing for the IDA-funded 10,000 SHS, procurement, transportation and installation of some 10,000 SHS well in advance of March 2010 closing date. The extensive technical

assistance and capacity building activities under the other five subcomponents were mostly completed by September 2009 when the REP II was processed. However, after the ending of the management contract and quality supervision contract, the implementation of off-grid programs supported by AusAID Additional Financing faced tremendous difficulties and challenges due to the weak capacity of the MEM team. The success of the on-grid program has provided additional challenges to the implementation of the off-grid programs. That MEM works with the private sector for the provision of electricity services to end users is a relatively new experience in Laos and is effectively creating new markets with many challenges in “unchartered territory”. On the other hand, MEM faced difficulties in successfully monitoring and evaluating the performance of private PESCOs and maintaining the continuity of the VOPS assistance. It was slow at issuing appropriate guidelines for SHS operations and maintenance, reusing withdrawn SHS, as well as in responding to complaints against the performance of PESCOs and Village Energy Managers (VEMs), and in reviewing the effectiveness and relevance of the SHS delivery mechanisms.

(c) Justification of Rating for Overall Borrower Performance

Rating: Moderately Satisfactory

Based on the assessment of Borrower and Implementing Agencies’ performance, the rating for Overall Borrower Performance is Moderately Satisfactory, owing to mainly the weaknesses in MEM’s implementation capacity as well as delays in the second tariff adjustments and in procurement.

6. Lessons Learned

The lessons learned and key factors contributing to the extraordinary progress in national electrification in Laos were recently reviewed by the World Bank in 2011⁴. These high-level lessons are applicable to this Project as part of the national electrification program and therefore summarized below:

- GoL has played an irreplaceable role in terms of making unwavering commitment, getting the policies right and staying the course. The government set clear targets for electricity access and developed an institutional framework and financing and monitoring mechanisms to ensure the achievement of the target in a timely and effective manner.
- EdL has been a key and keen facilitator and front line partner in implementing grid extension and roll-out programs, and makes them successful with effective leadership, sound planning, and efficient operations.
- Striking a workable balance among financing, subsidy and tariff policies by providing necessary state subsidies to rural electrification and at the same time maintaining the commercial viability of EdL with cost-recovery tariffs.
- Targeting the gender and extreme poverty dimension of rural electrification with the innovative P2P program.
- Complementing grid extension with off-grid options for remote rural areas where the grid cannot reach in the short term.

Other lessons germane to the Project include:

The importance of partnership cannot be overestimated for achieving the expected results of the Project and the national electrification program. Given limited IDA allocations for Laos, the Project drew partners of GEF, Norad, AusAID, ESMAP, PHRD and ASTAE during preparation and implementation. The resultant co-financing and parallel financing was almost four times the IDA grant amount, enabling the Project to exceed its original targets. Moreover, donor support is united in a single program and operated based on the same operational guidelines, enabling maximum efficiency.

⁴ See *The World Bank (2011). Lao PDR Power to the People: Twenty Years of National Electrification. World Bank Asia Sustainable and Alternative Energy Program (ASTAE), Washington DC.*

Continuous Bank engagement is essential to the lasting impact of Bank interventions. It takes much longer than one project cycle to influence sector policies and institutional capacity building. Bank support for the energy sector in Laos dates back to the late 1990s when EdL was still a relatively new company. Over the last two decades, the Bank has consistently engaged in the energy sector in Laos and provided financing and technical assistance for electrification as well as improving EdL's financial performance through five consecutive projects including the ongoing APL. The achievement made by the Project, with particular regards to the power sector financial performance, would not be possible and sustainable without such interventions.

Management of social and environmental impacts should be integrated into the regular operations of the implementing agency. Compliance with environmental and social safeguards policies should not be seen as a burden to the implementing agency and it is more organic to establish good practices for managing environmental and social impacts in its regular operations through the implementation of Bank-funded Project. REP I provided extensive safeguards training to both technical professionals and managers to raise their awareness and knowledge. The P2P program provided an entry point to address the gender dimensions of rural electrification, and EdL and MEM committed their own resources to scale up the program.

Sustainability of the SHS program requires long-term attention and strategy beyond the Project life. When installation, operation and maintenance of the SHS are outsourced to the private sector, the implementing agency still carries the principal responsibility to ensure the sustainability of the SHS program. There need to be clearly defined terms of reference and a proper compensation scheme for the private sector as well as adequate monitoring and evaluations systems to ensure the SHS provides electricity services as intended during and beyond the Project life. VOPS and other private service providers should remain adequately funded until proven in-house management capacity in the MEM is established. The SHS design needs to be reevaluated in view of the unprecedented success of the on-grid extension and increased cost of services after installation and re-flow collection.

Implementation and update of the Rural Electrification (RE) Master Plan are as important as its development. As there are multiple implementers of electrification projects at both national and provincial levels, the Rural Electrification Master Plan and its database are useful tools for guiding investments and assessing progress. It is necessary to maintain the Plan and the database up-to-date and reconcile the Master Plan with the provincial cluster plans and the electrification projects implemented at provincial level. Such updates should keep up with the fast pace of electrification. Only then can the RE Master Plan provide real guidance in electrification planning.

Right strategy supported by right incentives is the backbone of off-grid expansion. Mass withdrawal of SHSs at the end of REP1 brought about by rapid grid extension may have been avoidable if SHS installation had been strategically implemented in areas where the grid would not arrive in five or more years. It would cost more to install and maintain the systems. However, this cost could be managed if the right incentives are designed. In addition, the SHS delivery model designed for a relatively low coverage market could become obsolete when the electricity coverage reaches a high level, and as a result, warrants rethinking and evaluation for its suitability.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/implementing agencies

The IAs (EdL, MEM) agreed with the content of this ICR. The IAs confirmed their satisfaction with this ICR. No comment was made by them. Comment from the borrower (MoF) was not provided.

(b) Co-financiers

Comments from the co-financier (AusAID) are provided in Annex 8. All comments from AusAID were incorporated.

Norad also confirmed their satisfaction with this ICR. No comment was made by them.

(c) Other partners and stakeholders
(*e.g. NGOs/private sector/civil society*)
None

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent)

Rural Electrification Phase I Project of the Rural Electrification (APL) Program - P075531			
Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
EdL component	27.25	37.61	138%
MEM (MIH) component	5.84	8.59	147%
Total Baseline Cost			
Physical Contingencies	0.56		
Price Contingencies	2.62		
Total Project Costs			
PPF	0.00		
Front-end fee IBRD	0.00		
Total Financing Required	36.27	46.20*	127%
Rural Electrification Phase I Project of the Rural Electrification (APL) Program - P080054			
Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
EdL component	0.75	0.75	100%
MEM (MIH) component	3.00	2.95	98%
Total Baseline Cost			
Physical Contingencies	0.00		
Price Contingencies	0.00		
Total Project Costs			
PPF	0.00		
Front-end fee IBRD	0.00		
Total Financing Required	3.75	3.70**	99%

*including an additional financing of US\$9.42 million from AusAID and a GEF grant (P080054) of US\$3.75 million.

** The project had a GEF PDF B Grant of US\$330,000, of which US\$ 230,000 was disbursed.

(b) Financing

P075531 - Rural Electrification Phase I Project of the Rural Electrification (APL) Program				
Source of Funds	Type of Financing	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Mekong AusAID Energy Fund	Grant	0	9.41	99.87%
Borrower	Counterpart	13.35	8.16	61%*
Local Communities	Counterpart	4.36	4.36	100%
Global Environment Facility (GEF)	Grant	3.75	3.70	99%
IDA Grant	Grant	10.00	10.57	106%
NORWAY: Norwegian Agency for Dev. Coop. (Norad)	Grant	10.00	10.00	100%
TOTAL	All sources	41.46	46.20	111%
P080054 - Rural Electrification Phase I Project of the Rural Electrification (APL) Program				
Source of Funds	Type of Financing	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Borrower	Counterpart	0.00	0.00	.00
Local Communities	Counterpart	0.00	0.00	.00
Global Environment Facility (GEF)	Grant	3.75	3.70	99%
International Development Association (IDA)	Grant	0.00	0.00	.00
NORWAY: Norwegian Agency for Dev. Coop. (Norad)	Grant	0.00	0.00	.00
TOTAL	All sources	3.75	3.70	99%

* It is not 100% because in-kind contribution is not accounted for at completion.

Project Costs by Component at Appraisal (US\$ million)

<i>Component</i>	Source						
	IDA	Co-fin.	GEF	EDL	MIH	Cons.	Sub-total
A EdL Component							
A.1 Grid extension	5.56	10.00		6.61		4.23	26.40
A.2 Loss Reduction	1.00			1.00			2.00
A.3 IT System	0.80						0.80
A.4 Tariff Reform	0.05						0.05
A.5 Safeguards Capacity Building	0.14						0.14
A.6 DSM			0.75				0.75
Sub-total	7.55	10.00	0.75	7.61		4.23	30.15
B MIH Component							
B.1 Off-grid Investment	1.69				0.55	0.13	2.37
B.2 Institutional Strengthening			1.10				1.10
B.3 Alternative RE Delivery Models	0.40		0.30				0.70
B.4 RE Master Plan and Database	0.14		0.85				0.99
B.5 Sector Financing Strategy	0.21						0.21

B.6 Organization Strengthening of DOE/MIH			0.75				0.75
Sub-total	2.45	3.00	0.00	0.55	0.13		6.13
Total	10.00	10.00	3.75	7.61	0.55	4.36	36.27
Percentage	27.6%	27.6%	10.3%	21.0%	1.5%	12.0%	100%

Actual Project Costs by Component (US\$ million)

<i>Component</i>	Source						Sub-total
	IDA	AusAID	GEF	EDL	Local	Norad	
A EdL Component							
A.1 Grid extension	6.13	6.84		8.16	3.96	8.41	33.50
A.2 Loss Reduction	1.00						1.00
A.3 IT System	0.80						0.80
	0.also						
A.4 Tariff Reform	05						0.05
A.5 Safeguards Capacity Building	0.14						0.14
A.6 DSM		0.1	0.75				0.85
Sub-total	8.12	6.94	0.75	8.16	3.96	8.41	36.34
B MIH Component							
B.1 Off-grid Investment	1.70	2			0.40		4.30
B.2 Institutional Strengthening			1.10			0.59	2.09
B.3 Alternative RE Delivery Models	0.40	0.38	0.30				0.70
B.4 RE Master Plan and Database	0.14		0.85				0.99
B.5 Sector Financing Strategy	0.21						0.21
B.6 Organization Strengthening of DOE/MIH		0.1					0.70
			0.70				0.70
Sub-total	2.45	2.48	2.95		0.40	0.59	8.59
Total	10.57	9.42	3.70	8.16	4.36	10.00	46.2
Percentage	22.9%	20.4%	8.0%	17.7%	9.4%	21.6%	100%

Annex 2. OUTPUTS BY COMPONENT

The outputs of the two project components, executed respectively by EdL and MEM, are described below.

A. EdL Component

A.1 Grid Extension: A total of 2767 km distribution lines (1,724km of MV lines and 1,043km of LV lines) were built. Some 66,367 concrete poles were constructed and installed and 749 transformers were installed. Some 57,039 households were connected to the grid under REP I, including 18,535 HHs under AusAID financing. A total of 570 villages have been connected to the grid.

Although EDL has moved efficiently and effectively to procure materials and plan the works, one small detail at the design stage, has caused substantial delays in re-tendering for materials. The conclusion is that WB funded projects with predefined tendering procedures for goods are vulnerable to the “minor details” if goods and services are tendered separately. Project preparation puts great pressure on the utility and “designs” are bound not to be perfect under the best managed utilities. Hence combined supply and installation projects should be encouraged for distribution works even if they are perceived to be marginally more expensive. They are more cost effective overall.

A.2 Loss Reduction: A Master Plan for Distribution Loss Reduction was undertaken in March 2007, and a report and plan were produced in December 2008. The report made recommendations on technical and non-technical loss reductions. EdL also purchased eight licenses of CYMDIST, the software for distribution loss analysis and conducted software training for EdL staff at headquarters and in four the provinces with the assistance of the Consultant. The Consultant also visited some of EdL’s branch offices and made recommendations on data collection for EdL use in CYMDIST.

EdL implemented the loss reduction program using IDA resources from REP I and REP II as well as its own resources and established a loss reduction team in each of its branch offices in charge of planning, organizing and implementing the loss reduction program. Distribution losses have declined consistently in the last few years per the table below.

	2004	2005	2006	2007	2008	2009	2010	2011
Loss Ratio* (%)	18.81	19.32	17.86	15.83	13.17	11.98	10.78	10.45

Source: ICR by EdL and MEM dated September 8, 2012.

**Measured as kWh sent from substations to kWh paid for by EdL customers.*

Capacitor installation was undertaken over the distribution network according to modeling using the CYMDIST software. Analysis results revealed that Khammouane province MV losses were amongst the highest. Re-conductoring was undertaken to reduce losses. Commercial loss reduction activities were undertaken, which in conjunction with the technical measures, brought down the losses well below the 17% target to about 10.5%. Loss reduction teams were set up in all regions and consolidated in headquarters. Re-metering was undertaken on a pilot basis in Vientiane Municipality. Meter test benches were purchased and meter calibration of new meters (on a sample basis) as well as field meters was carried out. Further Non-Technical-Loss-Reduction exercises were initiated under REP II to complement loss reduction activities.

A.3 IT System: The equipment for a computerized accounting and financial management system was purchased under SPRE. However, due to limited IT support staff and lack of adequate IT equipment, only three modules were rolled out to EdL branch offices. Therefore it was agreed that the Bank would continue to support the IT system under REP in accordance with an agreed action plan. The development of a new Material Management and Procurement System was dropped from the Project due to lack of need. An action plan for financial sustainability of the power sector was developed in 2005 and implemented during REP I.

Some Virtual Private Network and servers were procured under REP II and are being used to support the current IT system of EDL which is under increased pressure associated with the increase of electrification and loss reduction.

A.4 Tariff Reform: Tariffs were adjusted in line with the agreed Action Plan for Financial Sustainability of the Power Sector developed in 2005 (see the Table below). A new tariff adjustment scheme was developed in 2009 in order to reach cost recovery tariffs and was approved by the GoL in December 2010; however, it was not implemented until March 2012.

Currency LAK	Before Adjustment		After Adjustment					
	Jul-Dec 2005	2006	Apr 2006	2007	2008	2009	2010	2011
Households (per month)								
0-25kWh	115	132	133	154	177	203	234	269
26-150kWh	265	273	276	284	293	301	310	320
more than 150kWh	765	765	773	773	773	773	773	773
Non-Households								
Irrigation/Agriculture	295	310	313	329	345	362	380	399
Government office	706	696	703	694	684	674	665	656
Industry	636	627	634	625	616	607	599	591
Commercial	826	826	835	835	835	835	835	835
International organization or Embassies	1,066	1,066	1,077	1,077	1,077	1,077	1,077	1,077
Discos, Karaoke, Nightclubs, etc.	1,095	1,095	1,106	1,106	1,106	1,106	1,106	1,106
Medium Voltage								
Irrigation/Agriculture	251	263	266	279	293	308	323	340
Government office	541	533	539	531	524	516	509	502
Industry	600	592	598	590	581	573	565	557
Commercial	702	702	709	709	709	709	709	709

A.5 Safeguards Capacity Building: A Social and Environmental Capacity Building Plan was developed, assessing the current capacity of staff in EdL and its branches, identifying their training needs, and estimating the budget needed to implement the Plan. Training in form of workshops and on-the-job training sessions was provided to the environment staff in EdL to implement the safeguards management frameworks. Additional training was provided to managerial and technical staff on environmental and social management in the form of training workshops and study tours. Monitoring and office equipment and supplies were purchased for the environmental management office of EdL and its branches.

A.6 DSM: A DSM Steering Committee was established in 2007, consisting of the Ministries of Finance, Public Works and Transport, Energy and Mines, Science and Technology, as well as Environment and Natural Resources. A DSM Unit was created within EdL in coordination with regional branches and reaches out to other departments of EdL as well as member ministries of the Steering Committee. An energy end-use database was completed in 2007 and is available at: www.laodsm.net. Walk-through energy audits were carried out in 50 selected government buildings in 2007, the results of which formed the basis for the preparation of the Energy Efficiency Manual for the Public Sector. Low cost energy efficiency measures such as (i) replace standard ballasts with electronic or low loss magnetic ballasts; (ii) install dedicated light switches (pull-cord type) for fluorescent tube lighting; (iii) use of efficient light reflectors; (iv) use of timers to control the hours of operations, and (v) routine AC maintenance were implemented in four pilot buildings, showing significant energy savings. One percent (1%) loss reduction is equivalent to saving Lao Kip 19.5

billion or US\$2.44 million per annum⁵. Capacity building for the government employees and awareness campaigns aiming at employees in the public sector were conducted. EdL appointed ten energy coordinators to continue to implement EE activities in government buildings. Phase-two survey on implementation EE activities will be supported under REP II.

B. MEM Component

B.1 Off-grid Investment Program: The goal of REP I was to provide electrification by off-grid technologies to about 10,000 households in about 200 villages in 17 provinces, of which 10 percent used village hydro and diesel-based generation systems. Under the project 9,840 SHS were actually installed, of which 3,923 were withdrawn due to the arrival of the grid after installation. No village systems were built under REP I. Another 5,000 SHS were purchased and will be installed with REP II support. The SHS scheme was one of the pioneering schemes in the region with enthusiastic support from MEM and implementation started well. However due to the unprecedented success of on-grid rural electrification and the continued push by the national and local governments, SHS lost substantial ground, its impact is being reduced and MEM is urgently trying to redefine a moving target. It appears from the recent workshop on September 28, 2012 that the initial revolving fund scheme is no longer practicable. This is because SHS is being targeted to the most remote communities now, and as a result, recovery cost is becoming negative which renders the revolving fund unsustainable.

B.2 Institutional Strengthening: MEM outsourced the overall coordination, implementation and monitoring of the off-grid component to a contractor known as Village Off-grid Promotion and Support or VOPS with financial support from Norad. There was a void of 20 months near the end of REP I without a VOPS after the contract of the first VOPS expired in December 2009 and before the contract for the second VOPS signed in February 2012. The first VOPS selected local private companies (also known as Provincial Electricity Service Companies or PESCOs) to be responsible for installation and maintenance of SHSs and payment collection with the assistance of Village Electricity Managers (VEMs) in targeted villages. An incentive scheme was designed and implemented to reward good performance of the first VOPS and PESCOs. During implementation, the technical capacity and knowledge on off-grid electrification at MEM and provincial departments of energy and mines were also strengthened.

B.3 Alternative RE Delivery Models: Fifteen village hydro projects were identified but not implemented. The Project investigated alternative delivery models for village hydro, and with IFC support, developed a proposal for a private public partnership scheme, which aimed at promoting private participation in provision of alternative RE services. MEM is currently re-evaluating this scheme following a first round of interest from the stakeholders of the village hydro projects. The project carried out a biomass resource assessment including the potential for biogas technologies. Four biomass projects were found by the assessment, which are being tendered under REP II for development. Unlike other rural electrification projects, there was no activity related to the use of electricity for income generation was supported by the Project. The village hydro schemes were designed to become replicable and self-sustainable. However with the increase of on-grid electrification, the pressure to maintain uniform tariffs and the nonexistence of special and clear government policy or subsidy for renewable-based electrification delivery schemes this model will not be replicable/sustainable. The first two projects under the IDA grant are about to be approved for tendering under REP II, and it will be of great interest to see the operational results of such projects.

B.4 RE Master Plan and Database: An RE master plan and a geo-referenced RE database were developed and related staff in MEM were trained to maintain and update the GIS database. An assessment of mini/micro hydro resources and rehabilitation of existing mini/micro hydro plants was completed. However, the RE development was not always referred to by the local authorities.

⁵ Based on EDL audited Financial report 2011.

- B.5 Sector Financing Strategy:** A sector financing strategy and standard IPP concession contracts were prepared by the Department of Energy Business of MEM. The strategy is being used by the GoL to promote private sector participation in power generation. As results, many foreign and local investors participated in large and small scale projects respectively.
- B.6 Organization Strengthening of IREP/MEM:** Staff at IREP/MEM and provincial departments of energy and mines participated in safeguards training, study tours, and English language training. PMU/IREP was maintained and functional throughout the Project.

**Table 1: Status of Triggers to Move from Phase I to Phase II
(September 2009, for original Project scope without AusAID additional financing)**

(A) EdL Component				
<i>Subcomponent</i>	<i>Phase I project activities</i>	<i>Triggers</i>	<i>Status</i>	<i>Remarks</i>
A.1 Grid Extension	(i) Implement Phase I grid extension subprojects (ii) Project preparation for Phase II	(i) 70% of Phase I households connection targets achieved	(i) On track. About 65.3% (27,407) of the original target (42,000) achieved as of mid-September 2009; and 93.2% of the households that could be achieved (29,400, 70%) with the original financial resources.	(i) The project financial resources can only finance about 70% of the original subprojects at appraisal in 2005 because of major price escalations during 2006–07. Only about 70% of the targeted households will be electrified with the existing resources of REP I. (ii) Preparation for REP II completed.
A.2 Loss Reduction	(i) Development of a Master Plan for distribution loss reduction (ii) Implementation of priority projects (iii) Prep. of program for REP II	(i) Master Plan completed (ii) Priority projects implemented	(i) Fully Satisfied. Master plan Completed (ii) Fully Satisfied. Priority projects implemented. Losses reduced from more	(i) Distribution losses reduced from more than 20% in 2005 to about 13% in 2009. (ii) Preparation for REP II completed.
A.3 Information Technology System and Financial Management	(i) Integration of EdL Headquarters and branch offices (ii) Development of Material Management and Procurement System (iii) Financial management capacity building and training programs on Internal Auditing and Corporate Planning	(i) Billing and accounting systems rolled out to the branch offices in the 7 targeted provinces (ii) Material Management and Procurement System developed and running (iii) Training programs completed	(i) Fully Satisfied. Rollout to all the 14 provincial branch offices completed. (ii) This activity was dropped during the project implementation since there is no urgent need for them and there was a shortage of budget under REP I because of price escalation mentioned above. (iii) Fully Satisfied. Training programs completed	(i) The dropped activity is a minor technical assistance activity, to be addressed at the restructuring together with closing date extension for accommodating additional financing (US\$6.24 million from AusAID for 12,000–15,000 households) to fill up the gaps for the Grid Extension Subcomponent. ICR update; The Project paper of AusAID additional financing did not mention explicitly the cancellation of this TA activity.
A.4 Tariff Reform	(i) Implementation of the Sustainability Action Plan	(i) Phased implementation on schedule	(i) Fully Satisfied. On schedule and the performance has been highly satisfactory	(i) Tariff reform was designed for implementation during 2006–11
A.5 Demand-Side Management and Energy Efficiency Program	(i) Establishment of DSM cell within EdL (ii) Development and implementation of Phase I DSM and EE programs (iii) Prepare program for Phase II	(i) DSM cell established in EdL and running (ii) Phase I DSM and EE programs implemented (iii) Phase II programs developed	(i) Fully Satisfied. DSM cell established and running (ii) Fully Satisfied. Phase I TA for DSM and EE program has been fully completed and implementation of recommendations is underway	

			(iii) Fully Satisfied. Phase II programs fully developed	
(B) MEM Component				
B.1 Off Grid Investment	(i) Implement Phase I off-grid electrification activities (ii) Project preparation for Phase II	(i) 70% of household targets achieved	(i) Fully Satisfied. 90% of targeted households electrified.	(i) Installation underway and 93% to be achieved by August 2009. (ii) Preparation for REP II completed
B.2 Institutional strengthening	(i) Management contract for off-grid awarded on competitive bidding basis (ii) Contract for quality assurance by a third party awarded	(i) Satisfactory execution of the mgmt. contract (ii) Satisfactory execution of the quality assurance contract	(i) Fully Satisfied. Satisfactorily executed (ii) Fully Satisfied. Satisfactorily executed	
B.3 Alternative Rural Electrification Delivery Models	(i) Operation and management of REF initially restricted to MEM projects (ii) Development of legal, regulatory and institutional arrangements necessary to enable REF to be accessible to other participants (iii) Project preparation and solicitation documents for alternative model projects (iv) Biomass resources assessment and biomass generation piloting (v) Assessment of income generation linkage with off-grid electrification	(i) REF in smooth operation to support MEM projects (ii) GoL agreement to extend to other participants and all necessary legal provisions developed and approved (iii) Solicitation documents for "other model" projects completed (iv) Resources assessment completed and piloting underway (v) Income generation linkage assessment completed	(i) Fully Satisfied. REF smoothly operating and financed REP I off-grid electrification (ii) Fully Satisfied. PM Decree issued and REF opened to others through the DOE. REF Operation Manual will be finalized by July 2009. (iii) Fully Satisfied. Solicitation documents for micro/village hydro completed and private sector and public-private partnerships in place (iv) Fully Satisfied. Assessment of biomass resources completed and preparation of pilot projects completed. (v) Fully Satisfied. Assessment report completed and delivered in July 2009	
B.4 Rural Electrification Master Plan and Database	(i) Development of a rural electrification master plan and associated rural electrification database (ii) Assessment of small and mini/micro hydro resource (iii) Assessment of rehabilitation of existing mini/micro hydropower plants	(i) A time bound rural electrification master plan covering the period up to 2020 developed and implemented (ii) Renewable resource inventory completed and rural electrification database established (iii) Assessment of rehabilitation of 20 existing mini/micro hydropower plants completed	(i) On track. Bid Evaluation completed. Signing of contract underway. (ii) Satisfied. Biomass resource inventory completed. Rural electrification database established. Data on biomass to be input in the database (iii) On track. Assessment of rehabilitation of existing mini/micro hydropower plants is under the rural electrification master plan contract	(i) Medium-term grid extension planning for rural electrification completed and identification of REP II grid extension subprojects and beneficiary villages completed. Off-grid electrification, mainly through SHSs, will be started in later 2010 and can be easily coordinated with the grid extension since the grid extension planning is already completed.
B.5 Sector Financing Strategy	(i) Revision of Power Develop. Plan in line with Power Sector Development Plan	(i) Sector financing strategy developed (ii) Preparation of two small	(i) Fully Satisfied. Financing strategy for investment projects are incorporated into to individual transactions	

	(ii) Development of financing strategy (iii) Preparation of legal documents for small-scale hydropower projects concessioning to independent power producers	hydropower projects, including solicitation documents for concessioning to independent power producers completed	(ii) Fully Satisfied. 14 small hydro project sites have been prepared with detailed feasibility studies; solicitation documents developed under B.3	
(C) For both MEM and EdL Components				
Safeguard Capacity Building	(i) Implementation of safeguard training program and study tours (ii) Identification of capacity building program for Phase II	(i) Satisfactory completion of training programs developed during Phase I and agreed by IDA	(i) Fully Satisfied. Satisfactory completion of agreed training programs	(i) Capacity building programs under REP II fully developed.

Annex 3. ECONOMIC AND FINANCIAL ANALYSIS

I. Project Economic and Financial Analyses

This section comprises the economic and financial analyses of: (i) the grid extension component under EdL, and (ii) the off-grid SHS component under MEM.

A. Grid Extension under EdL

a. Methodology adjustment – benefits of grid-based electricity supply

At appraisal, the economic analysis assumed a linear demand curve for lighting (See Approach I in table 1). A problematic implication of this assumption is that demand elasticity increases as the price level rises, resulting in a significant overestimate of project benefits. At the appraisal of REP II, the shape of the demand curve was adjusted to a more realistic concave shape with three linear segments defined by four price-and-consumption points identified through a consumer survey (See Approach II in table 1). This adjustment results in a nearly two-thirds decrease in the estimated consumer surplus. Following the recommended approach by IEG (2008)⁶, this analysis makes a further adjustment to the shape of the demand curve to log-linear, implying constant demand elasticity throughout the entire price range. This adjustment results in a further four-fifths reduction in the estimated consumer surplus of grid-based lighting (See Approach III in table 1). Using the same approach, this analysis also estimates the consumer benefits of grid-based electricity consumption for the use of radios and TVs (See table 2).

Table 1. Methodology: Consumer Surplus from Grid-based Lighting

		Demand Curve	Consumer Surplus (CS)	Estimate (application)
I		Linear	Weighted average of CS ₁ CS ₂ CS ₃ CS ₁ = A+B+C CS ₂ = B+C CS ₃ = C	Grid: Kip 808,210/month (REP I appraisal)

⁶ IEG, the Welfare Impact of Rural Electrification: A Reassessment of the Costs and Benefits, an IEG Impact Evaluation, 2008.

		Demand Curve	Consumer Surplus (CS)	Estimate (application)
II		Kinked with 3 linear segments	A+B+C	Grid: Kip 290,015 (REP II appraisal)
III		Constant elasticity (log-linear) $P=KQ^\eta$	A	Grid: Kip 55,980/month (REP I completion)

b. Summary of changes in assumptions and parameters of grid extension

Below is a summary of all assumption and parameter changes to the grid extension component.

		At Appraisal	At Completion
Investment Cost		US\$24.9 million	US\$ 48.76 million
Cost of Supply	Economic	Long run marginal cost (LRMC) of supply (2006-14) at HV <ul style="list-style-type: none"> EdL: \$0.046kWh (90%) EGAT: \$0.076/kWh (10%) 	Based on the 2009 Tariff Study, LRMC (2007-16): <ul style="list-style-type: none"> Generation: 448 kip/kWh Transmission: 86 kip/kWh before losses Distribution: 63 kip/kWh before losses
	Financial	<ul style="list-style-type: none"> EdL: \$0.024kWh (90%) EGAT: \$0.045/kWh (10%) 	EdL cost of supply: 959 kip/kWh (2009), 946 kip/kWh (2010), 976 kip/kWh (2011). From 2012, based on EdL tariff plan
	T&D losses	Did not take into account T&D losses	2008-11: actual 2012 onward: 10.0%
	O&M	An annual 1% of capital cost (\$17.24 million) excluding supervision and maintenance	Based on EdL provincial level O&M expense, the average cost in the 7 southern provinces was 275,000 kip per connection per year in 2009
Consumption	Household	<ul style="list-style-type: none"> HH connections: 42,295 Connection growth: 0% HH consumption: based on household survey, average HH consumption is 55 kWh (year 1-3), 62 kWh (year 4-5) and 68 kWh thereafter 	<ul style="list-style-type: none"> HH connections: 57,039 (actual) HH connections would grow 4.8% from 2010-11 in the electrified villages in the South (without additional connections added by REP I & II) HH consumption: 82kWh/month Assume connection growth will plateau in 5 years to population growth rate of 1.4% ; and HH consumption will grow from 55kWh/month to 82kWh/month in 5 years

		At Appraisal	At Completion
	Other customer segments:	<ul style="list-style-type: none"> ▪ Irrigation: 24 customers at 26,525 kWh/yr ▪ Industrial: 1,449 customers at 24,285kWh/yr ▪ Consumption: 60% of the average in year 1-5 and 100% from year 6 onward 	Based on EdL billing data in 7 southern provinces from 2010-11 <ul style="list-style-type: none"> ▪ Total consumption = 1.93 * total HH consumption
Tariff		Tariff adjustment approved by the GoL on June 24, 2005 and made effective on July 1, 2005	<ul style="list-style-type: none"> ▪ 2008-11: based on actual domestic weight average tariff ▪ 2012-16: EdL tariff plan ▪ 2017 onward: 2% growth annually
Dividend payout		<ul style="list-style-type: none"> ▪ 2008-11: based on actual dividend payout on per kWh basis 	<ul style="list-style-type: none"> ▪ 2008-11: based on actual dividend payout on per kWh basis ▪ 2012 onward: Based on EdL projected dividend payout schedule (per kWh)
Consumer Benefit	WTP for purposes other than lighting, radio and TV	<ul style="list-style-type: none"> ▪ Irrigation≈ 354 + cost of supply ▪ Industrial≈ 606 + cost of supply 	<ul style="list-style-type: none"> ▪ 859 kip/kWh (weighted average domestic retail tariff in 2011-12)
Exchange rate		1 USD = 11,205 kip	1 USD = 8,020 kip
Discount rate	Economics	10%	
	Financial	10%	10% (Sensitivity range 1 to 12%)

c. Results of Economic Analysis

At a 10 percent discount rate, the economic benefit of the grid extension component is estimated at a net present value (NPV) of US\$36.3 million at project completion compared with an estimated US\$280.8 million at appraisal. The difference is primarily due to the above mentioned change from a linear to a more realistic log-linear or constant-elastic demand curve for lighting. This change results in a US\$264.5 million downward adjustment in NPV over the lifetime of the project. Other factors, such as expansion of project scope, and local currency appreciation, in combination result in a net increase of US\$20.0 million in NPV.

Grid Extension under EdL	NPV (US\$ million)		Benefit / Cost Ratio		EIRR	
	Completion	Appraisal	Completion	Appraisal	Completion	Appraisal
	36.3	280.8	1.8	7.1	22%	687%

Table 2. Summary of Consumer Benefits of Lighting, Radio and TV Using Grid-Based Electricity

$$\text{Consumer Surplus} = \int_{Q_{ne}}^{Q_e} KQ^\eta dQ + Q_{ne} * (P_{ne} - P_e) = \frac{K}{\eta+1} * (Q_e^{\eta+1} - Q_{ne}^{\eta+1}) + Q_{ne} * (P_{ne} - P_e)$$

$$\text{Willingness-to-Pay} = \text{Actual Paid Amount} + \text{Consumer Surplus} = P_e * Q_e + \frac{K}{\eta+1} * (Q_e^{\eta+1} - Q_{ne}^{\eta+1}) + Q_{ne} * (P_{ne} - P_e)$$

Summary of Benefit	Non-Electrified		Grid		Demand Function $P=KQ^\eta$		Consumer Surplus (Kip/month)		WTP (Kip/month)		WTP (Kip/kWh)	
	Q_{ne}	P_{ne}	Q_e	P_e	Elasticity (η)	Coefficient (K)	ICR	PAD	ICR	PAD	ICR	PAD
Lighting (unit= <i>klu</i>)												
- Candle/ lamp (63%)	3.2	4,628	435	3.25	-1.476	26,135	42,315	1,015,484	44,722	4,113	4,110	1,016,929
- Candle/lamp/car battery (31%)	19.6	2,183			-2.094	1,112,600	80,638	497,398	82,102	7,543	7,545	498,844
- Car battery (6%)	25.3	1,029			-2.015	689,243	50,094	237,694	51,534	4,736	4,736	239,139
Weighted average							55,292	808,210	56,718	809,655*	5,212	74,405
Radio⁽¹⁾ (unit= <i>hour</i>)												
- Dry cell (63%)	10	521	124	3.0	-2.048	58,236	9,795		10,167		4,555	
- Car battery (37%)	106	263			-28.523	1.54E+60	28,559		28,931		12,962	
Weighted average							16,745	22,021	17,110	22,393*	7,666	10,033
TV⁽²⁾ (unit= <i>hour</i>)												
- Car battery	20.4	362	106	6.0	-6.249	2.72E+13	23,252	29,294	23,888	29,930*	2,817	5,633
Sub-total lighting, radio and TV							95,263	808,210⁽²⁾	97,716	809,655		

ICR= Implementation Completion and Results Report; PAD = Project Appraisal Document

⁽¹⁾ A plug-in radio generally has a load of 18 watts.

⁽²⁾ A TV set using grid-based electricity generally has a load of 80 watts.

⁽³⁾ Calculated based on the consumer surplus estimate. At appraisal, willingness-to-pay for radio and TV was not assessed.

⁽⁴⁾ At appraisal, only the consumer surplus from lighting was considered in the calculation of the economic benefit of the project. The benefits of other uses of electricity were not included even though they were assessed. This is likely because the estimated benefit of lighting at appraisal far outweighed the benefits of other uses of electricity.

d. Economic analysis sensitivity

The willingness-to-pay (WTP) for lighting, radio and TV are estimated at 5,212 kip/kWh, 7,666/kWh and 2,817 kip/kWh respectively (See table 2). Moreover, the 2004 survey data suggest that each household consumes around 22 kWh on lighting, listening to the radio and watching TV per month. For the remaining electricity consumption, such as for household cooking, refrigeration, agricultural irrigation, industrial and commercial uses, etc., the WTP is conservatively assumed at the weighted average domestic tariff of 2011-12 at 859 kip/kWh (US\$0.107/kWh). A sensitivity analysis suggests that the economic return of the project is highly sensitive to the assumed WTP for electricity consumption for purposes other than lighting, radio and TV – every 1 US cent/kWh increase in WTP will result in about US\$8.6 million increase in the project NPV (See Figures 1a and 1b).

Figure 1.a

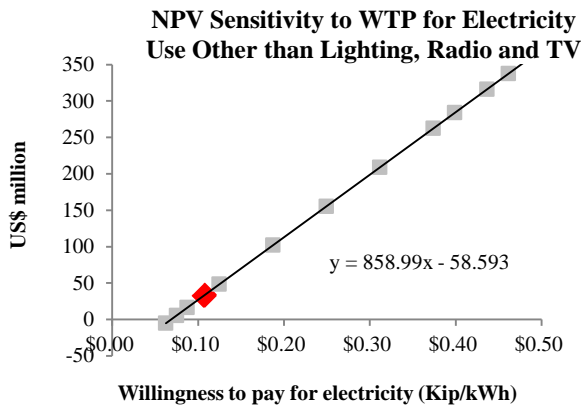
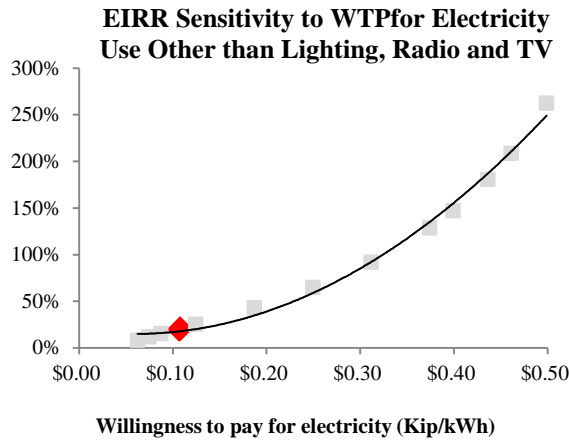


Figure 1.b



e. Financial analysis results

At a 10 percent WACC, the financial NPV (FNPV) of the grid extension component is about US\$13.6 million under the agreed subsidy arrangements and tariff regime at completion compared with an estimated US\$6.4 million at appraisal. The difference is primarily due to the increased scope of the project with additional financing from AusAID.

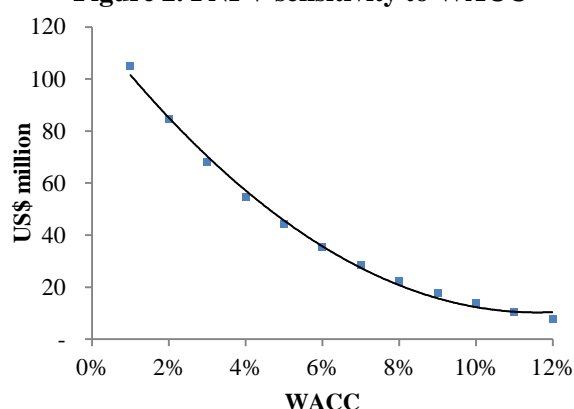
Table 3. Financial Analysis Outcomes- Grid Extension Component

Grid Extension under EdL	FNPV (US\$ million)		Benefit/ Cost Ratio		FIRR	
	Completion	Appraisal	Completion	Appraisal	Completion	Appraisal
Base case: w/ dividend &subsidy	13.6	6.4	1.11	1.20	16.2%	4.2%
Scenario 1: w/ subsidy only	4.7	6.3	1.04	1.20	12.1%	4.2%
Scenario 2: w/ none	(9.7)	(3.7)	0.92	0.91	7.1%	-1.5%

f. Financial analysis sensitivities

The project FNPV is highly sensitive to EdL’s WACC. The FNPV of the base case scenario would increase to US\$35.3 million with a WACC at 6 percent compared with US\$13.6 million with a 10 percent WACC (see figure 2).

Figure 2. FNPV sensitivity to WACC



B. Off-grid SHS under MEM

a. Methodology revision

At appraisal, the WTP for SHS-based lighting only took into account the consumer surplus while omitting the household current payment for SHS-based lighting, which ranges between US\$22 and US\$32 per household annually in 2006 dollars. This omission resulted in an underestimation of between US\$80 and US\$121 per system in NPV through the life of the project.

b. Summary of changes in assumptions and parameters

Below is a summary of all assumption and parameter changes to the off-grid component.

	Appraisal	Completion
System life	5 years	5 years (sensitivity range 1 to 10 years)
Daily usage hours	Not specified	Maximum 4 hours (sensitivity range 1 to 4 hours)
Upfront costs (including equipment, transport, installation, etc.)	20 Wp 30 Wp 40 Wp 50 Wp	US\$237 (incl. US\$158 for equipment) US\$321 (incl. US\$213 for equipment) US\$405 (incl. US\$268 for equipment) US\$468 (incl. US\$322 for equipment)
Subsidy	100% on all upfront costs	100% on cost of equipment
Annual O&M (including battery replacement)	20 Wp 30 Wp 40 Wp 50 Wp	2% capital/yr 2% capital/yr 2% capital/yr 2% capital/yr
	USD 18.45 annually	

Repayment schedule and amount	20 Wp	Year 1: USD 18.00 Year 2-5: USD 20.88	Upfront: 160,000 kip (\$19.95) 156,000 kip (\$19.45) x 10 yrs
	30 Wp	Year 1: USD 18.00 Year 2-5: USD 21.60	Upfront: 190,000 kip (\$23.69) 216,000 kip (\$26.93) x 10 yrs
	40 Wp	Year 1: USD 18.00 Year 2-5: USD 22.68	Upfront: 220,000 kip (\$27.43) 300,000 kip (\$37.41) x 10 yrs
	50 Wp	Year 1: USD 18.00 Year 2-5: USD 29.76	Upfront: 250,000 kip (\$31.17) 360,000 kip (\$44.89) x 10 yrs
Consumer Benefit	Electricity use other than lighting	Not included	859 kip/kWh (weighted average domestic retail tariff in 2011-12)
Exchange rate		1 USD = 11,205 kip	1 USD = 8,020
Discount rate	Economics	10%	
	Financial	10%	10% (Sensitivity range 1 to 12%)

a. Results of economic analysis

The economic benefits of SHS are estimated to range between US\$39 and US\$84 per system at project completion, compared with a range between US\$84 to US\$109 at appraisal. Two factors are the primary contributors to the change: (i) an increase of upfront costs by between US\$111 and US\$174 per system; and (ii) the above mentioned correction in the methodology for WTP calculation, which results in an upward adjustment between US\$80 and US\$121 per system in NPV.

Table 4. Economic Analysis Outcomes – Off-grid SHS

	NPV (US\$ million)		Benefit/ Cost Ratio		EIRR	
	Completion (ICR)	Appraisal (PAD)	Completion (ICR)	Appraisal (PAD)	Completion (ICR)	Appraisal (PAD)
Off-grid SHS						
20 W system	84.4	83.7	1.31	1.41	38%	52%
30 W system	38.9	66.7	1.12	1.28	18%	34%
40 W system	55.2	97.6	1.14	1.36	19%	40%
50 W system	62.6	109.3	1.14	1.35	19%	27%

b. Economic analysis sensitivities

The economic return of a SHS is sensitive to the system's lifespan and the average daily operating hours. A 30-50 Wp system operating on average four hours a day would have to last more than 3.5 years to break even economically. Similarly, a 30-50 Wp system with a lifespan of five years would have to operate on average more than three hours a day in order to break even (See figure 3a and 3b below).

Figure 3.a

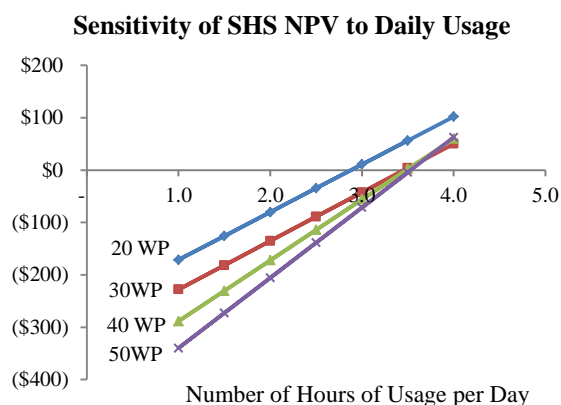
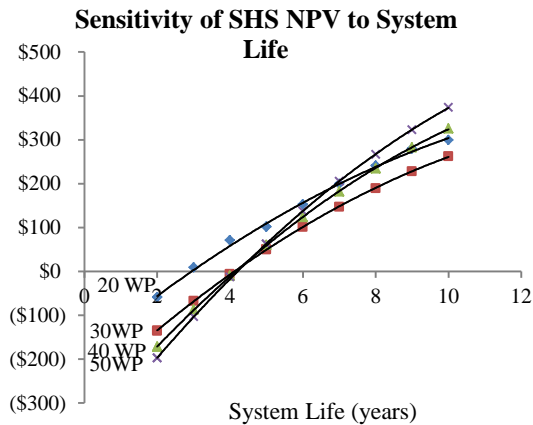


Figure 3.b



c. Financial analysis results

The FNPV of SHS is estimated to range between US\$8 and US\$114 per system at project completion compared with an estimated range between US\$7 and US\$35 per system at appraisal. The difference is primarily due to: (i) an increase of upfront costs between US\$111 and US\$174 per system; and (ii) changes in the household repayment schedule from five to 10 years, and (iii) appreciation of local currency LAK against US dollar.

Table 5. Financial Analysis Outcomes – Off-grid SHS

	FNPV (US\$ million) (per system)		Benefit/ Cost Ratio		FIRR	
	Completion	Appraisal	Completion	Appraisal	Completion	Appraisal
20 Wpw/ 100% subsidy on equipment	8.3	7.3	1.06	1.09	14.5%	480%
30 Wpw/ 100% subsidy on equipment	31.5	9.5	1.20	1.12	22.0%	630%
40 Wpw/ 100% subsidy on equipment	72.4	13.0	1.40	1.17	31.3%	850%
50 Wpw/ 100% subsidy on equipment	113.9	35.4	1.60	1.35	43.0%	2276%

* Project file suggests that the estimated IRR levels were incorrectly recorded at appraisal. The recorded values were off by two digits. The actual estimates should be 480%, 630%, 850% and 2276% for 20-50 WP systems respectively.

II. EdL Financial Performance

A. Covenant Compliance

At appraisal, EdL was able to generate sufficient cash from its operations to meet the three covenanted financial obligations associated with the IDA credits: (i) a self-financing ratio of no less than 30 percent; (ii) a long-term debt to equity ratio of no more than 1.5; and (iii) a debt service coverage ratio no less than 1.5.

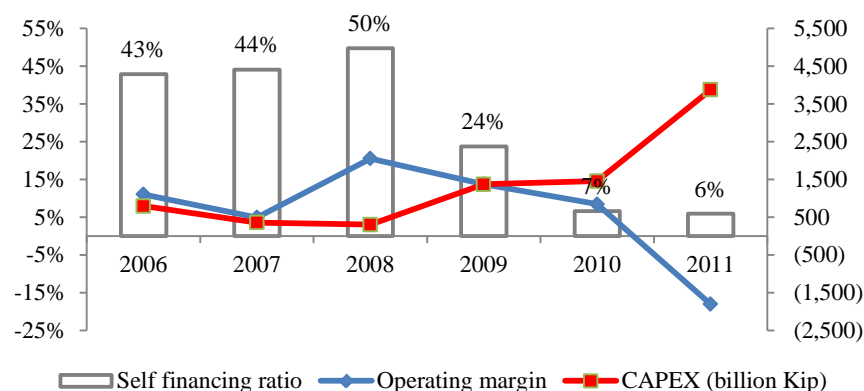
Table 6. Summary of EdL Covenant Compliance Status (2006-11)

	2006	2007	2008	2009	2010	2011
Debt to equity ratio (< 1.5)	0.57	0.60	0.59	0.75	0.63	1.3
Self-financing ratio (> 0.3)	0.43	0.44	0.50	0.24	0.07	0.06
Debt service coverage (>1.5)	1.83	1.78	2.44	1.72	1.74	1.21
Rate of return on revaluated asset	0.04	0.03	0.04	0.04	0.02	0.01

In the period 2006-10, EdL had continued fulfilling its covenanted financial obligation regarding debt-to-equity ratio and debt service coverage ratio. In 2011, the company's debt service coverage ratio fell below the covenanted 1.5 due to the narrow operating margin that year. Moreover, EdL did not meet the 4 percent rate of return on revaluated asset target at project completion largely due to the same reason.

Since 2009, EdL has been in breach of the self-financing ratio covenant as a result of: (i) rising investment levels and (ii) narrowing operating margin (See figure 4).

Figure 4. EDL Self Financing Ratio

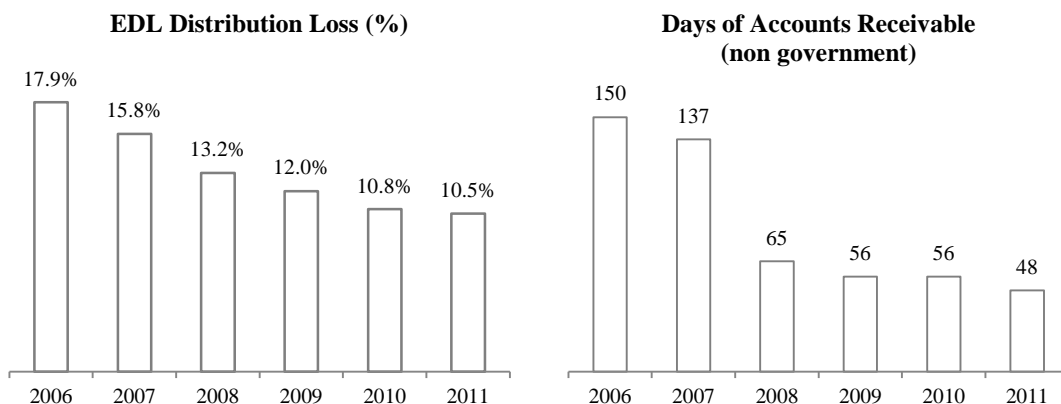


B. EdL Financial Performance (2006-11)

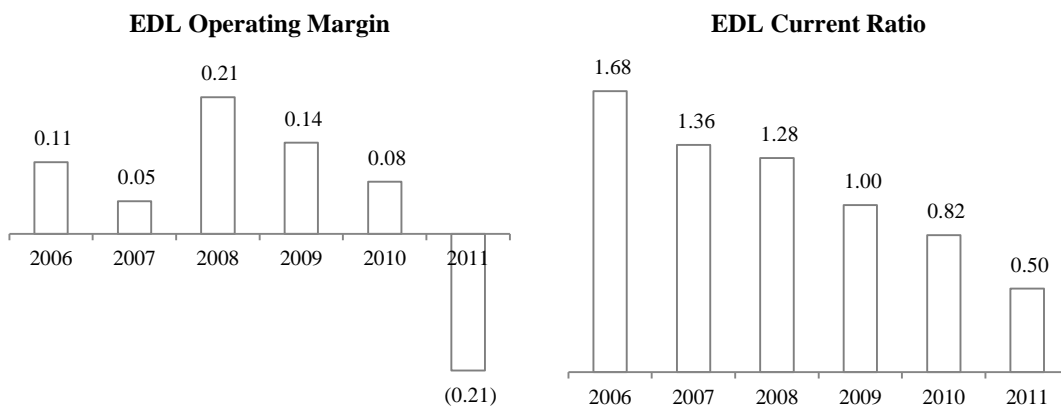
Below is a summary of EdL's financial performance in 2006-11.

<i>Billion Kip</i>	Audited 2006	Audited 2007	Audited 2008	Audited 2009	Audited 2010	Audited 2011
I Profit and Loss Statement						
1 Operating revenue	1,021	1,067	1,274	1,486	1,690	1,952
2 Operating expenses	908	1,015	1,013	1,282	1,547	2,356
3 Operating income	113	53	261	204	142	(404)
4 Other income (expenses)	102	78	53	81	(21)	434
5 Net income before tax	214	131	314	285	121	30
6 Taxes	31	27	81	57	35	46
7 Net income after tax	183	104	233	228	86	(16)
II Balance Sheet						
1 Current assets	673	695	878	894	705	908
2 Non-current assets	6,787	7,073	7,287	8,540	8,282	11,993
3 Total Assets	7,460	7,768	8,165	9,434	8,987	12,901
4 Current liabilities	402	511	688	897	876	1,818
5 Non-current liabilities	2,315	2,392	2,342	3,159	2,609	5,485
6 Equity	4,728	4,865	5,135	5,378	5,502	5,598
7 Total Liabilities & Equity	7,444	7,768	8,165	9,434	8,987	12,901
III Statement of Cash Flows						
1 Cash flows from operations	273	257	394	319	255	384
2 Cash flows from investment	(737)	(250)	(287)	(1,331)	(1,445)	(3,647)
3 Cash flows from financing	530	34	71	975	960	3,207
4 Net increase (decrease) in cash	66	42	178	(37)	(230)	(55)
5 Year-end cash balance	174	216	394	357	126	71

In the period 2006-11, EdL had made notable improvements in two areas: (i) distribution loss reduction, in part due to the investments from REP I; and (ii) reductions in days of accounts receivables among non-government customers.



However, EdL’s liquidity position has been deteriorating since 2006. Following the spin-off of EdL Gen in 2010, EdL, the parent company, experienced a sharp fall in its operating margin. In 2011, EdL Gen became one of the first two companies going public in the newly established Laotian Stock Exchange. The generation price included in the power purchase agreement between EdL Gen and EdL has shown to be well above the previous internal transfer price between EdL’s generation unit and its transmission and distribution units. As a result, EdL suffered an operating loss in 2010, the first time in more than a decade. In order for EdL to have broken even operationally that year, its domestic end-user tariff would have to have been 22 percent higher.



C. EdL Financial Projections (2012-16)

Going forward, EdL is expected to experience a fundamental shift in its business model from operational-profit-driven to investment-dividend-driven. Caught between a high PPA tariff on the generation side and the fully regulated retail tariff on the demand side, EdL is bound to experience razor-thin operating margins even if the tariff schedule manages to keep up with the cost of supply. Given the tariff increase has already fallen behind schedule, EdL will likely suffer operating losses in the short to medium term while putting its bottom line fully dependent on the dividend payouts from EdL Gen and the IPPs where it has equity ownership.

Preliminary financial projections of EdL suggest the company will face considerable challenges fulfilling all three of its covenanted financial obligations in the coming years that were set before the spin-off of the EdL-GEN.

Table 12.EdL Financial Projections (20012-16)

	2012	2013	2014	2015	2016
I Profit and Loss Statement					
1 Operating revenue	2,299	2,759	3,059	3,394	3,769
2 Operating expenses	2,349	2,581	2,765	3,031	3,257
3 Operating income	(50)	179	293	363	512
4 Other income (expenses)	302	246	203	185	192
5 Net income before tax	251	425	496	548	704
6 Taxes	23	28	31	40	95
7 Net income after tax	228	397	466	507	609
II Balance Sheet					
1 Current assets	1,072	1,229	1,344	1,438	1,536
2 Non-current assets	13,080	14,196	15,185	15,311	15,239
3 Total Assets	14,152	15,425	16,529	16,749	16,775
4 Current liabilities	1,511	1,303	1,191	1,084	1,031
5 Non-current liabilities	6,858	7,985	8,778	8,642	8,154
6 Equity	5,783	6,137	6,560	7,024	7,590
7 Total Liabilities & Equity	14,152	15,425	16,529	16,749	16,775
III Statement of Cash Flows					
1 Cash flows from operations	(602)	(279)	(51)	28	189
2 Cash flows from investment	(760)	(823)	(726)	126	320
3 Cash flows from financing	1,417	1,127	793	(136)	(488)
4 Net increase (decrease) in cash	55	25	16	18	21
5 Year-end cash balance	126	151	168	186	207
IV Financial Ratios					
1 <i>Debt to equity ratio (< 1.5)</i>	1.19	1.30	1.34	1.23	1.07
2 <i>Self-financing ratio (> 0.3)</i>	(0.31)	(0.18)	(0.13)	(0.09)	0.12
3 <i>Debt service coverage ratio (</i>	0.07	0.52	0.81	0.90	1.08

Annex 4. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION PROCESSES

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			
Jie Tang	Lead Energy Specialist	SASDE	Task Team Leader
Barry Trembath	Lead Power Engineer	SASDE	Task Team Leader
Apurva Sanghi	Lead Economist	PRMED	Economic Development
Bernard Baratz	Consultant	EASCS	Environmental Safeguards
Chrisantha Ratnayake	Consultant	AFTG1	Energy Development
Clifford Garstang	Consultant	EASCS	Legal
Darayes Bahadur Mehta	Consultant	EASTE	Energy Development
Diane Catherine Minogue	Consultant	EACSM	Project Support
Douglas French Barnes	Senior Energy Specialist	EASCS	Energy Development
Enrique O. Crousillat	Consultant	LCSEG	Economist
Esperanza Miranda	Consultant	HDNHE	Social Safeguards
Grayson Heffner	Consultant	EASIN	Energy Development
Hoi-chan Nguyen	Senior Counsel	OPCIL	Legal
Kannathee Danaisawat	FM Specialist	EASFM	Financial Management
Karin I. Nordlander	Senior Counsel	LEGEA	Legal
Kazim M. Saeed	Consultant	SASDE	Power Engineer
Kurt F. Schenk	Consultant	EASEG	Engineering and Procurement
Lars C. Lund	Consultant	MNSSO	Energy Development
Melissa Ortega Sanchez	Procurement Assistant	AES	Project Support
Mohinder P. Gulati	Sector Leader	ECSSD	Energy Development
Morten Larsen	Mining Specialist	SEGOP	Energy and Mining
Perry Lee Radford	Program Assistant	MNSSD	Project Support
Rebecca C. Sekse	Senior Financial Analyst	EASTE - HIS	Financial Management
Renganaden Soopramanien	Senior Counsel	LEGAFF	Legal
Robert P. Taylor	Energy Specialist	EASCS	Energy Development
Roch Levesque	Senior Counsel	LEGAM	Legal
Shaheena Khan	Consultant	MNSWA	Economic Development
Somphone Simmalavong	Consultant	EASOS	Procurement
Teri G. Velilla	Program Assistant	EASIN	Project Support
Tomoko Matsukawa	Senior Financial Officer	FEUFS	Financial Management
Voravate Tuntivate	Consultant	EASWE	Economy Development
William Derbyshire	Consultant	SACIN	Economic Development
Youxuan Zhu	Consultant	EASCS	Environmental and Social Safeguards
Yuling Zhou	Lead Procurement Specialist	EASR2	Procurement
Zhi Liu	Lead Infrastructure Specialist	EASTS	Transportation
Supervision/ICR			
Veasna Bun	Senior Infrastructure Specialist	EASTS	Task Team Leader
Julia M. Fraser	Sector Manager	EASTS	Task Team Leader

Jie Tang	Lead Energy Specialist	SASDE	Task Team Leader
Alfredo Bano-Leal	Consultant	EASTS	Operation Analyst
Bernard Baratz	Consultant	EASCS	Environmental Safeguards
Bounphamith Somvichith	Consultant	EACLF	Project Support
Bunlong Leng	Environmental Specialist	EASTS	Environmental Safeguards
Daniel R. Gibson	Consultant	ECAVP	Social Safeguards
Defne Gencer	Energy Specialist	EASWE	Energy Development
Grayson Heffner	Consultant	EASIN	Energy Development
Helene Monika Carlsson Rex	Senior Social Development Specialist	EASER	Social Safeguards
Jacqueline Rodriguez Garcia	Consultant	EASTS	Intern
Jian Xie	Senior Environmental Specialist	EASER	Environmental Safeguards
Jun Zeng	Social Development Specialist	EASCS	Social Safeguards
Kannathee Danaisawat	Financial Management Specialist	EASFM	Financial Management
Kaysone Vongthavilay	Program Assistant	EACLF	Project Support
Kurt F. Schenk	Consultant	EASEG	Engineering and Procurement
Luis Lopez-Polin Reano	Temporary	AFTA1	Project Support
Manida Unkulvasapaul	Consultant	EASVS	Environmental Safeguards
Morten Larsen	Mining Specialist	SEGOP	Energy and Mining
Oithip Mongkolsawat	Senior Procurement Specialist	EASRP	Procurement
Pajnapa Peamsilpakulchorn	Consultant	CEAR2	Infrastructure Analyst
Panos Vlahakis	Consultant	EASTS	Power Engineer
Patricia Ramos Peinado	Consultant	EASTS	Infrastructure Analyst
Rebecca C. Sekse	Senior Financial Analyst	EASTE - HIS	Financial Management
Roch Levesque	Senior Counsel	LEGAM	Legal
Satoshi Ishihara	Senior Social Development Specialist	EASTS	Social Safeguards
Sombath Southivong	Senior Infrastructure Specialist	EASTS	Transportation
Souksavanh Sombounkhanh	Program Assistant	EACLF	Project Support
Souphanthachak Sisaleumsak	Procurement Specialist	EASR2	Procurement
Sybounhueng Phandanouvong	Social Development Specialist	EASTS	Social Safeguards
Thalavanh Vongsonephet	Program Assistant	EACLF	Project Support
Voravate Tuntivate	Consultant	EASWE	Energy Development
Youxuan Zhu	Consultant	EASCS	Social Safeguards
Yuling Zhou	Lead Procurement Specialist	EASR2	Procurement
Zhihong Wei	Consultant	EASTE	Energy Development

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY02	0.25	7,005.46
FY03	22.09	155,482.60
FY04	28.43	208,883.70
FY05	32.43	172,282.00
FY06	16.15	60,846.48
Total:	99.35	604,500.24
Supervision/ICR		
FY06	3.3	21,936.16
FY07	13.83	82,337.45
FY08	17.8	67,645.11
FY09	16.73	33,746.06
FY10	10.8	69,365.74
FY11	13.07	63,115.88
FY12*	5.26	27,019.74
FY13*	1.2	10,373.97
Total:	81.99	375,540.11

*Note: This lower number of SWs and amount spent in BB in FY12 and FY13 was made up for by a Bank-executed trust fund under the AusAID Mekong Energy Fund for operational support.

Annex 5. BENEFICIARY SURVEY RESULTS *(if any)*

None

Annex 6. STAKEHOLDER WORKSHOP REPORT AND RESULTS

A stakeholder workshop took place in Vientiane, the capital of Lao PDR, on September 28, 2012, in the Mercure Hotel. Around 70 people participated in the workshop, including representatives from EdL headquarters and its provincial branches, MEM/IREP, Provincial Departments of Energy and Mines, Village Energy Managers, and PESCOs, household beneficiaries of the SHS program, REP II VOPS, the NGO Lao Institute of Renewable Energy, project suppliers (Sunlabob Co., Lao Enterprise and Partners Co. and Sengsavang Co. Ltd), Helvetas (the Swiss Inter-cooperation Agency), AusAID and the World Bank. Participants expressed their views on achievements and impact made by the Project, lessons learnt, and areas for improvement especially in relation to the off-grid component.

Opening remarks by the Institute of Renewable Energy Promotion Director General, Mr. Hatsady

- A family without electricity cannot be taken out of poverty
- SHS program is a decentralized top-down program
- The Government of Lao PDR gives a great value to the WB support on the way of funds and human resources development
- Success of the Government policy. “When there is a clear, realistic but ambitious target, things work”.
- One of the challenges is having a common understanding among all the stakeholders. It is not appropriate if the grid is extended faster than expected driven by the villagers and provincial governments and donors complain that the planning is not followed.
- Rural electrification sector meetings like this one will be taking place on a regular basis.

STAKEHOLDER COMMENT

Presentation by the EdL project manager, Mr. Gnangkham

- Norad budget was short and EdL had to contribute to the financial gap with US\$2M
- Difficulties when willing to report to the WB on all the activities, since there was much staff and different stakeholders involved in different locations
- Grid extension to isolated areas might not make sense in strict economic terms, but it makes much sense looking at socioeconomic reasons

Helvetas

- Needed Gov commitment on off grid having a role to play (too expensive to do grid extension in very remote villages, costing as much as US\$ 10,000 per HH in some villages in Xieng Kuang province)
- Actual SHS delivery model is not appropriate since too much money is asked to the beneficiary. On-grid beneficiaries benefit from at least 50% subsidy, more than off-grid beneficiaries
- Actual off-grid program is not flexible enough, is too focused on SHS. Other technologies need to be explored. Suggesting involving organizations with broad rural development experience to develop a new model.

RESPONS BY THE IREP DIRECTOR GENERAL, MR. HATSADY

- EdL should not monopolize working only with some private sector companies
- Next rural electrification program on its off-grid component will include picohydro, biomass and SHS. IREP is working on the needed analysis already.
- The Government of Laos has a policy of not giving things “for free”. They feel that if beneficiaries contribute, they will

love their assets.

- Actual SHS program delivery model has a 60% subsidy, but further analysis is needed by a technical advisor.
- The actual delivery model needs more analysis by VOPS.

Mr. Phonethipasa Bounthanong, Sengsavang Co. Ltd, Managing Director (surveys company awarded with the baseline and post-project impact surveys)

- SHS are still a good option based on his experience in the field
- Some villages have no access by road, not even by path
- Tax exemption will help renewable energies to develop in the market
- PESCOs should be given more authority for taking decisions

It is being evaluated by the National Assembly a proposal for tax exception on goods related with renewable energies

Agree on giving more power to PESCOs for them making decisions

Mr. Andy Schroeter, Sunlabob Co., Managing Director (a local company; supplier of the second package of SHS under REP I)

- Lack of capacity within the Ministry of Energy and Mines
- Full subsidy needed for SHS in very remote villages
- SHS cannot last for more than 5 years
- Minimum SHS capacity needed by HHs in Laos is 50W
- Biomass and picohydro have potential
- People need to power their lives
- Wish more support from the Gov on the development of micro grid (referring to the REP I IFC PPP)
- Lack of awareness of energy efficiency in all sectors, including MEM and EdL (example: efficient air conditioning appliances)

- Lesson learnt: broader consultation in the next project preparation

SHS beneficiary and VEM, Khammouane Province

- Beneficiaries do not understand the potential and limitations of the SHS, “they do not understand that 20W is only for lighting 2 bulbs”
- “still better than using candles”

PESCO, Saravan Province

- Systems do not work after 5 years
- Beneficiaries only interested in SHS of a larger size

Ms. Xiaoping Wang, Senior Energy Specialist, WB

- Having seeing a very encouraging picture in the field, access to electricity changes people’s life not only in terms of meeting basic daily needs but also increases in income through rice mills, shops and water pumping for agriculture
- Beneficiaries interviewed found the schemes affordable

- Planning and implementation is decentralized now
- SHS is a pre-grid scheme

- There is much room for promoting income generation activities, since the actual consumption in grid extension areas is as low as 40-80 kWh per month. This would be a win-win for EdL and the beneficiaries since it will bring up the consumption and bring prosperity and development to the communities
- Coordination among on-grid and off-grid is a challenge. 50% of the SHS have been withdrawn in the Bolikamxay Province. The cost of re-deploying these retrieved systems is expected to be significant since only solar panels are withdrawn.
- Spare parts should be made available to the users. It seems that there is miscommunication between PESCO, the VEM and the beneficiary.
- Need to inform the SHS potential users on when the grid will arrive for them to make an informed decision

Yes, more income generation promotion in the electrified villages is needed

Mr. Panos Vlahakis, Power Engineer, WB Consultant

- Change of paradigm; start with the off-grid electrification from the remote end, from the more isolated areas where the grid will never reach. Forget the middle ground.
- SHS delivery model needs to be simplified.

SHS delivery model structure is too complicated. “We want one company that will do all. No one is responsible of the small failures in the actual system”.

Luang Namtha, PDEM

- There is potential for SHS but the collection of repayments by the PESCO is too complicated since there are no access roads

EdL branch, Khammouane

- Access to electricity is basic for alleviating poverty
- We have to look at the reasons behind the delays in the implementation. The implementation of grid extension sometimes overlaps between PDEM and EdL and this generates difficulties. There is need for a new survey to identify the new villages that could be connected to the grid.

There is need to integrate the roads system and the electricity grid development. “It does not make sense that they have to relocate the transmission line poles for road expansion”.

REP II VOPS

The expressed issues have been pending for a long time. We are taking stock of these issues related to off-grid electrification and working on potential solutions

Mr. Makathy Tep, Environmental Safeguards Specialist, WB Consultant

- Good job done by EdL branches and IREP on safeguards compliance
- The consultation must be a two-way communication

EdL branch, Champasack

- P2P has been a very good way to facilitating access to the grid

Mr. Vongvilay Sisoulath, Deputy Manager, Environmental and Social Office of EdL

- More staff is needed in the environmental and social offices at the EdL branches
- The staff has to be more rigorous with the forms

Summary of the points raised during the workshop by the WB REP I TTL, Mr. Veasna Bun

- Strong commitment is needed on off-grid electrification
- Need to review/revise the SHS hire-purchase delivery model
- Import tax exemption on renewable energies goods is needed. The WB engaged in a similar policy dialogue in Cambodia and the legal reform took place at the end of 2009. Further discussion on this is needed in Laos
- Need to put more effort on energy efficiency
- Concerns of users: need to improve the consultation with prospective SHS users on the size of the SHS, potential uses of the electricity generated by SHS, and the life time of the battery.

The workshop agenda is attached below.

Time	Topic	Remarks
08:45 –09:00	Registration	All
09:00 –09:15	Opening Remarks	Mr. Hatsady Sisoulath, Director General, Institute of Renewable Energy Promotion
09:15-10:15	1. Overview of the Project	Veasna Bun, Senior Infrastructure Specialist, World Bank
	2. Presentation on MEM component by the Project Manager: Scope, Achievement, Challenges, Lessons learned and others.	Mr. Anousak Phongsavath, Deputy Director General of IREP and REP I Project Manager
	3. Presentation on EdL Component by the Project Manager: Scope, Achievement, Challenges, Lessons learned and others.	Mr. Gnankham Douangsavanh, Deputy Director of Transmission and Substation Development Department of EdL and REP I Project Manager
10:15 –10:30	Coffee Break	
10:30 –12:30	Open discussion	Moderator: Mr. Hatsady Sisoulath, Director General, Institute of Renewable Energy Promotion
12:30	Closing remarks	Mr. Hatsady Sisoulath, Director General, Institute of Renewable Energy Promotion, Mr. Veasna Bun, Senior Infrastructure Specialist, World Bank
12.30- 13.30	Lunch	<ul style="list-style-type: none"> - All participants are invited - Lunch at Mercure Hotel

Annex 7. SUMMARY OF BORROWER'S ICR AND/OR COMMENTS ON DRAFT ICR

The Borrower submitted its ICR of the Project to the Bank on September 6, 2012. The report is on project file. The Borrower's ICR was more than 10 pages long. However, it was incomplete in many of the evaluation sections required and was mainly focused on processes and outputs. The lessons learned discussed in the Borrower's ICR are deemed to have added values in addition to the description of processes and outputs and are summarized below.

1. EdL

Negative environmental and social impacts resulting from the project are considered to be minor. Environmental and social safeguard policies were well prepared and implemented to minimize the negative impact during project implementation. It is recommended that the Environment Office (EO) in cooperation with the EDL Branch Offices including Project Implementation Units (PIUs), Environmental Management Units (EMU) and related stakeholders should take into account the following in implementing REP II ;

- In order for the project to be managed effectively, a clear work plan to be developed and shared among the EO, the EMUs in the EDL Branch Offices, the PIU at HQ and the PIUs in the EDL Branch Offices.
- Office Resources and Equipment: In the EDL Branch offices, office resources and equipment are in limited numbers and have to be shared among different sections. Thus this limitation is restricting the work of the EMU and progression of the project. In order to effectively share the limited resources and equipment, work schedule at the office need to be well coordinated among the EMUs and the PIU.
- Recording: The following items need to be paid special attention;
 - The progress of the project need to be documented and the information need to be shared among all stakeholders.
 - Signatures of both village heads and affected households need to be collected in the compensation agreement sheet.
 - It is preferable to collect not only the signature from village administration staff but also signatures of all participated villagers at the consultation meetings.
 - Photos need to be taken at the consultation meeting as a record.
- Letters on Consultation Meeting: In order for the villagers to be duly informed of the date of the consultation meeting, the letters to inform the date of meeting need to be sent and reached the villagers at least one week before the meeting.
- Clarification of Ethnic Minority Group. At the time of consultation meeting information regarding the name of ethnic group, number of ethnic group households and their level of communication skills need to be inquired and recorded.
- Compensation Standard and Evaluation of Affected Assets. Basis of compensation standard on affected assets needs to be disclosed and evaluation for the affected assets needs to be duly recorded.
- In-kind compensation. Effort to match the needs from community and type of in-kind compensation should be made. The choice of in-kind compensation shall not be limited to the present choices such as free connection to the community temple or to school located in the project affected village.
- Safeguard policy on ethnic people faced communication problems because of the degree of understanding of official language by ethnic people. An interpreter (usually the village head) shall be arranged in the consultation meetings in order for villagers to participate and comprehend the project thoroughly.

Cooperation with other development organizations. Presently there are many government-led development projects in rural areas. However, the collaboration with other governmental agencies has

not yet realized. With the cooperation of local government at district level, it is recommended to make an arrangement for meeting on needs of targeted villages between on-going development projects and REP II. This kind of arrangement will enhance targeted villages' social and economic development so as to amplify the affordability of electricity.

Delay in the financial arrangement from other donors (Norad and AusAID) caused delay in the implementation of Grid extension. For future project, timely arrangement for financing is needed in order to complete the project in time.

Investments in loss reduction are effective. Enhanced measures including power system analysis software CYMEDIST and hardware and project evaluation technologies for reducing technical losses have been introduced in REPI project. For more efficient implementation of loss reduction programs, CYMEDIST modeling and power demand data collection should be continued to cover the remaining areas. Further, CYMEDIST modeling which have been carried out in the REPI project shall be updated in regular intervals.

IT system have been developed during the project by procurement of AFMS in SPRE and REPI project, and 12 provinces in total have already equipped with the above system and for the rest of the provinces it would be done in a later stage. However, due to the limited number of IT staff, it is not sufficient to support the users for day-to-day activities. Training of EdL staff for operating IT system and equipment, especially in Branch offices, is strongly required to support the IT system improvement of EdL.

2. MEM/IREP

IREP has fully gained experiences in management the off-grid rural electrification project in the supply chain cycle starting from procurement, delivery of equipment, stock and supply of spare part and some activities were outsourced to accelerate the implementation of the project and to exchange some expertise with the outsourcing firm experts.

IREP has developed a business model which attracted private firms or companies to come in this business as PESCOs. Because it generates income to PESCOs and can also provide other business in this area such as an electric appliances shop, electric supply and wiring shop, etc., this will strengthen the domestic private firms to be investors in the renewable energy business in Lao PDR.

IREP has set up various incentives measures to encourage the implementation of SHS, VHS, and GS in the remote off-grid electrification project for example Guideline of Incentives for enhancing private firms in implementation REP project, setting up Rural Electrification Fund for supporting IREP/MEM, PDEM staff in in daily operation by collecting incomes from customers payment on utilization of SHS in hire-purchase basis. These measures are still employed for implementing the next phase of rural electrification in Lao PDR.

IREP has gained experiences in enhancing private sector to participate in the energy business with public and private partnership (PPP) model and learned how to modify the PPP model to be properly and efficiently applied with the Lao economy situation.

Annex 8. COMMENTS OF CO-FINANCIERS AND OTHER PARTNERS/ STAKEHOLDERS

- *Comments from Norad:* None
- *Comment from AusAID:*

A couple of comments and lessons learned (see below) in writing from the AusAID (co-financier) were received on January 29, 2013. The comments included that:

- The need to revisit the target indicators of AusAID financing.
- More elaboration of delays of ICB bidding for AusAID-supported off-grid activities (SHS purchase) was needed.
- Little progress of development of the SHS withdrawal guidelines under REP I. Attention to the matter is needed under REP II.
- Delays of the AusAID-financed activities for the off-grid component (SHS) due to procurement delays and limited capacity of the DOE.

All comments were incorporated in this ICR.

Lessons learned shared by the AusAID included.

Partnership approach: It is noted that partnership approach not only enhanced aid effectiveness in terms of fulfilling financial gaps but also increased mutual learning on quality of the project implementation. AusAID joined in the implementation support mission since 2009 until the Implementation Completion and Results mission in October 2012. This involvement has provided good lessons learned on understanding the complexity of financial agreement arrangements of the project. We also learned that a part from joint implementation mission undertaken twice a year, on-going support and prompt advice from the Bank to the executing agencies are critical for project success.

Delay in processing the Grant Agreement under AusAID Trust Fund Agreement between GoL and WB. Trust Fund Agreement between AusAID and the WB was signed in May 2009 but actual disbursement from the WB to the recipient was done more than a year later. There were many reasons that caused the delays but this affected not only on the project implementation but also decreasing the trust of the target communities who were awaiting support from the project.

Procurement issues: During the project implementation, AusAID was approached by one disqualified bidder complaining that the on-grid procurement process was not fair. In November 2012, a mission confirmed that there were two unsuccessful bidders that complained on the SHS and micro hydro PPP procurement. While we noted that those bidders did not meet the eligible criteria, we learned that there should have been a bidder clarification meeting jointly held by the World Bank. This is done to ensure that the bidding is conducted in a transparent manner.

Capacity of Executing Agencies: While we noticed that knowledge of DoE/IREP has increased significantly in terms of technical and project management skill including procurement (ICB, NCB), chronic delays kept happening over the last 6 missions under the off-grid component. Thus, adequate institutional needs assessment should be done during project preparatory phase to understand the real status of the executing agency's capacity.

Annex 9. LIST OF SUPPORTING DOCUMENTS

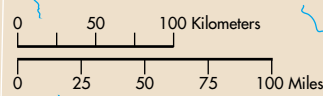
1. Resettlement Policy Framework, 2004
2. Indigenous People Plan, 2004
3. Integrated Safeguards Datasheet, 2004
4. Environmental Management Plan, 2005
5. Action Plan for Financial Sustainability of the Power Sector, 2005
6. Rural Electrification Fund Decree, August 2005
7. Project Appraisal Document, March 2006
8. Project Agreement, June 2006
9. Development Grant Agreement, June 2006
10. Village Off-Grid Program Operations Manual, November 2007
11. House Wiring Assistance Program Manual (P2P), March 2008
12. Demand-Side Management and Energy Efficiency Phase I Completion Report (including Energy Efficiency Manual for Public Sector Employees: Lao PDR), June 2008
13. Revised Electricity Law, December 2008
14. Power Distribution System Loss Reduction, December 2008
15. Rural Electrification Fund Operations Manual, May 2009
16. Rapid Assessment of “Power to the Poor” Pilot Project, May 2009
17. EDL Tariff Study, July 2009
18. Rural Electrification Master Plan and Hydro Assessment Studies In Lao PDR, December 2009
19. VOPS Final report, February 2010
20. Feasibility Studies on the Potential of Biogas for Off- and On-Grid Electricity Generation in Lao PDR, March 2010
21. Project Appraisal Document for AusAID Grant Additional Financing, June 2010
22. Grant Agreement for AusAID Grant Additional Financing, October 2010
23. Project Agreement for AusAID Grant Additional Financing, October 2010
24. Video: Lighting Homes, Empowering lives: 20-years of electrification in Lao PDR (available in Youtube), 2010
25. Video: Lao PDR: Electricity for All-A Gender Lens (available in Youtube), 2010
26. Video: Nam Theum 2 Making a Difference (available in Youtube), 2010
27. Houaphan Micro Hydro Public Private Partnership Bidding Memorandum, June 2011
28. Power to the Poor Updated Operational Manual, September 2011
29. Renewable Energy Development Strategy in Lao PDR, October 2011
30. 2011 Electricity Statistics Report by EDL, 2012
31. Power to the Poor – Twenty Years of National Electrification in Lao PDR, January 2012
32. Project Paper for Restructuring, March 2012
33. Development and Replication of Biogasification Power Generation Plants at Large Pig Farms, 2012
34. Impact Evaluation Inception Report, June 2012
35. Borrower Implementation Completion Report, 2012
36. Aide Memories
37. Safeguards Implementation Progress Reports
38. Project Progress Reports
39. Review of the Compliance with Financial Management Requirements of the Bank
40. Rural Electrification Phase I (P075531): Final Quality at Entry Assessment for FY06-07 (QEA8)

100°E 102°E 104°E 106°E 108°E
22°N 20°N 18°N 16°N 14°N

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Gulf of Tonkin



LAO PEOPLE'S DEMOCRATIC REPUBLIC

- SELECTED CITIES AND TOWNS
- ⊙ PROVINCE CAPITALS
- ⊕ NATIONAL CAPITAL
- RIVERS
- MAIN ROADS
- RAILROADS
- PROVINCE BOUNDARIES
- - - INTERNATIONAL BOUNDARIES