



**FOR OFFICIAL USE ONLY**

Report No: PAD5212

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT  
ON

A PROPOSED CREDIT IN THE AMOUNT OF SDR 19 MILLION  
(US\$25.50 MILLION EQUIVALENT)

AND

A PROPOSED SHORTER MATURITY LOAN OF SDR 19 MILLION  
(US\$25.50 MILLION EQUIVALENT)

TO THE

LAO PEOPLE'S DEMOCRATIC REPUBLIC

FOR A

POWER DISTRIBUTION IMPROVEMENT PROJECT

May 10, 2023

Energy & Extractives Global Practice  
East Asia and Pacific Region

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## CURRENCY EQUIVALENTS

(Exchange Rate Effective March 31, 2023)

Currency Unit = Lao Kip (LAK)

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1 LAK = US\$0.00005902

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US\$1 = LAK 16,943.41

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SDR 0.7400 = US\$1

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US\$1.34523 = SDR 1

## FISCAL YEAR

January 1 - December 31

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**ABBREVIATIONS AND ACRONYMS**

AM	Accountability Mechanism
ASA	Advisory Services and Analytics
CA	Concession Agreement
CAW	Commission for the Advancement of Women
CERC	Contingent Emergency Response Component
CoA	Chart of Account
CO <sub>2</sub>	Carbon Dioxide
COVID-19	Coronavirus disease 2019
CPA	Certified Public Accountant
CPF	Country Partnership Framework
CSG	China Southern Power Grid
DA	Designated Account
DSA	Debt Sustainability Analysis
EDL	Électricité du Lao
EDL-T	Électricité du Lao Transmission Company Ltd.
EIRR	Economic Internal Rate of Return
EMS	Energy Management System
ERP	Enterprise Resource Planning
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
FIRR	Financial Internal Rate of Return
FM	Financial Management
FMS	Financial Management System
GBV	Gender-Based Violence
GCRF	Global Crisis Response Framework
GDP	Gross Domestic Product
GoL	Government of Lao PDR
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
GW	Ground Wire
HR	Human Resources
HWMP	Hazardous Waste Management Plan
IDA	International Development Association
IFR	Interim Unaudited Financial Reporting
IFRS	International Financial Reporting Standards
IPF	Investment Project Financing
IPP	Independent Power Producer
IT / ICT	Information and Technology / Information and Communication Technology
JICA	Japan International Cooperation Agency
km	kilometer
kV	kilovolt



LA	Lightning Arrester
LFRS	Local Financial Reporting Standards
LMP	Labor Management Plan
MEM	Ministry of Energy and Mines
MD	Managing Director
MPI	Ministry of Planning and Investments
MoF	Ministry of Finance
MoNRE	Ministry of Natural Resources and Environment
MVA	Megavolt Ampere
MW	Megawatt
NPDP	National Power Development Plan
NPV	Net Present Value
OA	Operating Account
OE	Owner's Engineer
OHS	Occupational Health and Safety
O&M	Operation and Maintenance
PCB	Polychlorinated Biphenyl
PDO	Project Development Objective
PFM	Public Financial Management
PGI	Power Grid Improvement project
PIT	Project Implementation Team
PMO	Prime Minister's Office
PMU	Project Management Unit
POM	Project Operations Manual
PPA	Power Purchase Agreement
PPG	Public and Publicly Guaranteed
PPSD	Project Procurement Strategy for Development
SAP	The proprietary enterprise resource planning software that EDL has adopted
SCADA	Supervisory Control and Data Acquisition System
SEA/SH	Sexual Exploitation and Abuse / Sexual Harassment
SEP	Stakeholder Engagement Plan
SPPs	Small Power Producers
SME	Small and Medium Enterprise
SML	Shorter Maturity Loan
SOE	State-Owned Enterprise
SOP	Standard Operating Procedure
SS	Substation
TA	Technical Assistance
TOR	Terms of Reference
TSO	Transmission System Operator
T&D	Transmission and Distribution
UNIDO	United Nations Industrial Development Organization
UXO	Unexploded Ordnance
WAMS	Wide Area Monitoring System



**TABLE OF CONTENTS:**

<b>DATASHEET .....</b>	<b>1</b>
<b>I. STRATEGIC CONTEXT .....</b>	<b>9</b>
A. Country Context.....	9
B. Sectoral and Institutional Context.....	10
C. Relevance to Higher Level Objectives.....	17
<b>II. PROJECT DESCRIPTION.....</b>	<b>18</b>
A. Project Development Objective .....	18
B. Project Components .....	19
C. Project Beneficiaries .....	23
D. Results Chain .....	24
E. Rationale for Bank Involvement and Role of Partners .....	24
F. Lessons Learned and Reflected in the Project Design .....	25
<b>III. IMPLEMENTATION ARRANGEMENTS .....</b>	<b>26</b>
A. Institutional and Implementation Arrangements .....	26
B. Results Monitoring and Evaluation Arrangements.....	29
C. Sustainability.....	29
<b>IV. PROJECT APPRAISAL SUMMARY .....</b>	<b>29</b>
A. Technical, Economic and Financial Analysis .....	29
B. Fiduciary.....	32
C. Legal Operational Policies.....	35
D. Environmental and Social.....	35
<b>V. GRIEVANCE REDRESS SERVICES .....</b>	<b>40</b>
<b>VI. KEY RISKS .....</b>	<b>41</b>
<b>VII. RESULTS FRAMEWORK AND MONITORING .....</b>	<b>44</b>
ANNEX 1: Implementation Arrangements and Support Plan .....	51
ANNEX 2: Substation (SS) Investment Plan .....	65
ANNEX 3: Economic and Financial Analysis .....	68



DATASHEET

**BASIC INFORMATION**

Country(ies)	Project Name	
Lao People's Democratic Republic	Power Distribution Improvement Project	
Project ID	Financing Instrument	Environmental and Social Risk Classification
P178477	Investment Project Financing	Substantial

**Financing & Implementation Modalities**

<input type="checkbox"/> Multiphase Programmatic Approach (MPA)	<input checked="" type="checkbox"/> Contingent Emergency Response Component (CERC)
<input type="checkbox"/> Series of Projects (SOP)	<input type="checkbox"/> Fragile State(s)
<input type="checkbox"/> Performance-Based Conditions (PBCs)	<input type="checkbox"/> Small State(s)
<input type="checkbox"/> Financial Intermediaries (FI)	<input type="checkbox"/> Fragile within a non-fragile Country
<input type="checkbox"/> Project-Based Guarantee	<input type="checkbox"/> Conflict
<input type="checkbox"/> Deferred Drawdown	<input type="checkbox"/> Responding to Natural or Man-made Disaster
<input type="checkbox"/> Alternate Procurement Arrangements (APA)	<input type="checkbox"/> Hands-on Enhanced Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
01-Jun-2023	31-Aug-2028

Bank/IFC Collaboration

No

**Proposed Development Objective(s)**

To strengthen the capacity and efficiency of the distribution system in the Project Areas and improve EDL’s financial management capacity; and in case of an Eligible Crisis or Emergency, respond promptly and effectively to it.



**Components**

Component Name	Cost (US\$, millions)
Component 1: Substation Investments and Grid Monitoring Systems	46.00
Component 2: Financial Management System and SAP Implementation	5.00
Component 3: Contingent Emergency Response	0.00

**Organizations**

Borrower: Lao People's Democratic Republic

Implementing Agency: Electricité du Lao (EDL)

**PROJECT FINANCING DATA (US\$, Millions)**

**SUMMARY**

<b>Total Project Cost</b>	51.00
<b>Total Financing</b>	51.00
<b>of which IBRD/IDA</b>	51.00
<b>Financing Gap</b>	0.00

**DETAILS**

**World Bank Group Financing**

International Development Association (IDA)	51.00
IDA Credit	25.50
IDA Shorter Maturity Loan (SML)	25.50

**IDA Resources (in US\$, Millions)**

	Credit Amount	Grant Amount	SML Amount	Guarantee Amount	Total Amount
<b>Lao People's Democratic Republic</b>	25.50	0.00	25.50	0.00	51.00



National Performance-Based Allocations (PBA)	25.50	0.00	25.50	0.00	51.00
<b>Total</b>	<b>25.50</b>	<b>0.00</b>	<b>25.50</b>	<b>0.00</b>	<b>51.00</b>

**Expected Disbursements (in US\$, Millions)**

WB Fiscal Year	2023	2024	2025	2026	2027	2028	2029
Annual	0.00	2.00	6.00	17.00	16.00	9.00	1.00
Cumulative	0.00	2.00	8.00	25.00	41.00	50.00	51.00

**INSTITUTIONAL DATA**

**Practice Area (Lead)**

Energy & Extractives

**Contributing Practice Areas**

Governance, Macroeconomics, Trade and Investment, Infrastructure, PPP's & Guarantees

**Climate Change and Disaster Screening**

This operation has been screened for short and long-term climate change and disaster risks

**SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)**

Risk Category	Rating
1. Political and Governance	● High
2. Macroeconomic	● High
3. Sector Strategies and Policies	● High
4. Technical Design of Project or Program	● Moderate
5. Institutional Capacity for Implementation and Sustainability	● Substantial
6. Fiduciary	● Substantial
7. Environment and Social	● Substantial
8. Stakeholders	● Moderate
9. Other	





10. Overall

● Substantial

**COMPLIANCE**

**Policy**

Does the project depart from the CPF in content or in other significant respects?

Yes  No

Does the project require any waivers of Bank policies?

Yes  No

**Environmental and Social Standards Relevance Given its Context at the Time of Appraisal**

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Not Currently Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Relevant
Cultural Heritage	Not Currently Relevant
Financial Intermediaries	Not Currently Relevant

**NOTE:** For further information regarding the World Bank’s due diligence assessment of the Project’s potential environmental and social risks and impacts, please refer to the Project’s Appraisal Environmental and Social Review Summary (ESRS).



## Legal Covenants

### Sections and Description

#### Subsidiary Agreement

The Recipient shall, through the Ministry of Finance, make the proceeds of Financing available to the Project Implementing Entity under a Subsidiary Agreement on terms and conditions acceptable to the Association. (Section I.A of Schedule 2 to the Financing Agreement)

### Sections and Description

#### Environmental and Social Standards

##### Recurrent, Continuous

The Recipient shall, and shall cause the Project Implementing Entity to, ensure that (i) the Project is implemented in accordance with the Environmental and Social Standards, Environmental and Social Commitment Plan (“ESCP”) (including the management tools and instruments referred to therein), in a manner acceptable to the Association; and (ii) not amend, repeal, suspend or waive any of their provisions unless the Association agrees otherwise, and report on their status of implementation as part of the project reports. (Section I.B of Schedule 2 to the Financing Agreement)

### Sections and Description

#### Contingent Emergency Response

##### In case of an Eligible Crisis or Emergency

The Recipient shall ensure that (i) a manual (“CERC Manual”) and Emergency Action Plan are prepared and adopted for implementation of Part 3 of the Project in form and substance acceptable to the Association; (ii) in the event of an eligible crisis or emergency, ensure that the activities under said part are carried out in accordance with such manual, plan and all relevant environmental and social requirements; and (iii) not amend, suspend, waive or abrogate, repeal or waive any provisions of the manual unless the Recipient agrees otherwise in writing. (Section I.C of Schedule 2 to the Financing Agreement)

### Sections and Description

#### Mid-term Review

##### Once, on or about 30 months after the Effective Date

The Recipient shall cause the Project Implementing Entity to furnish to the Association a mid-term project progress report on or about the date 30 months after effectiveness, and carry out the necessary actions identified in the mid-term report after the submission. (Section II.B of Schedule 2 to the Financing Agreement)

### Sections and Description

#### Personal Data

##### Recurrent, Continuous

In sharing any information, report or document related to the activities described in Schedule 1 of the Financing



Agreement, the Recipient shall cause the Project Implementing Entity to ensure that such information, report or document does not include Personal Data unless otherwise explicitly requested by the Association or permitted under the Financing Agreement.

(Section II.C of Schedule 2 to the Financing Agreement)

Sections and Description

Institutional Arrangement

The Project Implementing Entity shall: (i) not later than one (1) month after the Effective Date, establish and thereafter maintain a Project Management Unit throughout the implementation of the Project with composition, functions, staffing and resources satisfactory to the Association; (ii) not later than one (1) month after the Effective Date, appoint a Project Manager who shall be responsible for providing overall guidance on and monitoring Project implementation, and for coordination across the PMU teams and coordination with the Association and EDL management; (iii) not later than two (2) months after the Effective Date, hire and thereafter maintain a financial management consultant and a procurement consultant; both with qualifications, experience and terms of reference acceptable to the Association; and (iv) not later than six (6) months after the Effective Date, hire and thereafter maintain an independent auditor with qualifications, experience and terms of reference acceptable to the Association.

(Section I.A of Schedule to the Project Agreement)

Sections and Description

Project Operations Manual (“POM”)

Recurrent, Continuous

The Project Implementing Entity shall ensure that the Project is carried out in accordance with the arrangements and procedures set out in the POM and shall not amend, abrogate or waive any provision of the POM unless the Association has provided its prior no-objection thereof in writing.

(Section I.B of Schedule to the Project Agreement)

Sections and Description

Environmental and Social Standards

Recurrent, Continuous

The Project Implementing Entity shall ensure that (i) the Project is implemented in accordance with the Environmental and Social Standards, Environmental and Social Commitment Plan (“ESCP”) (including the management tools and instruments referred to therein), in a manner acceptable to the Association; and (ii) not amend, repeal, suspend or waive any of their provisions unless the Association agrees otherwise, and report on their status of implementation as part of the project reports.

(Section I.D of Schedule to the Project Agreement)

Sections and Description

Completion Report

Once, 3 months after the Closing Date

The Project Implementing Entity shall prepare and furnish to the Recipient not later than three (3) months after the



Closing Date a completion report in form and substance satisfactory to the Association.  
(Section II.C of Schedule to the Project Agreement)

**Sections and Description**

Specific Implementation Arrangement for Part 1.1 of the Project  
Recurrent, Continuous

The Project Implementing Entity shall ensure that: (i) all Project activities under Part 1.1 of the Project shall be selected, appraised, implemented and evaluated in accordance with the eligibility criteria and procedures acceptable to the Association as set out in the Project Operations Manual; (ii) activities under Part 1.1 of the Project do not include any investment in asset(s) to be transferred to EDL-T; (iii) activities under Part 1.1 of the Project do not require any land acquisition; (iv) any Project area in which civil works under Part 1.1 of the Project will be implemented shall be free of PCB, or treated with PCB decontamination, and to this end, the Project Implementing Entity shall implement the Guideline for PCBs Management and Disposal issued by the Ministry of Natural Resources and Environment; and (v) any Project area in which civil works under Part 1.1 of the Project will be implemented has been cleared of unexploded ordnance, and to that end, prior to commencing civil works for any activities under Part 1.1, the Recipient shall provide a confirmation, in form and substance satisfactory to the Association that the Project area in which such civil works will be implemented has been declared safe and clear of unexploded ordnance.

(Section I.E of Schedule to the Project Agreement)

**Sections and Description**

Annual Work Plan and Budget (“AWPB”)  
Recurrent, Continuous

The Project Implementing Entity shall: (i) prepare and furnish to the Association for its no-objection not later than September 30 of each fiscal year during the implementation of the Project (or such later date as the Association may agree), a consolidated Annual Work Plan and Budget; (ii) ensure that the Project is implemented in accordance with the AWPB (provided, however, that in the event of any conflict between the AWPB and the provisions of this Agreement and/or the Financing Agreement, the provisions of the Financing Agreement and this Agreement shall prevail); and (iii) not make or allow to be made any change to the AWPB without prior no-objection in writing by the Association.

(Section I.C of Schedule to the Project Agreement)

**Conditions**

Type	Financing source	Description
Effectiveness	IBRD/IDA	The Recipient and the Project Implementing Entity has entered into a Subsidiary Agreement under the terms and conditions acceptable to the Association. (Section 10.01(a) of the General Conditions)
Effectiveness	IBRD/IDA	The Project Operations Manual has been adopted by the Project



		Implementing Entity in form and substance satisfactory to the Association. (Article 5.01 of the Financing Agreement)
Type Disbursement	Financing source IBRD/IDA	Description For Emergency Expenditures under Category (2):  (i) (A) the Recipient has determined that an Eligible Crisis or Emergency has occurred, and has furnished to the Association a request to withdraw Loan amounts under Category (2); and (B) the Association has agreed with such determination, accepted said request and notified the Recipient thereof; and  (ii) the Recipient has adopted the CERC Manual and Emergency Action Plan, in form and substance acceptable to the Association.  (Section III.B.1(b) of Schedule 2 to the Financing Agreement)



## I. STRATEGIC CONTEXT

### A. Country Context

- 1. Despite being among the fastest-growing economies in the world before COVID-19, Lao PDR's growth model was already showing its limitations.** Economic growth averaged about 7 percent over the two decades to 2019, but the economy's growth pattern was capital-intensive, resource-driven, and debt-fueled. Economic growth had been steadily decelerating from 8 percent in 2013 to 5.5 percent in 2019. Growth was predominantly driven by large foreign investments in hydropower, mining, and construction (of transport infrastructure), which provided few job opportunities. The domestic private sector has been hampered by an unfavorable business environment, particularly by limited competition and transparency. The financial sector is dominated by state-owned banks, and limited credit has flowed to the private sector.
- 2. Economic growth was severely affected by the COVID-19 pandemic but is starting to recover gradually.** Real GDP growth declined sharply from 5.5 percent in 2019 to 0.5 percent in 2020<sup>1</sup>, owing to the wide-ranging economic impacts of COVID-19 – including the collapse of international tourism. Growth was estimated at 2.7 percent in 2022, as the recovery in the services sector benefited from increased international and domestic tourism. Transport started to benefit from the operation of the Lao-China railway and a dry port. The post-pandemic recovery offers an opportunity to increase the share of public revenue in GDP. However, the recovery has been undermined by macroeconomic instability – with high inflation and a sharp currency depreciation weakening incomes, consumption, and investment.
- 3. The Bank assesses Lao PDR to be in external and overall debt distress under the Low-Income Countries Debt Sustainability Framework.** Lao PDR is facing both solvency and liquidity challenges, owing to significant financing needs, limited financing options, low foreign exchange reserves, and considerable depreciation pressures. The People's Republic of China accounts for nearly half of the external public debt. The energy sector, mostly represented by Electricité du Laos (EDL), has played an important role in public debt accumulation, accounting for about 30 percent of total PPG debt. There are also substantial contingent liabilities associated with public-private partnerships (PPPs) and non-guaranteed SOE borrowing, but these fiscal risks have not been adequately quantified yet. The ratio of debt service (i.e., principal and interest) to domestic revenue increased from 35 percent to 61 percent between 2017 and 2022. Meanwhile, combined public spending on education and health declined from 4.2 percent of GDP to an estimated 2.6 percent between 2017 and 2022. In the absence of debt service deferrals, which have provided temporary relief since 2020, interest payments would have overtaken social spending levels in 2022<sup>2</sup>. Debt sustainability is contingent on the outcome of ongoing debt negotiation with key creditors as covered in the DSA.
- 4. The Lao kip weakened significantly in 2021-2022, which helped drive consumer price inflation to record levels.** The kip depreciated by 79 percent against the US dollar between June 2021 and March 2023. A weakened kip has fueled domestic inflation and exacerbated external debt service costs, since most debt is denominated in US dollars. In the year to March 2023, inflation reached 41 percent. High inflation significantly undermines the purchasing power of households. The kip/USD exchange rate appears to have stabilized since

<sup>1</sup> Bank Staff estimates. The Lao authorities have estimated GDP growth in 2020 at 3.3 percent.

<sup>2</sup> Debt service deferrals (of principal and interest owed to China) have provided important temporary relief between 2020-2022. These deferrals have accumulated to about 8 percent of GDP.



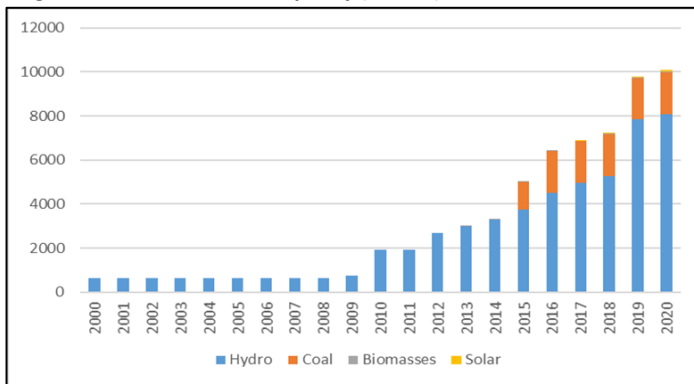
end-2022 as the Bank of Lao PDR tightened monetary policy and introduced administrative measures to manage the exchange rate. However, limited foreign exchange liquidity and low foreign reserves contribute to foreign exchange rationing by banks and a parallel exchange rate market premium.

5. **Lao PDR is amongst the countries most vulnerable to projected climate change impacts**, ranking 142nd out of 191 countries in the 2020 ND-GAIN index<sup>3</sup>. The country has extremely high exposure to flooding (ranked 6<sup>th</sup>), including riverine and flash flooding<sup>4</sup>, and some limited exposure to tropical cyclones and their associated hazards (ranked 47<sup>th</sup>). Climate models for Lao PDR indicate a warming trend and an increase in the intensity of heavy precipitation periods and extreme events<sup>5</sup>. The energy sector, particularly the Transmission and Distribution (T&D) subsector in Lao PDR, is vulnerable to flooding and storm surge resulting in power shortage and blackout, loss of connectivity, fuel supply disruption, and inundation of infrastructure. Managing and adapting to climate change related risks in the energy system will be critical for the provision of safe, affordable, and reliable electricity and will also increase societal resilience as climate change intensifies.

### B. Sectoral and Institutional Context

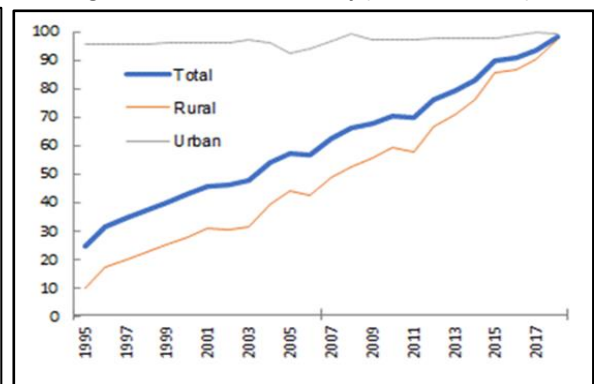
6. **Over the past 20 years, Lao PDR managed to harness its abundant hydropower resources, achieving a remarkable increase in power generation capacity.** From only 640 megawatts (MW) of installed capacity in 2000, Lao PDR increased its total installed capacity to 10,076 MW at the end of 2020 - of which about 60 percent is dedicated to export. Generation capacity doubled between 2014 and 2020, including the addition of one 1,878 MW coal fired power plant<sup>6</sup> (Figure 1). As a result, Lao PDR has now achieved nearly universal electrification in urban areas, and an electrification rate of about 90 percent in rural areas (Figure 2), placing Lao PDR as the best low-income country in the region in terms of electricity access, competing with its upper-income neighbors Thailand and Vietnam.

Figure 1: Installed Power Capacity (in MW) from 2000 to 2020



Source: MEM data

Figure 2: Access to Electricity (% of household)



Source: EDL Electricity Statistics 2019

7. **The power sector’s royalties and dividend contribution to the economy has stagnated owing to generous tax incentives to private investors and growing debt service obligations.** The value added of the

<sup>3</sup> University of Notre Dame (2019). Notre Dame Global Adaptation Initiative. URL: <https://gain.nd.edu/our-work/country-index/>

<sup>4</sup> WBG Climate Change Knowledge Portal (CCKP 2019).

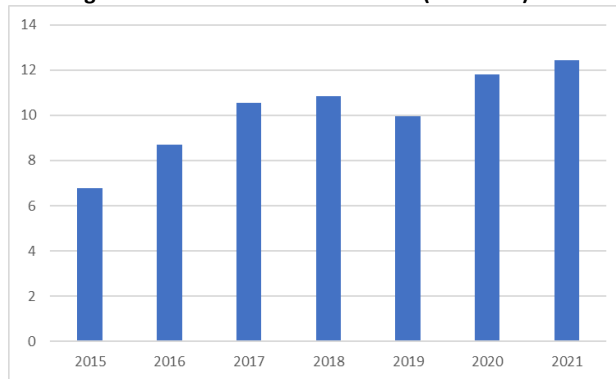
<sup>5</sup> Lao PDR Country Risk Profile 2021.

<sup>6</sup> The World Bank financing in this project is ring-fenced so it would go to non-coal operation in Lao PDR.



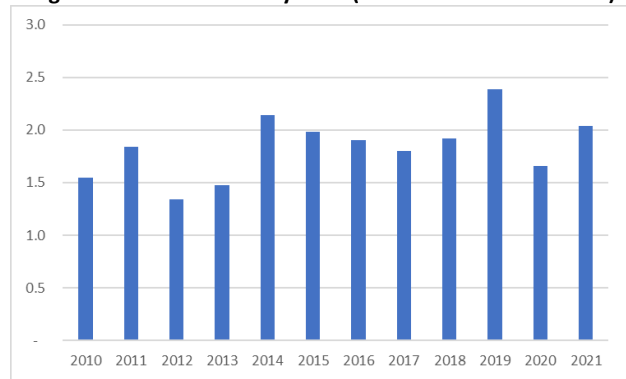
power sector to the Lao PDR economy has grown over the past decade from only 3 percent in the early 2000s to 12.4 percent in 2021 (Figure 3). The country benefits financially from the projects developed by Independent Power Producers (IPPs), who are contributing through royalties, taxes, and dividends to the shareholding SOEs. Although royalty incomes have fluctuated over the years, the last decade shows a stagnation in the increase of royalties' contributions, which peaked in 2019 at 2.4 percent of total fiscal revenues but declined to 2 percent in 2021 (Figure 4). Information on the collection of other revenues (taxes, dividends, dividend tax, in-kind payments) is not easily available. However, the total amount of power sector revenues is estimated by MoF to be less than 10 percent of total fiscal revenues. This limited contribution to fiscal revenues is due to investment incentives such as profit tax exemptions and a low royalty rate provided to IPP projects in the first 5-10 years of their operations. However, as IPPs are entering into later stages of operation, these incentives are phasing out and so government revenues from the sector are expected to increase between 2023 and 2025. On the other hand, the development of the power sector has led to a substantial debt stock, and continuing debt servicing requirements that cannot be covered by tariff revenue.

Figure 3. Power sector value added (% of GDP)



Source: Lao National Statistic Centre

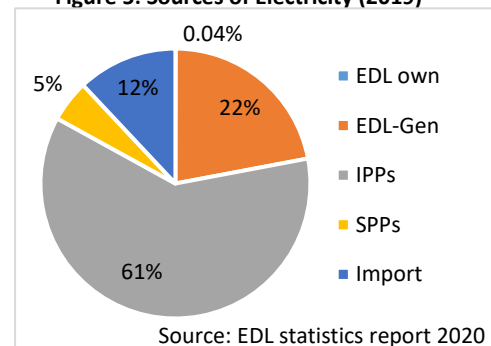
Figure 4. Power sector royalties (% of total fiscal revenues)



Source: WB calculations based on MoF Fiscal Reports

8. **EDL is the single buyer of power and sole distributor of electricity in Lao PDR – supplying power to domestic consumers as well as exporting to neighboring countries.** EDL sources its power from various entities including IPPs – 61 percent, EDL-Generation or EDL-Gen<sup>7</sup> – 22 percent, imports from neighboring countries (during dry seasons) – 12 percent, and the remainder from EDL’s own generation plus Small Power Producers (SPPs) (Figure 5). The Ministry of Energy and Mines (MEM) is responsible for the power sector in Lao PDR, with jurisdiction over energy policy, strategy, and management of the energy and the mining industry. MEM also acts as a regulator of the energy sector, though tariff decisions are finalized by the Prime Minister’s Office (PMO) and approved by the National Assembly.

Figure 5: Sources of Electricity (2019)



Source: EDL statistics report 2020

<sup>7</sup> EDL-Gen is a subsidiary of EDL that takes minority stakes in private sector power plants.





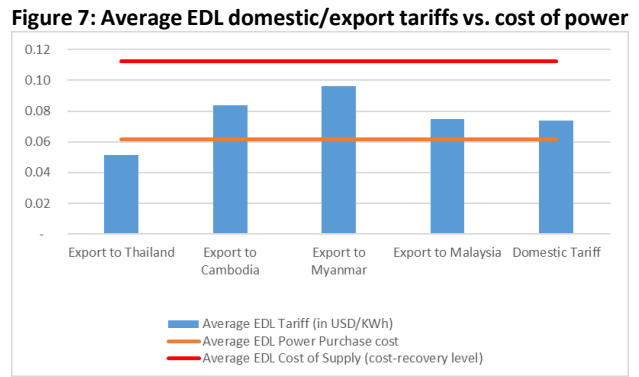
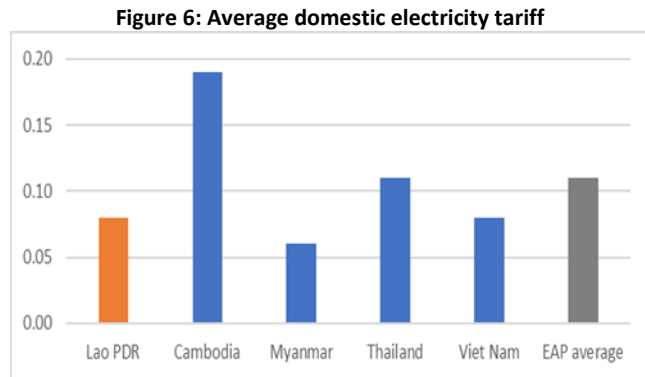
9. **Lao PDR has significant excess generation capacity based on its Take-or-Pay Power Purchase Agreements, with a total surplus power output of 8,100 GWh in 2021 after meeting domestic demand and exports.** This represents about 5 times EDL’s power export volume in 2019 (1,600 GWh). In addition, as the generation facilities that began construction in 2018 – 2019 are completed, the excess is expected to increase to 16,900 GWh by 2025. However, because the power generation in the dry season is on average 30 percent lower than in the wet season, EDL is required to import power from Thailand during the dry season despite the excess capacity. The growth in investments for power generation was not met by adequate power transmission investments across the country, which resulted in lack of transmission/distribution capacity to fully utilize the power generation potential. While the cumulative km length of the country’s 115 kV transmission lines has grown by approximately 50 percent from 4,500 km in 2014 to 6,800 km in 2019, this percentage is just a quarter of the growth of approximately 200 percent over the same period in generation capacity.

10. **EDL’s negative margins are the core concern for the financial sustainability of the sector.** EDL’s main sources of operating revenues are domestic and export power sales. However, domestic tariffs have been kept at below cost recovery level and they are lower than regional comparators. The average domestic tariff is of US\$0.074/kWh (LAK 666/kWh), while the cost-recovery requirement or Annual Revenue Requirement (ARR) was estimated to be at approximately US\$0.11/kWh (LAK 918/kWh)<sup>8</sup>. The domestic tariff is below the regional average and lower than the domestic tariff in neighboring countries (Figure 6). 87 percent of consumers are paying less than the average cost of supply and are therefore de facto subsidized. In addition, according to a World Bank-supported Cost of Service study conducted in 2017, average consumers were only paying less than 2.9 percent of their expenditure, which implies room for tariff adjustment. The high prices that Thailand charges to EDL for importing power during the dry seasons further widen the losses.

11. **Power export sales are also loss-making for EDL due to the seasonality of hydro power production.** Thailand imports 90 percent of EDL exports at an average tariff of US\$0.05/kWh, which is below the average EDL cost of power purchased from domestic IPPs (Figure 7). The resulting margin is at -32 percent, below cost recovery for domestic power sales, and -54 percent for EDL’s main export markets. Due to hydropower seasonality and the resulting inability to ensure stable export supplies throughout the year, EDL has limited room to renegotiate export tariffs upwards, and needs to import power from neighboring countries during the dry season. In addition, as stated earlier, EDL pays an average import tariff of US\$0.06/kWh for power purchased from Thailand during the dry season which widens the energy trade losses for Lao PDR.

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<sup>8</sup> Figures from the latest Cost of Service Study conducted in 2017: “EDL Cost of Service Study, Price Waterhouse Coopers, 2017”.



Source: EDL Electricity Statistics Report and EDL Financial statements 2019 for EDL data on tariffs and power purchase costs; WB RISE database for other countries tariff data; PWC study “Enhancing Financial Sustainability of the Power Sector in Lao PDR and Developing a Suitable Power Tariff Regime” (2017) for average cost of supply.

12. **EDL’s core operations have therefore been running at a loss for the past five years.** Table 1 below shows EDL’s operating income from the most recent audited financial statements of 2015-2019, adjusted by removing non-recurring expenses and income to analyze the core business performance of the company. While EDL’s revenues have grown from US\$433 million in 2015 to US\$673 million in 2019, i.e., by 10 percent annually, its income from core operations has remained negative in the past five years. This is due to tariffs not being at cost recovery levels, and the gross profit margin remaining at a low level of 10-14 percent while the gross profit margin of its subsidiary EDL-Gen was reported as 54 percent<sup>9</sup>. Though EDL has received US\$22 million in dividends in 2018 and US\$12 million in 2019<sup>10</sup>, the dividend income from EDL-Gen, was not sufficient to offset EDL’s losses from core operations.

Table 1: EDL’s Operating Income from Power Sales Business (in US\$ Million)

(USD million)	2015	2016	2017	2018	2019	Compound Annual Growth Rate (CAGR)
Domestic tariff revenue	409	445	469	512	563	8%
Export revenue	25	58	72	104	74	44%
<b>Revenues from Power Sales</b>	<b>433</b>	<b>503</b>	<b>541</b>	<b>616</b>	<b>637</b>	<b>10%</b>
IPP power purchasing costs	282	385	461	514	475	15%
Import costs	93	47	26	16	79	66%
<b>Cost of Power Sales</b>	<b>375</b>	<b>432</b>	<b>487</b>	<b>530</b>	<b>554</b>	<b>10%</b>
<b>Gross profit for power sales</b>	<b>58</b>	<b>71</b>	<b>54</b>	<b>86</b>	<b>84</b>	<b>14%</b>
Gross profit margin (%)	13%	14%	10%	14%	13%	-
Operating expenses	150	254	292	307	348	26%
<b>Income from core operation</b>	<b>(92)</b>	<b>(183)</b>	<b>(238)</b>	<b>(221)</b>	<b>(264)</b>	<b>-</b>
Operating income margin (%)	-21%	-36%	-44%	-36%	-41%	-

Source: World Bank Team analysis of EDL audited financial statements 2015-2019

13. **EDL’s weak financial management (FM) capacity was identified as a major factor in contributing to its financial difficulties.** Most of EDL’s accounting processes are being carried out manually (transactions,

<sup>9</sup> EDL-Gen financial statement, June 2022 accessed in October 2022 from [https://edlgen.com.la/uploads/financial-statements/2022/en/Financial\\_statements\\_for\\_the\\_first\\_six\\_months\\_of\\_the\\_year\\_ended\\_30\\_June\\_2022\\_\(ENG\).pdf](https://edlgen.com.la/uploads/financial-statements/2022/en/Financial_statements_for_the_first_six_months_of_the_year_ended_30_June_2022_(ENG).pdf)

<sup>10</sup> The figures were calculated based on EDL’s 75 percent share stake to EDL-GEN, using the exchange rate as of March 2023.



approvals, and reporting) through excel sheets and paper documents, exposes accounting and financial management to high risks of human error. The critical challenges in managing financial data were recognized by EDL management. During 2015-2018, EDL invested almost US\$4 million to install an ERP system - namely SAP S/4 HANA - under the Power Grid Improvement Project (P149599) supported by the World Bank.

14. **However, while earlier efforts to improve the FM process at EDL focused on the hardware, the investments did not address capacity and systems gaps, as well as the required changes in accounting requirements.** Although the SAP installation was formally completed, an assessment of FM processes<sup>11</sup> showed that EDL currently only utilizes less than 35 percent of functionality across all 11 modules. In addition to the technical challenges faced by EDL, which could not be addressed during the warranty period (2019 – 2020) due to COVID-19 restrictions, two issues have been identified as impediments to the full roll-out of the SAP system:

- (a) Changes to accounting requirements after SAP installation: in 2020, the MoF issued a new Chart of Account (CoA) which required structural changes in the SAP configuration to align to government’s accounting requirements. As these policy changes occurred after the SAP system implementor contract ended, and EDL lacked financial resources to extend the contract, to date these required changes have not yet been completed.
- (b) Limited capacity of EDL accounting systems and staff: the investment in SAP installation was not coupled with the development of institutionalized accounting practices (such as accounting manuals, Standard Operating Procedures, internal control systems), capacity building, change management or implementation support to revise the business process to enable full utilization of SAP functions across the company. As a result, current intended SAP users lack the process and in-house IT/ERP capacity to carry out the necessary calibration and maintenance of the system.

15. **With the incomplete implementation of SAP, EDL is currently unable to meet its financial reporting requirements in a timely manner.** The 2019 audited financial statements were qualified by the auditors with a disclaimer opinion highlighting key issues that prevented them from expressing an unqualified (clean) audit opinion. Since then, EDL has not been able to produce any audited financial statements. EDL has also not yet aligned its CoA to the new CoA issued by the MoF in 2020<sup>12</sup>. The Decree on State-Owned Enterprises (September 2022)<sup>13</sup> mandates that all SOEs submit annual financial reports to the MoF, which will enable the MoF to better monitor and address fiscal risks. Submissions will be required within three (3) months after the end of the financial year (i.e., by the 31<sup>st</sup> of March of the following year), which EDL is currently unable to meet. The challenge to produce accurate financial information has exacerbated the company’s financial difficulties, as EDL management and shareholders do not have access to the basic financial data required for informed decisions.

16. **Continuing operating losses and with limited FM capacity to track its own financial situation has led to EDL accumulating significant debt stock unchecked.** Between 2014 and 2018, EDL invested US\$5 billion in new assets, which widened the financing gap in the sector in addition to the negative margins highlighted

<sup>11</sup> Energy Sector Financial Recovery Program (P175881).

<sup>12</sup> Ibid.

<sup>13</sup> Decree of State-Owned Enterprises, 2022 <http://aoofficialgazette.gov.la/kcfinder/upload/files/322%E0%BA%A5%E0%BA%9A%202.9.2022.pdf>

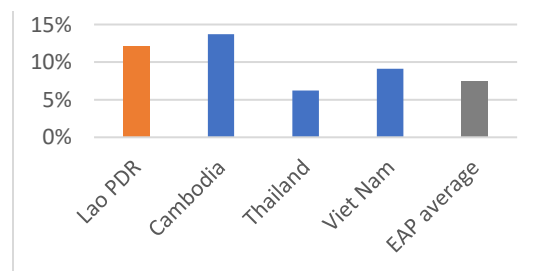


above. At the end of 2018, EDL’s debt reached US\$4.8 billion, while EDL’s payables and other short-term liabilities also increased sharply to reach US\$1.5 billion. As of 2021, total EDL debt was estimated to amount to US\$5.4 billion. The associated increase in EDL’s annual debt service requirement is expected to significantly exceed repayment capacity. Data from 2019 financial statements show that 66 percent of EDL’s debt stock was on-lent by the MoF to EDL, meaning that in case EDL is unable to service the debt, the burden will fall on the government. The on-lending to EDL accounts for 24 percent of total PPG and 33 percent of the total external debt of Lao PDR. Additionally, most of the remaining 34 percent of debt that EDL has borrowed directly is covered by sovereign guarantee (corresponding to about 12 percent of total external PPG debt). EDL’s financial recovery is therefore not only an energy sector issue, but also of macro-fiscal significance.

17. **Government actions have been too small to make a significant impact.** The Government of Lao PDR (GoL) has taken some policy actions to address the sector’s financial issues: (1) Tariff Adjustments – in March 2021, the PMO issued a directive to increase the tariff by 2 percent, which was however offset by a 3 percent tariff reduction applicable to residential households from May 2021 as part of GoL measures to mitigate the economic impacts of COVID-19. As a result, the annual tariff increase for EDL resulted in a revenue boost of only US\$9 million, which was outweighed by inflation of 41 percent in the year to March 2023 and depreciation of the kip of 63 percent in the year to November 2022; (2) re-negotiation of Power Purchase Agreements (PPAs) with IPPs – Government and EDL requested a 8 percent reduction in power purchase prices from all power producers, which so far has been accepted only by small/medium-sized (= <10MW) generators. Due to the small portion of energy purchases impacted, in 2021 this was estimated to result in only US\$2 million of cost savings for EDL; (3) debt repayment deferrals - during the period 2020-2022, EDL benefited from debt service deferrals from its lenders. Overall, the World Bank estimated that deferrals had accumulated to about 8 percent of GDP by November 2022 (for Lao PDR, not just EDL). However, the terms of these deferrals are not clear, so it is not yet possible to assess their impact.

18. **Service quality has suffered, as EDL T&D losses have been increasing due to lack of resources for maintenance and rehabilitation of the grid system.** T&D losses, standing at 12 percent<sup>14</sup> of total power generated in 2019, are higher than the regional average (Figure 8), having increased from 10 percent in 2015. The delay in implementation of rehabilitation and maintenance has led to overloading, bottlenecks, and imbalance in the power system, which has led to supply disruptions, including system tripping, rolling blackouts, and wide area blackouts in severe cases. EDL has resorted to rotating old distribution transformers<sup>15</sup> from one location to another to address some of these issues temporarily or to respond to some emergency cases, but this is not sustainable, as the already aged equipment will degrade rapidly and increases the risk of equipment failure. The impact is being felt by consumers, as the 2018 World Bank Enterprise Survey indicated that almost 80 percent of companies in Lao PDR experienced

Figure 8: Transmission & Distribution Losses (in % of total power generated)



Source: Lao PDR Energy Statistics; IEA Statistics

<sup>14</sup> Out of the total 12 percent transmission and distribution losses, 6.7 percent are non-technical losses (due to poor collection rates and insufficient metering system) and about 5 percent are technical losses.

<sup>15</sup> EDL mainly intends to rotate transformers manufactured in the 1970s, and 1980s.



electrical outages - up from around 50 percent in 2016 and at a higher percentage than the regional average (<60 percent).

19. **As part of an effort to enhance regional power trade and address some of the financial issues faced by EDL, in 2018, GoL initiated discussions with China Southern Power Grid Ltd. (CSG) to form Électricité du Lao Transmission Company Ltd. (EDL-T).** CSG, a regional power utility in Yunnan province, had indicated an interest in a concession for EDL's high voltage transmission lines and substations (230 kV and above), which are used to export power from Lao PDR to its neighbors, as well as to move bulk electricity domestically between network zones. After lengthy negotiations, CSG and GoL signed a Concession Agreement (CA) in March 2021, where EDL-T was established as a joint venture company with 90 percent of shares owned by CSG and 10 percent owned by EDL<sup>16</sup>. Once the CA will be effective, EDL-T will be the lessee of existing 230 kV and 500 kV assets from EDL and the investor for the new Lao power transmission system assets during the concession term. CSG will make an upfront payment and investments to the high voltage transmission lines as agreed with GoL, and will recover the cost through a usage fee, or "wheeling charge", for the power flow that goes through the transmission lines under EDL-T operation. The operational details of the CA are still being discussed among the parties and the CA will not become effective until an agreement is reached.

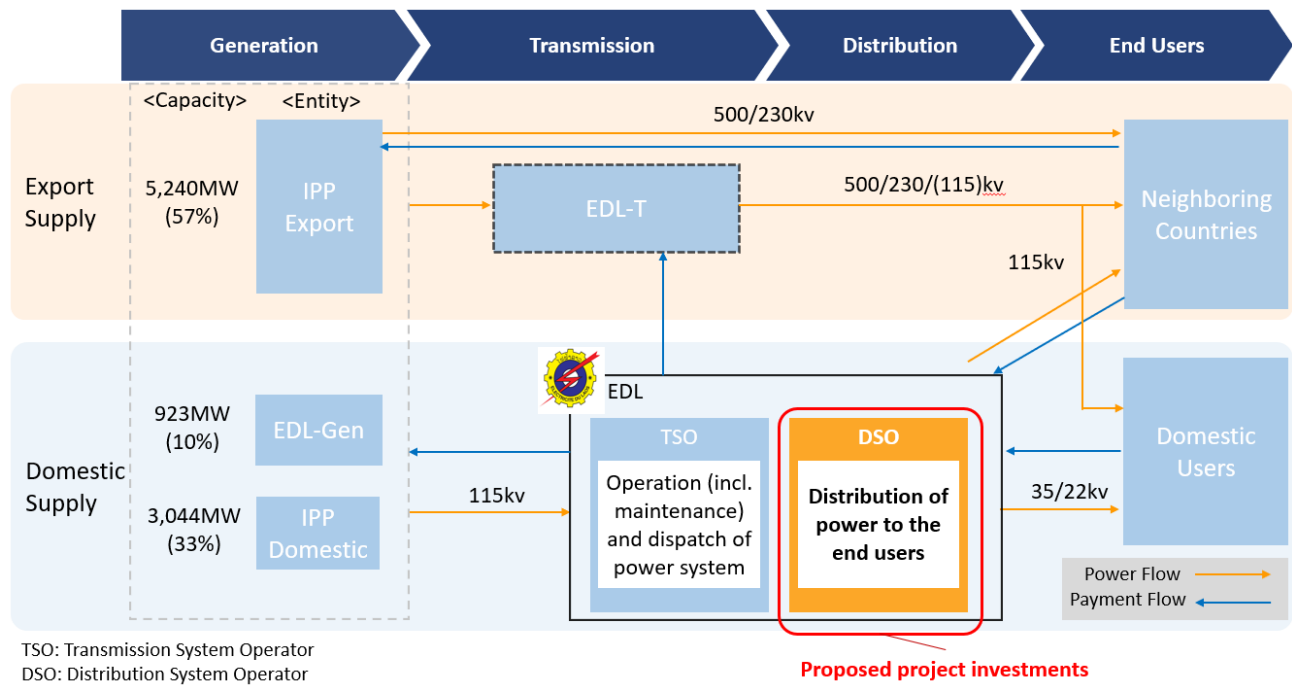
20. **While the potential EDL-T transaction concerns high-voltage transmission lines only, the Project focuses on addressing critical bottlenecks in the low-voltage distribution system, which will remain fully under EDL responsibility and control.** The aging domestic distribution system is already unable to meet growing demand at the 115kV distribution substation level. The de-bottlenecking and rehabilitation of these points are crucial to ensure that domestic and export supply obligations<sup>17</sup> can be met, and that the domestic supply does not deteriorate further. The investments are expected to bring economic and financial benefits to EDL by reducing distribution losses and by increasing revenues through increased transformer capacity, as demonstrated by the results of the economic and financial analysis under Section IV. The investments to be supported under the Project are only at the distribution system level and will continue to be fully under EDL's control and responsibility (Figure 9). The technical viability and financial benefits of the Project investments will therefore be unaffected by the EDL/EDL-T agreement.

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<sup>16</sup> While EDL was involved in the discussions, it is not among the Lao parties that are signatories of the agreement, which are only MEM and MPI.

<sup>17</sup> Small and medium hydro power plants are connected to 115kV and below grid.

Figure 9. Overview of power sector system including potential role of EDL-T



### C. Relevance to Higher Level Objectives

21. **The Project is fully aligned with the World Bank Group’s Country Partnership Framework (CPF) for Lao PDR FY23-26 (Report No. 177311-LA),** addressing one of the three High Level Outcomes- Purchasing power and access to public services protected from macroeconomic instability and fiscal pressure on social spending. The Project will support meeting the CPF Objective 2: “Improved institutional capacity and power network efficiency of EDL” by reducing the EDL’s distribution grid system losses and increasing power flow. The Project will also contribute to achieving CPF Objective 4: “Increased connectivity through climate-resilient infrastructure”.

22. **The Project also aligns with the power sector’s strategic priorities.** It is consistent with the National Power Development Plan (NPDP) for the period 2020-2030, which aims (a) to ensure the reliability and security of the Lao power system, and (b) to expand the T&D system to align with the electricity generation plan and power demand both for domestic consumption and export.

23. **The Project will support investments and implementation support activities to address key bottlenecks in EDL’s investment program.** The distribution system investments were identified by EDL management and approved by their Board in line with the NPDP and authorized by the Parliament in August 2022 but have not been implemented due to lack of funds. On the other hand, the technical assistance (TA) and capacity building activities to strengthen EDL’s FM and support the implementation of the SAP system complement the SAP investments that EDL made under the PGI project and will enable the completion and integration of all SAP system modules to full functionality.

24. **The Project is aligned with Pillars 3 and 4 of the World Bank Group’s Global Crisis Response**



**Framework (GCRF): Strengthening Resilience and Strengthening Policies, Institutions and Investments for Rebuilding Better.** The Project will contribute to improving the capacity and contingency of the domestic distribution system to support the climate resilience of the power sector, reducing the incidence of power supply disruption. Improved financial and accounting data will also improve EDL’s institutional resilience and support the implementation of power sector responses to crises. The Project is aligned with the World Bank Group’s Green, Resilient and Inclusive Development approach.

25. **By addressing the problem of inadequate resources and investments to the distribution grid and Financial Management System (FMS), the Project builds on the Bank’s analytical work and technical assistance to help improve EDL’s performance.** The Project builds on past and ongoing Advisory Services and Analytics (ASA) programs, namely the most recent Energy Sector Financial Recovery Program in Lao People's Democratic Republic (P175881), completed in FY22, and the earlier Lao PDR Sustainable Energy and Extractives Advisory Program (P171029). In particular, this Project builds and operationalizes some of the analytical findings and recommendations conducted under the FY22 ASA, with respect to two pillars: (a) Domestic Grid Optimization: this pillar assessed and analyzed potential domestic grid improvement options for Lao PDR taking into account domestic demand growth and regional synchronized power exchange through its domestic grid, already committed investments in generation and transmission, generators’ operating reserves, and grid contingencies and security of supply for the next 10-year period, and; (b) EDL Corporate Governance and Financial Management Improvement: this pillar, supported by the Public-Private Infrastructure Advisory Facility and European Union trust funds, focused on providing an in-depth assessment of EDL’s FM and accounting reporting practices, as well as on the implementation of its Enterprise Resource Management System/SAP. The investments and activities under this Project are based on this analytical work. Analytical work and dialogue (relating to tariff setting, regulatory, institutional and structural issues) is continuing under the Power Sector Sustainable Development Support (P179306).

26. **Linkages with development partners’ energy activities in Lao PDR.** With the help of United Nations Industrial Development Organization (UNIDO), the Government has adopted Basel and Stockholm Conventions requirement to deal with Persistent Organic Pollutants and Polychlorinated Biphenyl (PCB), but EDL will still need to manage some transformers having PCB for the time being. To support this, Component 1 of this Project will provide portable PCB analyzers and relevant training. The World Bank is also coordinating closely with Japan International Cooperation Agency (JICA) on the EDL corporate restructuring and Human Resources (HR) reform agenda, which has been providing support through embedded consultants in EDL focusing on decision making processes and incentive structures.

## II. PROJECT DESCRIPTION

### A. Project Development Objective

#### PDO Statement

27. **The Project Development Objective (PDO)** is to strengthen the capacity and efficiency of the distribution system in the Project Areas and improve EDL’s financial management capacity; and in case of an Eligible Crisis or Emergency, respond promptly and effectively to it.



## PDO Level Indicators

28. **The achievement of the PDO will be measured by the following PDO level indicators:**
- i. Increase in efficiency at the targeted substations (%)
  - ii. Increase in distribution capacity at the targeted substations (kVA)
  - iii. Reduction in the amount of time to complete annual financial reports for MoF (months)
  - iv. Reduction in the number of issues raised in the disclaimer opinion of the audit reports (number)

## B. Project Components

29. **The Project consists of three components:**

30. **Component 1: Substation Investments and Grid Monitoring Systems (US\$46 million equivalent)** will finance two sub-components:

- (a) **Component 1 (a) (indicative amount US\$38.95 million equivalent):** The sub-component will support replacement or additions of transformers in targeted substations that have low performance and high technical losses due to the aging transformers and/or inadequate distribution capacity. The replacement with/installation of new transformers will enable EDL to improve the efficiency and capacity of its distribution networks. The investments will also increase the resiliency of the infrastructure, as new transformers and equipment will adopt a more advanced design to address: (i) the impact of excess heat through efficient cooling and heat-resistant material; (ii) the risk external electric surge through lightning arresters; (iii) the risk of earthquake through improved design of bushing and foundation, and (iv) degradation from pollution through better insulation design or advanced material. This sub-component is aligned with Pillar 3 of the GCRF: Strengthening Resilience. In addition, this sub-component will also procure mobile substations to improve the speed of post-disaster recovery and to secure adequate supply capacity during the overhaul or construction. The investments will result in most substations having at least two same-capacity transformers so that the substation's N-1 contingency will be improved. The identified investments are listed below (see Table 2) and have been screened from a list of investments already approved by EDL Board, based on their technical needs, and which shall fulfill the following three criteria: a) No assets subject to transfer to EDL-T, b) No greenfield investments and/or investments that would require additional land acquisition, c) All investment sites must be either PCB-free or work will only begin after treatment of PCB contamination with the support of UNIDO (detailed information is provided in Annex 2), and d) cleared of all Unexploded Ordnance (UXO). While receiving 115kV transmission lines have been confirmed to have enough capacity to take on the larger capacity of the replaced transformers, investments in some substations include the upgrading of 115kV and 22kV equipment to ensure the ability to larger power flow. During Project implementation, additional distribution substation(s) would be considered subject to technical requirements, funding availability and contributions to the development objective of the Project, in addition to the above three criteria.



**Table 2: List of distribution substation investments**

Distribution Substation	Outline
M. Kham	Replacing temporary 10MVA <sup>18</sup> transformer with a new 30MVA transformer and adding a new 30MVA transformer, installing switchgears, a shunt reactor, a control building, and operators house on the secured substation yard
KokSaad	Replacing 22MVA transformer and 30MVA transformer with two new 50MVA transformer
Pak Bo	Replacing two 20MVA transformer with two new 50MVA transformer and 22kV side enforcement
Sa Pao Thong	Replacing a 20MVA non-standard tap transformer with a standard new one to improve voltage control range and this will make parallel operation possible with existing 20MVA transformer
Bang Yo	Replacing two 25MVA transformer with two new 50MVA transformer and 22kV side enforcement
Na Lea	Replacing 20MVA transformer with a new 30MVA Tr and this will make parallel operation possible with the existing 30MVA transformer
Sa La Phoukhoun	Installing a new 20MVA transformer, switchgears, a control building, two tension towers, and operators house on the secured substation yard
Vangvieng	Replacing a 16MVA transformer and a 13MVA transformer with two new 30MVA transformer
Paksan	Replacing a 16MVA transformer with a new 30MVA transformer and this will make parallel operation possible with the existing 30MVA transformer
Ban Na	Installing a 30MVA transformer and making parallel operation possible with the existing 30MVA transformer
Phonsavan	Installing a new 115kV line bay as a stand-by bay to transfer power to M. Kham in case of existing bay failure or repair, and replacing existing two non-compatible local SCADA systems with new local one in the expanded building's space
Mobile	Two 115/22kV 20MVA mobile substation sets consisting of a trailer head, to be stationed at Vientiane warehouse yard

At least one transformer at Nalea SS is suspected<sup>19</sup> of being PCB contaminated ( $\geq 50$ ppm). EDL shall therefore follow the Hazardous Material Management Plan, as well as ensuring that the work on this transformer will commence only after the scheduled PCB decontamination process has been completed by the Ministry of Natural Resources and Environment (MoNRE) with support from UNIDO.

(b) **Component 1 (b) (indicative amount US\$7.05 million equivalent):** The sub-component will support the installation of system monitoring and protection relay units, procuring design and planning software and portable analyzer sets, project technical implementation support, and EDL staff training for the use of the system planning software packages and portable analyzers:

(i) Pilot installation of Wide Area Monitoring System (WAMS) – The system will enable EDL to monitor system status<sup>20</sup> comprehensively and in real time, so that EDL operators can better monitor grid stability, take preventive measures to avoid system disruptions, and enable faster recovery after disruption. It is expected that climate change will increase intensity and impact of natural phenomena (lightening, dust pollution, winds, high temperatures) which may lead to increased cases of grid instability and supply disruptions that may lead to blackouts. The WAMS will improve the EDL's system operation capacity to quickly respond to these challenges and

<sup>18</sup> This historical transformer was used for the first 115kV high voltage grid connection between Lao PDR and Thailand.

<sup>19</sup> However, the sample oil inventory from the targeted transformer (ABB) has different ID number and it is PCB negative, and PCB positive sample oil inventory has only oil amount information, thus the origin of oil cannot be perfectly specified.

<sup>20</sup> SCADA resolution is a few seconds order, but WAMS resolution is a few milli-second order.



therefore increase resilience of the distribution system. This is aligned with Pillar 3 of the GCRF: Strengthening Resilience.

- (ii) Digital Protection Relay Units – The equipment will replace old analog and transistor/digital relay units and will improve fault clearance time and system stability through automated grid protection and supervision.
- (iii) System Planning Software – The software will acquire subscription licenses for the industry standard power system simulation and planning software.
- (iv) Technical Implementation Support – This will support the hiring of an Owner’s Engineer (OE) who will help EDL with the implementation of Component 1 including detailed technical design and specifications, scope of work, environment and social safeguard issues, procurement support for complex technical contracts, clarifications, negotiations, contracting, payment, monitoring the delivery, installation, commissioning, and handover of the equipment and on-site works. The consultants shall be embedded in EDL’s headquarter office to ensure close coordination, on-the-job training and knowledge transfer.
- (v) Provision for regional maintenance offices of six (6) PCB portable analyzers and relevant training for safety maintenance and appropriate handling.
- (vi) Training of targeted EDL staff in the use of WAMS, digital protection relay units, and system planning software.

**31. Component 2: Financial Management System and SAP Implementation (US\$5 million equivalent).** This component will support consulting and non-consulting services, technical assistance, and capacity building required for the strengthening of FMS at EDL corporate level and for completing the integration and adoption of the SAP to its full capacity. This component also includes FM and procurement implementation support at the project-level, as well as support annual external audits of financial reports both at the project-level and for EDL as a corporate entity. The activities under this component are summarized as follows:

- (a) Development and implementation of new accounting and FM systems: To hire an international experienced consultancy firm to support EDL to : (i) update EDL’s CoA to latest CoA developed by MoF<sup>21</sup>, (ii) develop an Accounting Manual that will realign/develop accounting policies in accordance with International Financial Reporting Standards (IFRS) or Local Financial Reporting Standards (LFRS) requirements<sup>22</sup> and EDL’s CoA, (iii) implement the internal control framework (supporting the internal audit committee), and (iv) provide handholding support and training on the use of the Accounting Manual and related accounting policies and FM processes to targeted staff in the Accounting and Finance Department and other relevant departments. This will ensure that EDL has a clear and institutionalized set of accounting rules and processes documented in the Accounting Manual as a single source of reference, as well as strengthened internal controls and FM capacity of

<sup>21</sup> As of March 2023, the latest MoF Charts of Account was approved in 2020. However, there are ongoing efforts within MoF – supported with TA provided by the World Bank – to update the MoF Charts of account and the new revised version is expected to be approved in December 2023. The Project Management Unit (PMU) and Project Implementation Team (PIT) for Component 2 of this Project will liaise closely with MoF to ensure that the outputs supported by a full alignment of EDL’s CoA with the latest applicable MoF accounting standards.

<sup>22</sup> Currently, under Lao regulations, EDL is required to comply with LFRS, however its subsidiary EDL-Gen is transitioning towards IFRS. A recommendation made by the World Bank, based on the assessment conducted by Deloitte in 2021, was for EDL to request the adoption of IFRS, on the grounds that it is providing an ‘essential service’ and also that using IFRS would increase transparency and would facilitate the auditing process as well as the consolidation of financial statements with its subsidiary EDL-Gen. However, ultimately the decision rest with EDL and the support will comply with the applicable financial reporting standards.



staff. This investment is aligned with Pillar 4 of the GCRF: Strengthening Policies, Institutions and Investments for Rebuilding Better.

- (b) System Implementor services – The service provider will (i) perform the integration of SAP modules with Payroll and Billing system; (ii) modify SAP system configuration to align with the new EDL’s CoA; (iii) resolve any outstanding technical issues and any additional SAP module/feature required for full functionality; (iv) extend access/user licenses to enlarge the SAP user base from 300 to 500 staff not limited to Accounting and Finance but also operational departments that SAP requires input from; (v) support annual SAP operating and maintenance fees (vi) develop a SAP Standard Operating Procedure (SOP) Manual with clear steps and responsibilities across all departments; (vii) provide training on SAP<sup>23</sup> and implementation support to resolve any day-to-day issues. The SOP Manual will include a step-by step description on how to perform functions as per SAP modules and how they are integrated into corporate accounting and FM systems. This aims to ensure that procedures and practices will be standardized, transparent and accessible to all staff and will ensure continuity of operations even as individual staff may rotate out of current roles. In this sense, the SOP Manual aims to make EDL’s ERP system more resilient. This activity is aligned with Pillar 4 of the GCRF: Strengthening Policies, Institutions and Investments for Rebuilding Better.
- (c) Change Management support: Experienced consultants will provide support to EDL in integrating the new changes in accounting, FM and SAP systems into EDL’s corporate practices and structure, including to (i) define new roles of teams (in particular, roles, responsibilities and coordination between the Accounting and Finance Department, the Business Planning and Finance Department, and other departments), (ii) establish an in-house SAP team with support competences, (iii) cause behavioral change for SAP users, and (iv) engage top management in the change management process.
- (d) Independent External Auditor: The Project will support the hiring of an independent external auditor to conduct annual project-level audit and entity-level audits<sup>24</sup>.
- (e) Project Management Unit (PMU) support: hiring two (2) experienced consultants to support the PMU on project-related FM and procurement activities, to ensure timely reporting and compliance with World Bank’s fiduciary requirements as well as implementation of project activities. The two local consultants will liaise closely with the other consultants to ensure consistency and knowledge exchange between the corporate-level FM transformation and project-level FM and procurement activities. To ensure future sustainability of this support, the two consultants will be explicitly mandated not only to support staff in the day-to-day activities but also to transfer their knowledge and build capacity to perform those activities independently.
- (f) Capacity building of Accounting Staff - Support twenty (20) staff<sup>25</sup> to complete a Certified Public Accountant (CPA) certification, including training and tuition fees for CPA courses, examination fees and membership fees to complete and maintain the CPA accreditation, as required. This aims to

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<sup>23</sup> The training for SAP usage will be tiered according to the type of users: (a) basic training for all SAP users to ensure correct data inputs; (b) advanced SAP software system training for IT Application Team; (c) advanced SAP hardware system training for IT Infrastructure team.

<sup>24</sup> The entity-level audits will start from the second year of project implementation.

<sup>25</sup> The number of EDL staff to be supported for the CPA certification was estimated based on current EDL’s staff eligibility and assumption that an International CPA accreditation will be pursued. This number is indicative and subject to change, within the limits of the agreed budget allocation, depending on factors such as: (a) pool of eligible EDL staff with adequate basic accounting credentials to start the CPA accreditation; (b) costs of Local CPA vs International CPA.



ensure that there are at least a minimum number of staff with the required qualification to oversee a sound accounting practice. This activity will include a bonding clause that the staff certified under Bank's support should continue work for EDL for at least three (3) years after the completion of the CPA accreditation and the breaking of the bonding would result in the staff's obligation to reimburse for all costs incurred.

32. **Component 3: Contingent emergency response (US\$0 equivalent)** - This zero-dollar component would allow rapid reallocation of credits proceeds to respond to an unanticipated Eligible Crisis or Emergency. This component has no allocation and no financing unless an emergency is declared. The Emergency Response Manual for the contingent emergency response component (CERC) will be prepared as an Annex to the Project Operations Manual (POM). In the event the component is triggered, a formal restructuring will be prepared for the purpose of reallocation and revision to the results framework to include appropriate indicators related to the emergency response activities, among other changes.

33. **Climate and Resilient Infrastructure Aspects:** Component 1 will contribute to making EDL's domestic 115kV distribution grid system more climate resilient. EDL's grid scheme is generally an air-insulated substation scheme that is directly exposed to various weather impacts such as lightning, high temperature rise, and dust pollution that may be aggravated by climate change and could lead to equipment failure. To mitigate this impact, sub-component 1(a) will replace old or small capacity transformers with new transformers that adopt (i) advanced design and new materials to prevent large electric shocks and excessive thermal rise threatening to internal insulation, (ii) better insulators to improve external insulation, (iii) Lightning Arresters to protect transformers against electric surge from lightning, (iv) appropriate capacity which can satisfy long-term demand growth and N-1 contingency, and (v) mobile substations as a post-natural and non-natural disaster recovery mitigation measure and alternative power supply during replacement or overhaul maintenance at substations. Sub-component 1(b) will procure Digital Protection Relay units that will clear faults much faster and provide more detailed information than analog protection relay units would. WAMS would enable real-time monitoring of grid status through Phase Monitoring Units installed to key stations and will enable system operators to take preventive measures. Even after any fault in the system, WAMS will quickly inform grid status, identify the location of the fault, and advise operators on how to maintain power supply, minimize affected area, and direct them to the affected location to enable quick recovery of power supply. The Project will also adopt a standard foundation design that prevents oil leaks and earthquake-free.

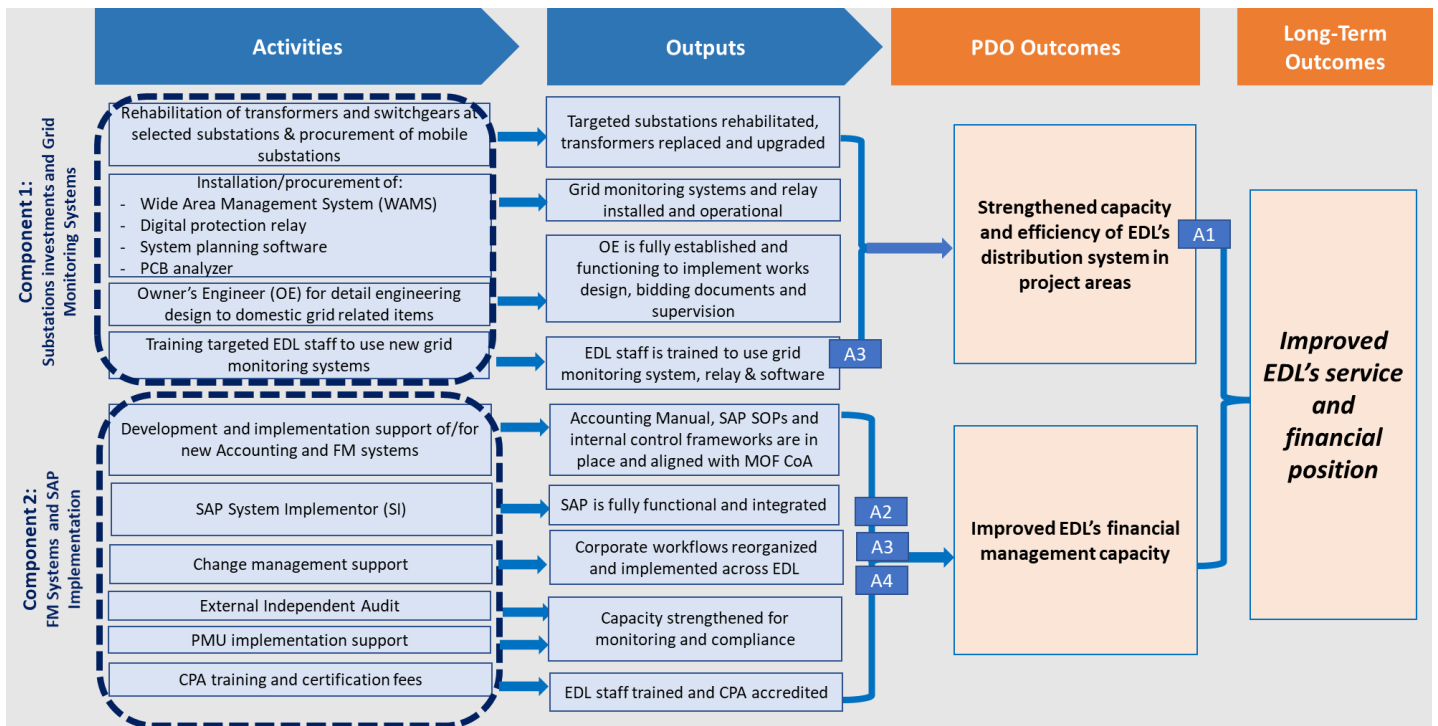
### C. Project Beneficiaries

34. The final beneficiaries are expected to be about 7.3 million people in Lao PDR, including existing and future grid-connected households, businesses, and mining companies, who will become less vulnerable to power system faults. Firms, particularly small and medium enterprises (SMEs), will benefit from investments through (a) avoided load shedding and blackouts; (b) reduced costs due to outages, resulting in lower revenue; and (c) higher power-supply quality through more stable voltage and frequency. In particular, SMEs suffer disproportionately from the low quality of electricity services when compared to large firms which are usually supplied from the 115kV distribution system directly and likely to have additional infrastructure to stabilize and supplement the power supply. Given that their financial condition will ultimately impact the macro-fiscal situation, the cost-savings and improved financial management of EDL due to the Project will ultimately benefit all Lao PDR citizens.

35. EDL staff (consisting of 5,772 employees) are also expected to benefit from the activities provided under this Project including in terms of improved work safety, efficiency of day-to-day operations and capacity building. This includes engineering and technical staff who plan, design, operate, and maintain the EDL’s grid; and staff in corporate functions, such as accounting, financing, business planning and corporate strategy. In addition, female EDL staff (consisting of about 1,148 employees) are also expected to benefit from the Project activities in terms of greater opportunities to receive technical training programs and capacity building, opportunities for career advancement and promotion in the company.

**D. Results Chain**

**Figure 10: Lao PDR Power Distribution Improvement Project’s Theory of Change and Results Chain**



**Critical Assumptions:**

- A1:** EDL continues to allocate budget to maintain hardware investments to prevent further deterioration of the distribution system
- A2:** EDL continues to allocate resources (budget and staff) for proprietary software fees and staff to operate the systems
- A3:** EDL staff is retained in the functions for which they were trained
- A4:** EDL Management endorses and supports change

**E. Rationale for Bank Involvement and Role of Partners**

36. **The investments under the Project were identified in 2018 but not implemented, as EDL did not have the resources or clearance from the GoL at that time.** Already facing aging equipment and bottlenecks in the grid system, the quality of electricity services and ability to meet growing domestic demand are steadily deteriorating. Building on the Master Plan developed by JICA for EDL, the World Bank conducted in FY21 a



domestic grid optimization analysis, which identified specific investments at the distribution level to address critical bottlenecks. The team focused the identification of investment at the 115kV distribution substation level in order to avoid any area of overlap with the transmission lines that could be potentially leased to EDL-T, if the CA becomes effective in the future.

37. **Given EDL’s financial challenges and need for support, the Bank is well positioned to provide financing.** Private sector financing for distribution investments is not realistic for EDL considering its financial situation and weak FM capacity. The activities identified under Component 2, to finalize the adoption of the SAP system and strengthen EDL’s FMS, have a public good justification, as the benefits will include improved availability of financial information to non-EDL stakeholders, improved oversight of EDL by its shareholders, and more transparent decision-making regarding fiscal support that may be considered for EDL.

38. **The Bank can, alongside the proposed investments, support improved management and corporate restructuring which will reduce technical and financial losses.** The work builds on the Bank’s track record of providing analytical and advisory support and is supported by the recently created EDL Reform Committee. The Bank is also heading the Energy Sector Donor Coordination Committee, which coordinates various projects implemented by JICA, the United States Agency for International Development and others. The Bank is currently in dialogue with other donors to co-fund the Bank’s program of Power Sector Sustainable Development Support.

#### F. Lessons Learned and Reflected in the Project Design

39. **The Bank-financed PGI project (P149599) exposed the severe FM challenges that EDL is facing.** Although the SAP installation is formally completed and the PGI project is closed, the SAP system in EDL is not yet fully functional and the average utilization of SAP by EDL is less than 35 percent. The Implementation, Completion and Results Report of the PGI project reports substantial deficiencies in compiling a project asset register, updating contract monitoring arrangements, documenting the use of funds in the Designated Account (DA), including explaining questionable expenditures, and the timing of audited report submissions. While most of the identified issues were eventually resolved, there were substantial delays in compiling and submitting to the World Bank the audited financial reports. Weak controls over the review and approval of financial transactions, as well as lack of regular performance of bank reconciliations, have led to inaccurate tracking of project expenditures. While the project’s financial statements have been finally corrected, these issues have been repeatedly raised by the auditors in prior years and require a development in-house of adequate FM skills and processes to avoid their recurrence in the future.

40. **A key lesson, therefore, is the importance of allocating adequate resources to strengthening corporate systems and implementation support alongside IT hardware investments.** However, the investment for SAP installation was not coupled with the development of institutionalized accounting practices (such as accounting and SOP manuals, internal control systems, etc.) and insufficient allocation of resources for capacity building, change management and implementation support. As a result, currently staff who are designated SAP users lack understanding of SAP functionalities and input requirements, as well as lacking in-house IT/ERP technical capacity to handle implementation challenges of the SAP system. Component 2 therefore aims to support development and implementation of reforming the required corporate systems to effectively utilize SAP. The Project includes series of activities aimed at creating sound



and institutionalized accounting and FM reporting practices at the corporate level by developing an Accounting Manual in line with international/local accounting standards and MoF CoA and build their capacity to adopt and implement such practices.

41. **Secondly, another lesson is on the importance of setting appropriate and realistic indicators to capture the progress towards intended outcomes.** An observation of the PGI project indicated the lack of PDO-level indicator to measure the outcomes of the ERP investments it supported. For this Project, a specific indicator to measure the achievement of the expected outcomes for Component 2 has been included. Secondly, the expectation included in the intermediate results of the results framework (a reduction in the number of months to issue audited financial statements from nine (9) months to four (4) months after the end of the financial year) was unrealistic given the complex nature of EDL operations, low capacity and external factors that contribute to the issue. Taking these lessons learned, the Project includes the intermediate results indicator adjusted from audited financial statements to unaudited, with the target being a reduction from five (5) months to three (3) months. However, the impact from the Component 2 interventions is expected after outputs are provided and will be monitored by an additional indicator to reduce adverse opinions from the auditor later in the Project period to be met by the end of the Project.

42. **Thirdly, an important lesson from PGI's experience is the need to allocate adequate budget for implementation capacity support and to consider the challenges that EDL is facing in staff retention.** The weak capacity of staff is highlighted in the review of the PGI project. This Project therefore allocates substantial budget specifically for implementation support, training, and on-the-job training support that are necessary for the development of capacity within EDL. Furthermore, the World Bank took into account the concern of EDL management that staff tends to rotate to new positions or leave the company for better-paid opportunities after being upskilled with the training. This Project attempts to mitigate this risk by establishing an Accounting Manual for continuity and having a bonding clause for the CPA certification, so the knowledge gained by the supported staff would be given time to be passed down to other staff members.

### III. IMPLEMENTATION ARRANGEMENTS

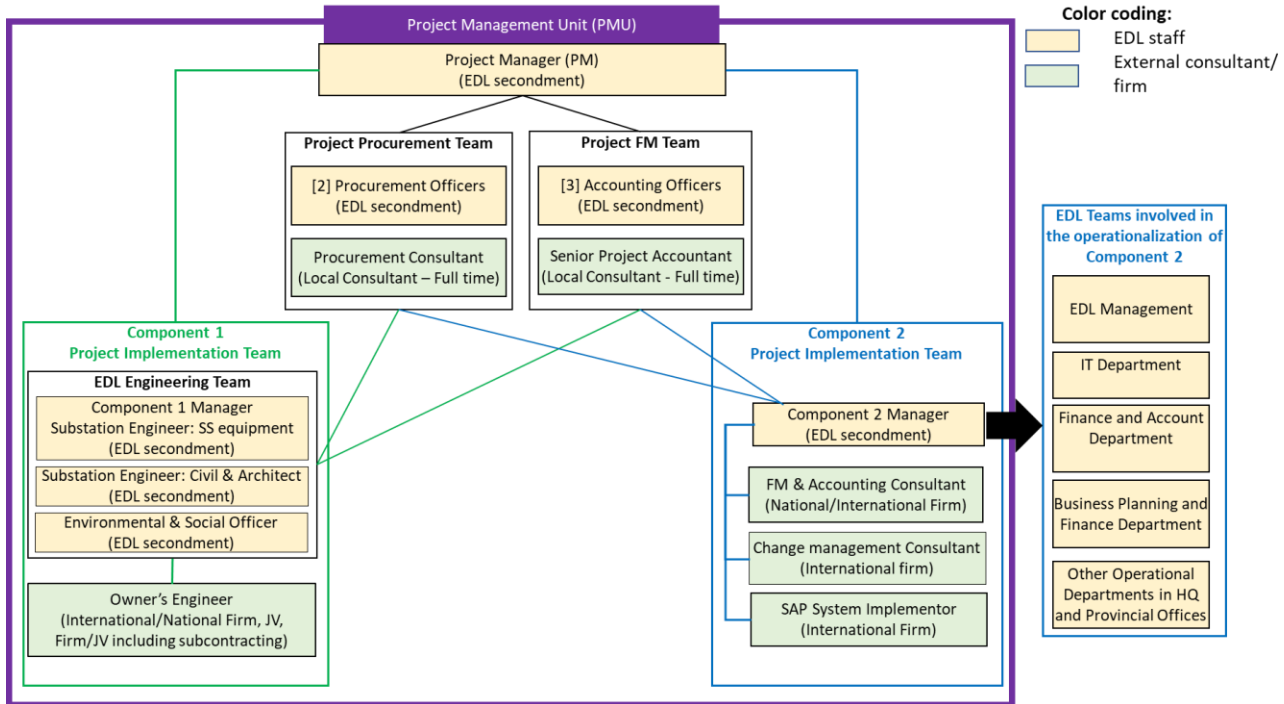
#### A. Institutional and Implementation Arrangements

43. **EDL is the sole implementing agency for this Project and will be responsible for overall project coordination and management including FM, procurement, monitoring and reporting.** EDL will ensure that fiduciary requirements are complied with. EDL already has experience in managing many World Bank-funded projects such as the PGI project, Southern Provinces Rural Electrification I (P105638), Rural Electrification Project II (P110978) and Greater Mekong Subregion Power Trade (Lao PDR) project (P105331). However, past experience has shown the need to strengthen EDL's own structures and staff with substantial implementation support and external expertise aimed at developing in-house skills.

44. **A PMU will be established at EDL's headquarters, responsible for overall management and control of the Project execution, as well as monitoring and reporting in accordance with the World Bank's requirements.** The PMU will consist of the following components: (i) a Project Manager, (ii) two Project Implementation Teams (PITs) responsible for the implementation of Component 1 and Component 2 respectively, and (iii) a Procurement team and an FM team responsible for fiduciary compliance. The

implementation architecture is illustrated in Figure 11.

**Figure 11. Project Implementation Arrangements**



45. **The Project Manager will be responsible for providing overall guidance** on project implementation and for coordination across the four PMU teams, as well as serving as a focal point for coordination with the World Bank and EDL management.

46. **The PITs will be responsible to ensure compliance with project procurement procedures.** The Procurement Team will include at least one Senior Procurement Officer and a Junior procurement officer seconded from EDL and supported by a full-time experienced external consultant, hired and paid by the Project.

47. **The Project FM Team will be responsible for administrative, accounting and financial management work related to the overall Project.** The FM team will include at least one Senior Accounting Officer that will oversee project work and two Junior Accounting officers (these three staff will be seconded from EDL) and supported by an external Senior Project Accountant (full-time experienced local consultant, hired and paid by the Project). The external Senior Project Accountant shall be on board no later than two (2) months after project effectiveness. Given the FM challenges experienced during the PGI project, this team will work in close collaboration with the FM & Accounting consultants provided under Component 2 of this Project, by integrating the FM monitoring and compliance at the project-level with an overall capacity development of the entire corporate FM and accounting systems in EDL. A project-specific audit will be conducted annually by an independent and qualified auditor hired and paid for by the Project, with audit report to be submitted to the World Bank no later than six (6) months after the year end. The independent and qualified auditor will





also conduct annual entity audits starting from the second year of project implementation<sup>26</sup>. The World Bank will provide no-objection to the Terms of Reference (TOR) for the audit. The Project auditor is to be contracted no later than six (6) months after project effectiveness.

48. **The Component 1 PIT will be responsible for implementation and compliance with the agreed technical, social and environmental requirements with the support of the Owner's Engineer (OE).** Under Component 1, the PMU will procure an OE, which could consist of a firm or a consortium of firms. Under the supervision of the EDL Engineering Team, the OE will support project implementation in certain aspects of Component 1, including: project management, basic design (civil, architectural, electrical), substation and SCADA / Protection engineering, and the technical preparation of bidding process. At the site implementation stage, the OE will support supervision and monitoring for site works, site tests, commission processes, and handover processes to EDL. OE will also support environmental and social risk management related activities including safeguards, gender, and occupational health and safety. They will also provide technical inputs to the Project FM team concerning accounting for project-related expenditures under Component 1 and contribute to ensure that reports and Project audits are submitted on time. Further, the OE will collect and analyze all data required for reporting and measuring the results indicators with technical support from EDL under the relevant substation sub-components. In addition, the OE shall support EDL to prepare the regular progress report, the completion report, and the Project Implementing Entity (EDL)'s Implementation Completion Report. Both completion reports shall begin at least six (6) months before the Project closing date. An EDL Environmental and Social Safeguard specialist will supervise implementation with the responsibility to monitor the social and environmental impacts. They will need to ensure mitigation measures are implemented throughout the Project according to the Environmental and Social Management Plan (ESMP) and other plans such as the Stakeholder Engagement Plan (SEP), Labor Management Plan (LMP), and Hazardous Waste Management Plan (HWMP) to minimize the social and environmental impacts according to the agreed policy frameworks for safeguards.

49. **The Component 2 PIT will be responsible for the technical implementation of the activities financed under Component 2.** The Component 2 PIT will be led by an EDL senior employee who will perform the role of Component 2 Manager, by coordinating and managing the firms hired to support EDL in the implementation of the activities (SAP System Implementor, Consultancy firm for Corporate Financial Management, Accounting System and Change Management) as well as ensuring that the FM & Accounting Consultant hired to support the PMU's FM and Procurement Team are closely coordinating with the Component 2 activities. The EDL Component 2 PIT Manager will report to the World Bank on the progress of the activities, and will coordinate with all the relevant EDL stakeholders and departments involved in the operationalization of Component 2, including EDL senior Management, IT departments, Accounting and Finance Department, Business Planning and Finance Department and other Operational departments in charge of feeding inputs and data into the SAP and overall FM system, both in EDL headquarters and Provincial Offices. The PIT Manager and overall team will also closely coordinate with MoF relevant counterparts (SOE Management, Development and Insurance Department and Accounting Department) to ensure compliance of the system with the EDL's CoA revisions and reporting processes.

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<sup>26</sup> The entity audit will start from the second year because during the first year EDL's financial management system is not going to be mature enough to allow a timely completion of the financial reports that would allow external audit. However, starting from the second year, the external entity audit will keep track of the progress towards the achievement of the PDO level indicator "Reduction in the number of issues raised in the disclaimer opinion of the audit reports".



## **B. Results Monitoring and Evaluation Arrangements**

50. The PMU established within EDL, with the support of each component's PIT, will monitor the progress of Component 1 and 2 against the performance indicators listed in the Results Framework, establishing baselines where required, and prepare annual progress reports on project implementation. The responsibility for monitoring the progress of Components 1 and 2 will lie with the PMU's Project Manager. The technical assistance activities will have their own monitoring and evaluation mechanisms, some of which will be built into project design. A mid-term review is scheduled to be carried out thirty (30) months after effectiveness to take stock of implementation progress.

## **C. Sustainability**

51. The GoL and EDL state that they are fully committed to the successful implementation, operation and maintenance (O&M) of the works at the substation-level, and to the adoption of the SAP system to improve its capacity to produce reliable financial reports. The Project is considered financially sustainable as it is expected to have a financial rate of return of approximately 33 percent and corresponding Net Present Value (NPV) of US\$510 million (see Economic and Financial Analysis).

52. The sustainability of the Project is based on the expectation that EDL will allocate budget and staff to operate and maintain the additional investments and systems financed under the Project, e.g., for O&M of the transformers, the annual fees of proprietary software (including the SAP system), and for the skills required to operate them. EDL is committed to providing these resources as the Project itself will be generating considerable positive returns throughout the assets' economic life.

53. As further support for EDL's sustainability, the World Bank is currently preparing, in parallel to this operation, the aforementioned multi-year programmatic ASA (P179306), which includes an update of a cost-of-service study to reassess options for improving EDL's net revenues. The study will also include support on a) Domestic electricity demand growth, b) Power export strategy assessment, c) Regulatory reform and tariff methodology, and d) EDL corporate governance and financial management. This programmatic ASA is expected to be implemented in two phases with Phase 1 being analytical work and Phase 2 focusing on implementation support to EDL and the MEM.

## **IV. PROJECT APPRAISAL SUMMARY**

### **A. Technical, Economic and Financial Analysis**

#### **(i) Technical Analysis**

54. The activities supported under Component 1 are selected based on a review of EDL's investment program and the results of the analytical work under the ASA Energy Sector Financial Recovery Program in Lao People's Democratic Republic (P175881), conducted by the World Bank in FY22. This ASA included a power grid optimization study analyzing potential distribution grid improvement options for Lao PDR, and taking into



account of (i) key constraints of power flow and low efficiency at the critical substations; (ii) domestic demand growth and regional synchronized power exchange through the domestic system, (iii) the already committed investments in generation (including the conversion to domestic generation) and transmission, generators' operating reserves, and (iv) grid contingencies. The investments are sound in view of the analysis conducted under this power grid optimization study, which used commercial software and the Electricity Planning Model developed by the World Bank.

55. The equipment, technologies, and software which will be used in Component 1 are industry standard and widely used by utilities in both developed and developing countries worldwide. The investments will be implemented according to internationally accepted technical standards and practices such as International Organization for Standardization, International Electrotechnical Commission, Conference Internationale des Grands Reseaux Electriques a Haute Tension: International Conference on Large High Voltage Electric Systems, and so on. Due to insufficient investment funding, targeted domestic substations currently lack the consistency of equipment to their intended load volume (e.g., different capacity and tap range, lack of N-1 contingency, different transformer vector group, two independent local SCADAs with no link etc.) and this Project will contribute to resolving these issues.

56. In 2021, GoL executed the "Agreement (Legislation) on Management and Monitoring of PCB Decontamination and Disposal for Electrical Transformers" and put into force the "Guideline for PCB Management and Disposal", both of which had been implemented by MoNRE and supported by UNIDO. A Hazardous Material Management Plan and the site specific ESMP taking this into account will be prepared for every investment to be supported under this Project. EDL has committed to fully follow these regulations and plans in a proper manner and EDL's PMU and the PIT will monitor and manage targeted transformers based on those protocols and consult MoNRE as needed. Component 1 will also procure PCB analyzers. Finally, as there are already existing international treaty commitments, national policies, regulations and guidelines on the management of PCB contamination, EDL has agreed to incorporate them into its own regulations and guidelines. According to the analysis conducted by MoNRE with UNIDO support, it is suspected that at least the Nalea SS transformer may have PCB contamination of about 100ppm<sup>27</sup>, though the source of the oil sample is not clear. No oil leak has been observed there.

57. On the Unexploded Ordinance (UXO) issue, M. Kham SS in Xiengkhouang province and Sa La Phoukhoun SS in Luangprabang province are located within the provinces with identified potential UXO risk. However, since EDL has already cleared most of the site area of M. Kham SS, and already completed i) site leveling earthworks, ii) a transmission tower building and wire lining, iii) 22kV distribution feeders from the existing temporary SS, and iv) the access road expansion / extension from the main road, the risk of UXO has already been mitigated to a certain degree. For Sa La Phoukhoun SS, the substation area was originally used as the quarry pit for road construction funded by Asian Development Bank. The access road from main road to the quarry pit area was constructed, quarry exaction was performed, and a 115kV transmission tower had been built in the past, so the risk of UXO is also considered already mitigated to a certain degree. In all of the

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<sup>27</sup> Threshold of hazardous is 50ppm.



Project Sites, the risk of UXO will be managed under the Government's existing regulations and procedures, and in line with the UXO risk management protocol. UXO clearance will be covered from EDL's budget.

58. The activities supported under Component 2 are a result of an in-depth assessment of EDL conducted in FY22 by the World Bank, supported by Deloitte. The assessment covered four dimensions: a) FM and accounting reporting practices; b) Enterprise Resource Management System/SAP, documentation recording and data storage; c) Corporate governance and accountability arrangements; d) Performance framework and procurement arrangements. The assessment clearly indicated critical gaps across the four dimensions and provided specific recommendations to address such gaps based on industry best practice and accounting standards. The activities of this Project are grounded on those recommendations.

## (ii) Economic and Financial Analysis

59. **Economic analysis.** The implementation of this Project would contribute to improving EDL's profitability by generating: (i) cost savings from improved efficiency at the target substations and, (ii) additional sale revenues from increased power distribution capacity of the national grid. The Project is expected to generate financial benefits that will contribute positively to EDL's financial position. A cost-benefit analysis was conducted to calculate the economic benefit of the Project. The analysis focuses on the quantifiable benefits resulting from the Project; (i) incremental consumption in targeted areas due to the increase in power supply, (ii) energy savings from lower energy losses, and (iii) reduction of CO<sub>2</sub> emissions from loss reduction. The direct economic benefits of the activities provided under Component 2 are difficult to quantify but will contribute to a more robust and efficient operation and management of EDL. In a similar project implemented by the World Bank in Indonesia (Java-Bali Power Sector Restructuring and Strengthening Project - P063913), the ERP investment generated significant annual savings that were not previously anticipated, yielding an EIRR of 14.95 percent. Under the results framework of this Project, the PITs will collect the baseline data on time spent by EDL to manually compile and update financial data and to outsource its accounting functions (currently baseline data not available within EDL) so that at the end of the Project it will be possible to also quantify the cost savings generated by the activities supported by Component 2.

60. Based on the economic analysis, the estimated NPV of the net economic benefit is US\$116.22 million with a corresponding EIRR of 35.68 percent, higher than the social discount rate of 12 percent used in this analysis. The Project is therefore economically viable. The sensitivity analysis was performed to identify how much variations of "Commission delay" and "Cost overrun" impact the NPV and EIRR of this Project. Under the worst scenario with nine years of commission delay and 300 percent of cost overrun, the NPV remains positive at US\$6 million with a corresponding EIRR of 15 percent.

61. **Financial analysis.** The financial analysis is based on the financial costs and revenues for EDL as a result of the Project investments. The estimated financial NPV of the Project is US\$510 million with a corresponding Financial Internal Rate of Return (FIRR) of 33.04 percent, higher than the discount rate of 3.3 percent<sup>28</sup> (WACC calculated based on EDL's investment portfolio) used in this analysis. Additionally, the FIRR is significantly

<sup>28</sup> The financial discount rate (WACC) was obtained from available data of EDL's actual financing facilities (79 facilities with US\$5.4 billion disbursed). The WACC 3.3 percent is an average financing cost of these loans. If financial discount rate is 6 percent, then NPV will be US\$312 million. The PGI project used an even lower discount rate of 0.42 percent. (WACC calculated as IDA's regular financing terms of 38yr maturity with 6-year grace period).



higher than EDL's on-lending term of 2.5 percent per annum. The Project is robust to changes in cost overrun and concession delays. In the worst scenario with nine years of commission delay and 300 percent of cost overrun, the NPV stands at US\$94 million with a corresponding FIRR of 13 percent.

62. **Financial viability of EDL.** EDL's recent financial performance and position are difficult to analyze accurately due to the lack of reliable and comprehensive financial information. Audited financial statements are only available until 2019 and EDL's staff FM and accounting capability is constrained due to limited number of staff with adequate accounting skills and lack of a functioning FM software – both of which will be addressed by this Project under Component 2, by providing the TA and capacity building required for strengthening EDL's FM practices and for completing an effective functioning, integration, and adoption of the ERP/SAP system.

63. The World Bank conducted financial viability assessment of EDL based on the audited financial information available for the years 2015-2019, and unaudited profit and loss data from 2020-2022. The findings clearly indicate financial distress. For profitability, the gross profit margin ratio from 2015-2019 was very low at 13 percent compared to its subsidiary, EDL-Gen (54 percent<sup>29</sup>) and a peer company from a neighboring country such as Électricité du Cambodge (EDC) in Cambodia (29 percent<sup>30</sup>). The gross profit margin dropped significantly between 2020-2022 due to newly fulfilled power purchase agreements. For liquidity analysis, the current ratio<sup>31</sup> was low at 0.1 in 2019 which means that EDL has available only 10 percent of the cash required to fulfill its debt obligations due within a year. EDL's debt to equity ratio is about 3.9, which is concerningly high compared with a peer power utility, EDC (1.38<sup>32</sup>), and aggravated by volatile earnings, resulting in a shortage of cash to repay debt service obligations.

64. **Financial projections for EDL:** EDL's financial situation is expected to remain vulnerable. Based on the information made available to the World Bank by EDL, power purchasing costs in 2023 are expected to be more than double the 2019 level assuming full application of Take-or-Pay contracts with IPPs. However, domestic tariff revenue in Lao Kip is estimated to grow by 48.9 percent only. A sharp decline in the value of the Lao Kip will cause dollar denominated payments to IPPs, repayments of foreign debts, and interest payments to rise steeply. Estimates by the World Bank expect that, in absence of substantial reforms and/or action taken, the debt service obligations (debt repayment plus interest expenses) will exceed the projected revenues starting from 2023.

## B. Fiduciary

### (i) Financial Management

65. The FM capacity assessment for the Project was carried out in September 2022 in accordance with the World Bank Policy and Directive on Investment Project Financing (IPF) to determine whether existing FM capacity and systems of EDL are acceptable and sufficient to implement the Project and provide the World Bank reasonable assurance that funds will be used for the intended purposes. A Project FM team, as part of

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<sup>29</sup> in 2022

<sup>30</sup> in 2017

<sup>31</sup> Current ratio = current assets/current liabilities

<sup>32</sup> in 2017



the PMU housed at EDL's headquarters, will be responsible for the overall FM implementation of the Project. The team will comprise three (3) EDL staff seconded full time and a full time external senior project accountant (full time consultant).

66. The assessment concluded that the FM risk is High. After applying mitigation measures, the residual risk is reduced to Substantial. The following risks have been identified: (1) systemic weaknesses in the financial reporting processes at the entity level. These include incomplete SAP system implementation, outdated chart of accounts, lack of a coherent internal controls framework, significant delays in preparing annual financial statements and submitting external audit reports to regulators and stakeholders. These weaknesses are acknowledged in the design of Component 2 of the Project which is dedicated to strengthening EDL's financial reporting regime; (2) absence of dedicated qualified project staff to oversee FM work and prepare timely financial statements and follow up on audit arrangements; (3) a disconnect between the planning and finance unit and the accounting unit to enable efficient and timely processing of payments and recording of transactions; and (4) absence of documented FM procedures. These identified risks could result in a delay in the overall implementation of the Project and the ability to comply with the World Bank's FM requirements. The following mitigation measures have been agreed to address the risks:

- (a) Hire a qualified and experienced FM consultant (full time) to provide support to the staff seconded by EDL. The TOR of this position should receive no objection from the World Bank. The consultant should be in place within two (2) months of the Project becoming effective (dated covenant).
- (b) Assign three (3) qualified and experienced finance and accounting staff from EDL to the PMU. These personnel should be identified and be assigned full time as part of the establishment of the PMU within one month of the Project becoming effective (dated covenant). TORs for these seconded positions should also be prepared and receive a no objection from the World Bank. The assigned staff, along with the consultant, will receive training in the World Bank's disbursement procedures and other FM requirements once the FM team of the PMU is formed.
- (c) The POM will document high level FM arrangements for the Project. An FM Manual will also be prepared that will provide in greater details of the procedures, rules, and regulations with regards to planning and budgeting, accounting, internal controls, funds flow, financial reporting, and auditing. The FM Manual will be part of the POM and should also consider appropriate payment approval authority to ensure efficiency in the payment process. The POM should be in place and receive no objection from the World Bank as a condition for Project effectiveness.
- (d) Component 2 of the Project supports the strengthening of entity FM and systems integration. The TA interventions that include strengthening of financial reporting capacity, development and rollout of a robust internal control framework, ERP/SAP system integration, accountancy skills augmentation and training will improve the overall FM environment of EDL during the implementation period, if pursued rigorously and consistently.

67. An IFR shall be prepared on a bi-annual basis based on an agreed format and to be submitted to the World Bank no later than 45 days after the end of each period.

68. The Project will be subject to an annual audit to be conducted by an independent and qualified audit firm, with TOR acceptable to the World Bank. The auditors will be appointed within six (6) months after the



Project becomes effective. The audit report and management letter will be submitted to the World Bank within six (6) months after the end of each reporting period and on the closing date of the Project. Audited financial statements and audit opinions will also be subject to disclosure in accordance with World Bank Policy on Access to Information.

69. A Pooled DA denominated in USD will be opened at the Bank of Lao PDR to receive advance from IDA. Applicable disbursement methods will be advance, reimbursement, direct payment and special commitment. The ceiling for the DA will be fixed at US\$3.5 million.

70. The IDA Credit will fully finance eligible expenditures for activities under Components 1, 2, and 3. Disbursement categories for the IDA Credit are presented in Annex 1. Retroactive financing of up to SDR 7.6 million (US\$10 million equivalent) from the Shorter Maturity Loan (SML) may be made available for payments made prior to the signing date but on or after May 30, 2022 for eligible expenditures under Category 1. The activities undertaken during the retroactive financing period must follow the World Bank procurement procedures and the World Bank ESF requirements, if applicable.

71. The approved Annual Work Plan and Budget will specify the source of the financing (Blend or SML) to be financed for the Eligible Expenditures under Category 1. To the extent possible, SML proceeds shall be disbursed first.

72. Disbursement for CERC—Contingent Emergency Response. No withdrawal will be made under this component until the disbursement conditions set out in the Financing Agreement have been met. All expenditures under this component, should it be triggered, will be in accordance with the World Bank Policy and Directives on IPF and appraised, reviewed, and found to be acceptable to the World Bank before any disbursement is made.

**(ii) Procurement**

73. About 75 percent of the Project funds will finance supply and installation of transformers and equipment including works contracts. There will be supply and installation of transformers and equipment for substations contracts, that will be packaged as per substations' locations and/or the complexity of the scope of work at a substation. The rest of the funds will finance IT systems, technical assistance and capacity building of EDL.

74. A procurement capacity assessment of EDL was carried out by Bank staff in March 2022. Based on the assessment, EDL was found not to have adequate capacity to carry out procurement following World Bank Procurement Regulations. Under the previous PGI project, most of the procurements were conducted and all contracts were managed by an International Procurement Consultant; very few EDL Procurement Division staff were trained under that Project. Key risks identified include: (i) possible delays in procurement and contract delivery, and (ii) governance risks associated with possible conflict of interest, fraud and corruption practices. Risk mitigation measures will include hiring an external Procurement consultant to support EDL staff in the PMU's Procurement Team with procurement and contract management tasks. Findings of the suppliers/contractor capacity assessment indicate that there is an adequate number of local



suppliers/contractors to participate in the tenders within the values envisaged under the Project. A detailed procurement plan has been agreed for the first 18 months and will be used to monitor implementation. Detailed information on the capacity assessment, risk mitigation measures, oversight arrangements and procurement arrangements is included in Annex 1.

75. The World Bank Procurement Regulations for IPF Borrowers dated November 2020 will be applied. As required under the Procurement Regulations, EDL has prepared a Project Procurement Strategy for Development (PPSD) to inform fit-for-purpose procurement arrangements in the procurement plan that will cover at least the first 18 months of implementation of the Project. The PPSD has been submitted and agreed upon with the Bank at negotiations, alongside the procurement plan. For the Request for Bids (International market approach) and selection of consultants involving international competition under the Project, the Bank’s standard procurement documents shall be used. For the Procurement of goods and works through Request for Bids (National market approach) and Request for Quotations, the harmonized standard open bidding documents dated July 2021 and requests for quotations dated July 2021 as agreed with the World Bank shall be used.

C. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No

D. Environmental and Social

76. **The environmental and social risk for the Project is rated as substantial mainly due to the potential presence of PCB in the 115/22kV distribution transformers that are to be replaced, and the environmental and social risk management capacity of the Project implementing entity (EDL).** The environmental and social risks and impacts that could be posed by the Project are identified, assessed, and will be managed and monitored to improve the Project's overall environment and social performance throughout the Project’s lifecycle. The Project will not finance infrastructure works outside existing substations’ perimeters. Thus, no key environmental and social risks related to physical and geographical issues, land access, and cultural heritage have been identified. The applicable Standards in addition to ESS1 (Assessment and Management of Environmental and Social Risks and Impacts) are: ESS2 (Labor and Working Conditions), ESS3 (Resource Efficiency and Pollution Prevention and Management), ESS4 (Community Health and Safety), ESS6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources), ESS7 (Indigenous Peoples), and ESS10 (Stakeholder Engagement and Information Disclosure).

77. **The environmental risk classification is classified as Substantial.** This is due to two main reasons under Component 1: (i) adverse health and environmental risks and impacts related to presence of PCBs during the replacement of 115/22kV distribution transformers at the existing substations (SSs) if not handled properly and disposed of with care; and the limited experience of EDL with the Environmental and Social Framework (ESF). The construction of control buildings on the existing substation yards at M. Kham SS and Sa





La Phoukhoun SS, as well as civil and equipment installation works on existing substations under Component 1 may also impose some potential direct impacts associated with the construction works such as waste disposal, management of storm water, and workers' and community health and safety. During the operational stage, there are potential occupational health and safety (OHS) impacts for workers conducting operational and maintenance of the facilities. The nature and magnitude of these direct impacts and risks are temporary, site specific, predictable and reversible if relevant mitigation measures are properly conducted.

78. **The social risk is classified as Moderate.** Whilst the Project aims to deliver a range of benefits, Project activities have the potential to generate minimal, predictable, mitigatable social risks and impacts that are low in magnitude. Social risks and impacts anticipated for this Project include: (a) risks related to the labor and working conditions of project workers; (b) limited stakeholder engagement; and (c) risk of Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH). These risks and impacts are low, and they are for the most part predictable and possible to mitigate during the lifetime of the Project. The anticipated risks can be mitigated through appropriate actions/risk management plans. The Project was screened using the World Bank's Gender-Based Violence (GBV) Risk Assessment Tool for Investment Project Financing involving Major Civil Works and was classified within the Low-Risk category. No substations will be selected for Component 1 where works would require land acquisition. Component 2 is not expected to result in staff redundancies or layoffs.

79. EDL requires capacity enhancement to manage risks described above and implement the mitigation measures proposed under the Project. Hence the overall environmental and social risk rating takes into consideration the environmental and social capacity of EDL. The Environmental and Social Commitment Plan (ESCP) outlines the required capacity building activities.

80. During the preparation period, the environmental and social risks and impacts were assessed through site visits and review of existing information and data. Based on the assessments, EDL has developed the following mitigation action plans:

- a. *Environmental and Social Impact Assessment (ESIA)* which includes Site investigation/audit at the identified substations. The focus is on (i) PCB contaminated transformers and the potential risks; (ii) areas surrounding the substations for possible contamination from leaking oil contaminated with PCBs; (iii) current practices on resources and waste management; and (iv) current practices and protocols on OHS. The ESIA will also include a protocol for UXO clearance in risk prone area(s) and a chance finds procedure.
- b. *Site Specific Environmental and Social Management Plan (ESMP - minimum of three)* that provides more information about the nature and probable site-specific environmental and social impacts. The ESMPs for the rest of the substations/sites will be developed during Project implementation.
- c. *Hazardous Waste Management Plan (HWMP)* that includes mitigation measures such as decontamination of identified PCB contaminated oil and rendering all the equipment "PCB-free" as defined under the Stockholm Convention, and in line with the GIIP (Good International Industry Practice).
- d. *Stakeholders Engagement Plan (SEP)*, including a Grievance Redress Mechanism (GRM) to guide the Borrower to identify stakeholders, build and maintain a constructive relationship with them, and to meet communication and disclosure requirements, with a particular focus on project-affected parties. The SEP



includes inclusion and engagement strategies for indigenous peoples.

e. *Labor Management Plan (LMP)* outlining the government regulations and Bank requirements for project workers' health and safety, working conditions and procedures, including the contractor's obligation of fair treatment for all types of workers and to ensure exclusion of forced and child labor from the Project. The Project was screened using the World Bank's GBV Risk Assessment Tool for Investment Project Financing involving Major Civil Works and was classified within the Low-Risk category.

f. *Environmental and Social Commitment Plan (ESCP)* for the borrower's responsibilities and actions that are to be carried out during the Project to meet ESF requirements, including the capacity building plan for EDL.

81. Contractors will be required, as a condition of their contracts with the Project, to follow the site-specific ESMPs and the Protocols for PCBs management (applicable substation(s) only), LMP, and SEP. Contractors and their workers will also be subject to and trained on codes of conduct which includes GBV/SEA measures, interacting with local communities and security provisions.

82. During Project preparation, several face-to-face and virtual meetings were organized with various Project stakeholders in the capital city of Vientiane, in the eight project target provinces and in the eleven substations that the Project will finance. Local stakeholder consultations were conducted at two of the selected substations (Nalae substation on December 5<sup>th</sup>, 2022, and Vang Vieng substation on December 6<sup>th</sup>, 2022) and a national level consultation was conducted on December 7<sup>th</sup>, 2022 in a face-to-face meeting in Vientiane. Participants at the national level consultation were representatives of governmental agencies including MoNRE and MoF, other interested stakeholders, and representatives of EDL management. The consultations aimed to solicit feedback of consulted parties on identified environmental and social risks and impacts, mitigation measures, and the Project's approach to manage PCB-contaminated transformers, including the draining, storage, and transportation of PCBs from substations to Vientiane for storage and disposal under the PCB treatment facilities which are under development under a project financed by UNIDO.

83. All draft environmental and social documents and executive summaries in the local language were disclosed on EDL's official website on December 22<sup>nd</sup>, 2022, and the draft documents were disclosed by the World Bank on January 18<sup>th</sup>, 2023. EDL redisclosed the finalized document on March 17<sup>th</sup>, 2023 and continued the stakeholder consultations on the disclosed documents. The finalized documents were also redisclosed on the World Bank's external site between March 12<sup>th</sup>-15<sup>th</sup>, 2023.

## Gender

84. **Lao PDR's energy sector is increasingly promoting female participation and representation in managerial and technical roles.** At the MEM, taking together the central and local levels, women represent 23.5 percent (out of 1,599 employees in 2020), and 19.35 percent of staff in state-owned enterprises in the energy sector (out of 6,687 employees in 2020) – up from 21.5 percent and 18.4 percent respectively in 2015<sup>33</sup>. In the energy sector, women occupy 29.1 percent of decision-making positions in government at the central

<sup>33</sup> Lao PDR. 2016. Vision 2030. The 10-year Strategy for Gender Equality (2016-205) and the First 5-year Gender Equality Development Plan of Ministry of Energy and Mines (2016-2020).



level (out of 182 employees in 2020) and 15.3 percent of decision-making positions in state-owned enterprises (out of 65 employees in 2020).

85. **At EDL, of the total 5,772 workforce in 2022 (1,148 female staff represents about 20 percent of the total workforce), women currently occupy only 16 percent of administrative positions, 3 percent of technical positions, and 8 percent of managerial positions.** According to EDL, the majority of EDL's female staff hold engineering or other technical degrees. Among the major barriers which EDL's female staff face in advancing their careers or engaging in technical positions are adverse gender norms and stereotypes of careers in the power sector, and lack of practical field-based training opportunities induced from negative perceptions. However, although women are underrepresented in science, technology, engineering and mathematics fields of study in Lao PDR, their share among graduates of relevant courses for the energy sector suggests that there is potential for increasing women's employment among EDL's technical and managerial ranks. In 2018, women were 29 percent of graduates of STEM programs in general, and 18 percent of graduates of Engineering, Manufacturing and Construction programs in particular.

86. **Currently, EDL has no specific HR policy to promote gender equality within the workforce.** Within EDL, the EDL Women Union - established in 1975 under the umbrella of the MEM's Commission for the Advancement of Women (CAW) - follows the MEM's CAW 10-year Strategy for Gender Equality (2016-2025), which set a target for female staff in the energy and mines sectors of 25 percent, and a target of 25 percent for female participation in training by 2020, and a target of 30 percent of female in decision-making positions in the energy and mines sectors by 2025. However, progress has been slow in realizing annual targets.

87. **The Project will help EDL initiate advancing gender equality through a Gender Gap Assessment.** To address the gender gaps in employment among EDL's workforce and allow EDL to attract and retain a wider pool of talented and committed professionals, the Project will be undertaking a Gender Gap Assessment of employment at EDL. The assessment will identify the barriers to women's employment and career advancement in the company, and the opportunities for promoting gender equality among the workforce. It will provide a detailed baseline regarding women in technical and management positions at EDL, as well as qualitative information on the challenges those female employees face in joining the company and in progressing in their careers.

88. **Based on the outcomes of the assessment, a set of actions will be identified to address the gaps (i.e., a Gender Action Plan).** Actions may include reforming EDL's HR policies and practices concerning attraction, recruitment, retention, and promotions; creating or strengthening internship programs with targets for female participants; conducting outreach in relevant academic institutions explicitly targeting female engineering students; providing technical and/or leadership training to female employees, and other soft skills training (including English language and, effective communication skills), setting quotas for women in technical and managerial positions; seeking Economic Dividends for Gender Equality certification or similar; etc. A specific Gender Action Plan with detailed activities will be determined following the full assessment, including intermediate indicator(s) to be monitored and evaluated under the Project results framework.



## Climate Change

89. **The Project has been screened for climate and disaster risks using the WB's Climate and Disaster Risk Screening Tool.** The overall exposure of the Project location to climate change hazards is generally low in the extreme temperature, storm surge and strong winds but high in extreme precipitation and flooding. The Project location is not exposed to drought or sea level rise. Therefore, the impacts on the Project's physical components were assessed to be relatively low.

90. **The investments under the Project aim to rehabilitate and upgrade the existing distribution substations, which will increase their resilience to climate change.** Particularly, a distribution substation is directly exposed to various weather impact such as lightning, high temperature, and dust pollution, that may be exacerbated by climate change. These may lead to equipment failure and potentially lead to supply disruptions. In addition, grid lines have ground wire installed, but they only provide limited protection against the surges after lightning strike which may lead to blackout and system-wide destabilization in the event of an adverse weather event. The investments intend to install or replace transformers that will also adopt improved protection features such as: (a) advanced design and new materials to prevent large electric shocks and excessive thermal rise threatening to internal insulation, (b) better insulators to improve external insulation, (c) lightning arrester to protect transformers against electric surge, and (d) mobile substations as post disaster recovery mitigation and securing power supply capability during replacement work.

91. **Flooding is one of the critical climate risks, even though EDL carried out a flood vulnerability study for each substation site.** A typical substation control building in the EDL system which houses the local SCADA system, protection relays, communication interface and servers has its floor about 1.5m above ground level. Therefore, flood risk to selected substations is already mitigated to a large extent. Its effectiveness was indicated during the 2019 flood, when a substation in Attapeu province became an evacuation and rescue designated location for the people nearby. However, even though EDL considered flood risk quite well at the site selection stage, flood risk will persist in the event of extreme weather events. As a priority measure to mitigate the risk of system disruption as result of flooding, the Project will procure two mobile substations to secure temporary supply capacity during the post-disaster damage recovery period, until an inundated substation is recovered.

92. **The Project will also address potential system failures due to natural disasters and adverse weather incidents.** Climate change may intensify weather conditions such as lightning and wind, which may lead to damage to the equipment and distribution lines, potentially leading to wide area supply disruption if a fault cannot be cleared in a short period of time or recovery operations cannot be performed quickly and properly. Sub-component 1 (b) will support digital protection relay units that will clear faults faster and provide more detailed information than an analog relay unit and WAMS will monitor the real time grid status through Phase Monitoring Units installed to key stations, and they will provide detailed real-time information on status and possible grid risks to the EDL operator in advance. After any fault, WAMS will calculate grid status, present instable grid locations, and timely inform the EDL operator in order to maintain grid connectivity and to recover affected grids quickly. This will enable EDL to recover from any equipment damage due to adverse weather events such as hurricanes and/or other natural disasters.

93. **The Project will adopt a transformer foundation design that would prevent oil leaks from a transformer** where necessary. An aging transformer generally tends to suffer from oil leakage when under



operation, and without proper maintenance the oil leak continues. To minimize oil leak risk during the operation period, this Project will adopt a transformer foundation design having an oil dike around the transformer's base filled with crushed stones, and an oil-water separation pit at a discharging point in the substation site. EDL already adopts this design in many substations, and this will be replicated for targeted substations which do not have this. In addition, the crushed stone inside the oil dike also lowers the possibility of fire when a huge oil leak occurs in the event of severe transformer damage, such as electric faults which can happen more frequently if climate change aggravates weather conditions such as lightning and strong wind.

94. **Climate Benefits.** Climate benefits are expected from the adoption of climate resilience measures, reduction of system losses and technical assistance and capacity building. The upgrade and replacement of transformers will improve EDL grid distribution networks, and reduce technical losses.

### **Citizen Engagement**

95. The Project incorporates various elements to strengthen citizen engagement and enhance public participation. The Stakeholder Engagement Plan (SEP) has identified key stakeholders and describes the process for sharing information on Project activities as well as incorporating stakeholder feedback into project design, reporting and disclosure of project documents. The SEP also outlines a Grievance Redress Mechanism (GRM) for the project, which is built upon EDL's existing grievance redress mechanism. The existing GRM allows citizens to submit grievances through multiple entry points, including feedback box, phone or email designated and administered by the EDL GRM focal points. The GRM procedures for the Project will be disclosed in public domain (e.g., websites of EDL, at public notice board located at village hall, and in front of substation). The GRM procedure will be explained in detail to participants to consultation meetings. All grievances received under the Project will be recorded by EDL PMU and offices at relevant substations and will be required to be processed/resolved in a given timeframe, and monitored by EDL GRM focal point. In addition, the Project will also adopt the EDL's existing annual user satisfaction survey to obtain comments and feedback about their overall service quality. The Project will utilize this existing user feedback mechanism to survey user groups such as existing grid-connected households and SMEs benefiting from the Project intervention. The comments and feedback derived from the survey will be monitored and evaluated under the Project results framework.

## **V. GRIEVANCE REDRESS SERVICES**

96. **Grievance Redress.** Communities and individuals who believe that they are adversely affected by a project supported by the World Bank may submit complaints to existing project-level grievance mechanisms or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, as a result of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted to the AM at any time after concerns have been brought directly to the attention of Bank



Management and after Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's Grievance Redress Service (GRS), please visit <http://www.worldbank.org/GRS>. For information on how to submit complaints to the Bank's AM, please visit <https://accountability.worldbank.org>.

## VI. KEY RISKS

97. **The overall risk<sup>34</sup> associated with the Project is assessed to be Substantial.** The Project is being implemented in a challenging environment. EDL's financial difficulties stem from high risk concerning governance which culminated in below cost recovery tariff and limited competition in awarding PPAs, which continue to put the financial sustainability of EDL at risk. Structural vulnerability of Lao PDR's economy and fiscal sustainability combined with inflationary trends and currency depreciation increase the risk of cost overrun during Project implementation. Limited transparency in the decision-making process for sector policy and strategy has already caused major disruptions to EDL's ability to plan and invest in desperately needed investments. Under these conditions, critical investments to key substations and urgently needed FM capacity strengthening at corporate level have been identified, with strong buy-in and consensus amongst EDL, Government and stakeholders.

98. **Political and governance risks are High.** The operating and governance relating to EDL has been the main cause of its financial difficulties and will continue to put the sustainability of the utility at risk. The power system has been partially unbundled with the establishment of EDL-Gen but the regulatory framework has not been revisited accordingly. The limited transparency and unclear mandate for each unbundled institution has resulted in below cost recovery tariffs, overexpansion of power generation and underinvestment in transmission/distribution. With the expected establishment of EDL-T, the political and governance risks are still significant. Although the Project will not be able to directly address the issues at the Government level, the ongoing TA has provided critical guidance in the corporate governance of EDL and Component 2 of the Project will enable EDL management and the World Bank to better monitor and report the situation in a timely manner. The Power Sector Sustainable Development Support programmatic ASA will also contribute to addressing some of these governance issues with EDL and MEM.

99. **Macroeconomic Risk is High.** Lao PDR is assessed to be in external and overall debt distress under the Low-Income Countries Debt Sustainability Framework<sup>35</sup>. The Lao economy has been showing signs that its growth is stagnating due to an unfavorable business environment and due to lack of infrastructure compared with its neighbors. The situation has been aggravated by the COVID-19 lockdowns. Poor public debt management has left the Government with very little fiscal space as they have been forced to decrease spending. As a result, the Lao currency, Kip, has been depreciating significantly against the US dollar in recent times. Such currency fluctuations significantly impact EDL's financial standing as much of its PPAs and debt repayments are in US dollars. Coupled with the global trend of inflation, the currency depreciation is also

<sup>34</sup> Under the Systematic Operations Risk-rating Tool, the World Bank rates each risk as High, Substantial, Moderate, or Low based on their assessment of the relevant risk to achieving the operations' development outcomes. Except for Environment and Social risk, ratings are assessed on a residual basis, considering planned and ongoing mitigation measures.

<sup>35</sup> Lao People's Democratic Republic Joint World Bank-IMF Debt Sustainability Analysis, May 2023.



expected to negatively impact the price of goods and services to be procured under the Project and puts the viability of the investment at high risk. To mitigate this risk, the Project targets investments with high economic and financial returns (>30 percent) to ensure its viability even under high-cost volatility. In parallel, the World Bank's concerted efforts on the issue, including the ongoing DSA, will provide the necessary inputs to the analysis of the situation and policy dialogue on the subject.

100. **Sector Strategies and Policies risk is High.** The sector strategy and policy has been lacking transparency due to unclear accountability and mandate in the power sector, and limited clarity and transparency has negatively impacted the system planning and strategic planning for EDL investments. The Government has often opted for closed-door bilateral negotiations over open competition, which has resulted in high cost of power from IPPs. Such limited transparency was also seen recently during the EDL-T concession process. The fact that such major sector restructuring, which impacts the investment and financing strategy of EDL significantly, was conducted with almost no transparency puts EDL's financial and operational sustainability at high risk. In this context, the Project focuses on critical bottlenecks in the low-voltage distribution system that remains fully under EDL control with project benefits accruing at the level of EDL and its consumers. The World Bank will continue to monitor and engage proactively with not only EDL, but with the other stakeholder agencies such as MEM, Ministry of Planning and Investments (MPI), MoF, Ministry of Foreign Affairs and PMO. The aforementioned programmatic ASA, alongside measures to strengthen EDL's financial transparency under this Project, have strong buy-in and support from stakeholders in EDL, Government and the National Assembly.

101. **Institutional capacity for implementation and sustainability risk is Substantial.** While the investments to replace and rotate transformers at the target sub-stations are not complicated and EDL has experience in similar projects, the institutional and implementation capacity risk is substantial due to EDL's weak FM systems and the fact that the corporate-wide adoption of SAP would require substantial development of EDL capacity, and resources to be sustained. The World Bank has included substantial TA and capacity building support into the Project to build stronger FM systems and strengthen the internal monitoring and reporting process, including the development and adoption of standardized FM manuals and SOPs, and the support from specialized change management consultants to transition EDL's functions and staff towards SAP adoption and usage. The World Bank will support EDL with advice on how to develop detailed and clear TORs for the firms and the consultants that will be hired, which will contain a specific requirement from consultancy firms and individual consultants to transfer knowledge and build capacity with EDL, with dedicated performance indicators as part of these contracts. EDL staff will be trained and certified to obtain a CPA qualification with the binding clause to continue working for EDL, in order to maintain the capacity built in-house. The POM – which will be reviewed by the World Bank and will receive no objection - will contain detailed instructions to facilitate project implementation and will include, inter-alia, guidance on how to effectively manage the contracts and the tasks of the Project Manager, including the responsibility of collating fraud and corruption complaints and sharing reports with the World Bank every six (6) months during implementation support missions. Furthermore, to mitigate the risks of weak controls and strengthened integrity practices, it was also agreed to expand the scope of work of the existing EDL Internal Audit Committee to the monitoring of the Project's compliance with the principles, processes and systems outlined in the POM.



102. **Fiduciary risk is Substantial.** Although the Business Planning and Finance Department at EDL has had experience implementing Bank financed projects in the past, fiduciary capacity remains an issue. The recent analytical work has also highlighted weak accounting practices and corporate governance, coupled with gaps in IT systems and staff capacity in EDL. Further, the final Interim unaudited Financial Report and final audit report of the recent PGI project were submitted with significant delays. Hence, the main FM risks identified are: (1) systemic weaknesses in the financial reporting processes; (2) an absence of qualified staff to prepare financial statements for audit; and (3) disconnect between the accounting and disbursement unit to enable efficient and timely processing of payments and recording of transactions. Procurement capacity remains limited as EDL had been assisted by an International Procurement Consultant under the previous Bank project and there has been turnover of EDL staff experienced in World Bank procurement. Component 1 is the core component of this Project and involves relatively complex procurement and its budget takes up 75 percent (budgeted for US\$45 million) of the total project cost. With limited procurement capacity, the risk of procurement delay and not being able to manage/monitor contracts and deliverables is considered High before mitigation measures. These identified fiduciary risks could result in a delay in the overall implementation of the Project and the ability to comply with World Bank fiduciary requirements. To mitigate these risks, the Project includes measures to strengthen procurement, financial management, internal controls and oversight, and to improve complaints handling mechanisms in EDL. The mitigation measures are outlined in the Fiduciary Section (B) of the Project appraisal Summary (IV), and include: (a) hiring qualified and experienced full time FM and Procurement consultants to support dedicated EDL staff specifically assigned full time to the PMU; (b) requirement to prepare an FM Manual as part of the POM, which would be in place and receive no objection from the World Bank as a condition for Project effectiveness; (c) engagement of external auditors within 6 months of Project effectiveness, and (d) the activities supported under Component 2 are providing an overall strengthening of EDL's FM systems and capacity. Thus, the combined fiduciary risk is considered as Substantial at this stage until mitigation measures are fully implemented by EDL. Additionally, refresher trainings on FM, procurement and disbursement requirements of the World Bank will be conducted after the Project effectiveness.

103. **Environmental and Social risks are Substantial.** The environmental and social risk for the proposed Project is rated as substantial, mainly due to the potential presence of PCB in the 115/22kV distribution transformers that are to be replaced, and the environmental and social risk management capacity of EDL. The other potential risks related to the civil works are quite moderate, site-specific and temporary. The Project will ensure capacity and budget are adequate to implement the management plans and protocols.





VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Lao People's Democratic Republic

Power Distribution Improvement Project

Project Development Objectives(s)

To strengthen the capacity and efficiency of the distribution system in the Project Areas and improve EDL's financial management capacity; and in case of an Eligible Crisis or Emergency, respond promptly and effectively to it.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	Intermediate Targets				End Target
			1	2	3	4	
<b>Strengthened capacity and efficiency of distribution system</b>							
Increase in efficiency at the targeted substations (Percentage)		0.00	0.00	0.00	10.00	10.00	34.00
Increase in distribution capacity at the targeted substations (Kilovolt-Amphere(KVA))		397,000.00	397,000.00	397,000.00	451,000.00	451,000.00	710,000.00
<b>Improved EDL's financial management capacity</b>							
Reduction in the amount of time to complete annual financial reports for Ministry of Finance (Months)		5.00	5.00	5.00	4.00	4.00	3.00
Reduction in the number of issues raised in the disclaimer		3.00	3.00	3.00	2.00	2.00	0.00



Indicator Name	PBC	Baseline	Intermediate Targets				End Target
			1	2	3	4	
opinion of the audit reports (Number)							

**Intermediate Results Indicators by Components**

Indicator Name	PBC	Baseline	Intermediate Targets				End Target
			1	2	3	4	
<b>Component 1: Substation Investments and Grid Monitoring Systems</b>							
Number of transformers rehabilitated (Number)		0.00	0.00	0.00	3.00	6.00	12.00
Number of new transformers installed (Number)		0.00	0.00	0.00	1.00	2.00	3.00
Annual energy loss reduction from transformers replaced (Megawatt hour(MWh))		0.00	0.00	0.00	1,946.00	1,946.00	7,281.00
<b>Component 2: Financial Management System and SAP Implementation</b>							
Increased number of staff processing information through SAP [50% target for female staff participation] (Number)		300.00	300.00	300.00	400.00	400.00	500.00
Reduction in staff time used to manually input and update financial data (Hours)		24.00	24.00	24.00	16.00	16.00	8.00
Reduced rate of SAP software and hardware errors that EDL cannot solve in-house (Percentage)		100.00	100.00	100.00	60.00	60.00	10.00



Indicator Name	PBC	Baseline	Intermediate Targets				End Target
			1	2	3	4	
Accounting Manual and SAP SOP Manual accessible for all EDL staff (Text)		No Manual	No Manual.	No Manual	2 Manuals adopted and endorsed by EDL Board	2 Manuals adopted and endorsed by EDL Board	2 Manuals published on EDL website and EDL staff users trained
<b>Overall</b>							
Number of EDL staff trained (of which 50% female) (Number)		0.00	30.00	50.00	100.00	150.00	200.00
Increased share of female staff in technical and management positions (Percentage)		8.00	8.00	8.00	10.00	11.00	13.00
Annual user satisfactory survey conducted targeting project specific user groups such as existing grid-connected households and SMEs (Yes/No)		No	No	Yes	Yes	Yes	Yes
Increased response rate of the EDL Annual User Satisfactory Survey (Percentage)		0.00	5.00	10.00	15.00	20.00	30.00

**Monitoring & Evaluation Plan: PDO Indicators**

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Increase in efficiency at the targeted substations	This indicator calculates the loss of transformers at the targeted existing substations as the base value by considering the	Annual	EDL monitoring/project progress report	EDL monitoring/project progress report	EDL



	load profile, transformers' capacities, and their manufactured year. Then it is calculated along the implementation and is compared with the base value.				
Increase in distribution capacity at the targeted substations	This indicator is calculated by sum of distribution transformers' capacity in the targeted substations. The baseline is the existing transformers' capacity.	Annual	EDL monitoring/project progress report	EDL monitoring/project progress report	EDL
Reduction in the amount of time to complete annual financial reports for Ministry of Finance	This indicator is calculated by the amount of time (in months) to finalize the annual financial reports by EDL to be submitted to the Ministry of Finance	Annual	EDL monitoring/project progress report	EDL monitoring/project progress report	EDL
Reduction in the number of issues raised in the disclaimer opinion of the audit reports	This indicator measures the reduction in the number of issues raised in the disclaimer opinion of the audit reports	Annual	EDL monitoring/project progress report	EDL monitoring/project progress report	EDL



**Monitoring & Evaluation Plan: Intermediate Results Indicators**

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Number of transformers rehabilitated	Number of existing transformers to be rehabilitated (cumulative targets over years)	Annual	EDL progress/monitoring report	EDL progress/monitoring report	EDL
Number of new transformers installed	Number of New Transformers installed/added (cumulative targets over years)	Annual	EDL progress/monitoring report	EDL progress/monitoring report	EDL
Annual energy loss reduction from transformers replaced	This indicator calculates yearly reduction in energy losses that results from replacement of existing old transformers with new, more efficient ones. Theoretical target numbers for this indicator are calculated using a same load factor and capacity for both the old and new transformers.	Annual	EDL progress/monitoring report	EDL progress/monitoring report	EDL
Increased number of staff processing information through SAP [50% target for female staff participation]	This indicators measures the increase in numbers of staff processing information through SAP resulting from the project intervention, with at least 30 percent	Semi-annual	EDL project progress report	EDL project progress report	EDL



	female staff participation as target. The numbers target are accumulated over years.				
Reduction in staff time used to manually input and update financial data	This indicator measures the reduction of staff time (in hours) to manually input and update financial data	Annual	EDL progress/monitoring report	EDL progress/monitoring report	EDL
Reduced rate of SAP software and hardware errors that EDL cannot solve in-house	This indicator measures the reduction rate of SAP errors that EDL cannot solve in-house. Currently EDL is not able to resolve any SAP issues internally	Semi-annual	EDL project progress report	EDL project progress report	EDL
Accounting Manual and SAP SOP Manual accessible for all EDL staff	Develop Accounting Manual and SAP SOP Manual accessible for all EDL staff	Twice a year	EDL project progress report	EDL project progress report	EDL
Number of EDL staff trained (of which 50% female)	Targeted training of EDL staff (at least 50 percent of total female staff training) on various capacity building activities under project interventions (cumulative targets over years).	Semi-annual	EDL project progress/monitoring report	EDL project progress/monitoring report	EDL
Increased share of female staff in technical and management positions	Percentage share of female staff in technical and management positions	Annual	EDL project progress/monitoring report	EDL project progress/monitoring report	EDL
Annual user satisfactory survey conducted targeting project specific user groups such	This indicator measures the undertaking of EDL's	Annual	EDL Annual User	EDL Annual User Satisfactory Survey	EDL



as existing grid-connected households and SMEs	existing annual user satisfactory survey mechanism for the target group and feedback.		Satisfactory Survey		
Increased response rate of the EDL Annual User Satisfactory Survey	In 2022, the EDL Annual User Satisfactory Survey received about 380 response (focusing only a few districts in Vientiane Capital) out of 1.6 million customers nation wide. The response rate is less than 0.0003. This indicator measures the increased rate of response to also cover Project target areas.	Annual	EDL Annual User Satisfactory Survey	EDL Annual User Satisfactory Survey	EDL



## ANNEX 1: Implementation Arrangements and Support Plan

### COUNTRY: Lao People's Democratic Republic Power Distribution Improvement Project

#### I. Implementation Arrangements

1. The Project implementation is expected to start in September 2023 and end in August 2028. Closing for the IDA Credit will be on August 31, 2028.
2. The World Bank Team will be comprised primarily of members based in the Vientiane and Singapore Offices, including the Task Team Leader. However, there will also be team members based in other offices such as in Washington D.C., Bangkok, Yangon, Jakarta, Sydney and other regional country offices to provide efficient and effective implementation support to the client. Timely monitoring and support to EDL will be provided by the World Bank throughout the project implementation period, but especially in the first 24 months to help EDL put in place the staff resourcing and necessary consultancies to fill all identified gaps. Formal implementation support and field trips will be carried out bi-annually or as often as needed for smooth implementation of the Project.
3. The primary responsibility for this support lies with the Task Team Leader with key inputs from specialized Bank experts. Evaluation of the results indicators and focus on identified risk mitigation measures will be part of the regular implementation support missions. A description of support to be provided by the World Bank is outlined below:
  - a. **Technical inputs.** In addition to regular support from the World Bank's power engineer and FM experts, the team will provide technical inputs in reviewing the bidding documents and technical evaluation and reviewing the quarterly-progress reports. The team will also review progress reports from EDL, anticipate potential implementation or contractual challenges, and proactively propose solutions to the client in a timely manner. During the replacement of the transformers and the other substation related works, technical supervision is required to ensure contractual obligations are met on technical grounds. As necessary, field visits by the team's engineers would be conducted at least on a bi-annual basis throughout project implementation.
  - b. **Safeguards.** A substantial team of environmental and social specialists of high caliber and experience has been dedicated to the Project. They will be supported by additional environmental and social expert consultants with knowledge of specialized areas, in advising the client and provide just-in-time reviews on any implementation issues related to the various environmental and social plans. Field visits are expected to take place bi-annually.
  - c. **Financial Management.** FM supervision will be consistent with a risk-based approach. The FM Specialist is based in Vientiane. The supervision intensity is based initially on the assessed FM risk rating and subsequently on the updated FM risk rating during implementation. Given the substantial residual risk rating, on-site supervision will be carried out at least twice a year. On-site review will cover all aspects of FM, including internal control systems, the overall fiduciary control environment, carrying out transaction review of expenditure paid from the DA(as reported in the Statement of Expenditure) or through direct payment during the regular supervision or more frequently if needed to ensure expenditure incurred by the Project remain eligible. Supervision





activities will also include desk review of the Project’s financial reports, internal audit reports, project’s audit report and management letters and timely follow-up of issues that arise and updating the FM rating in the Implementation Status and Results Report and the FM system. Additional target reviews may be conducted depending on emerging risks. The Bank’s project team will support in monitoring the timely implementation of the action plan. Regular reporting arrangement and supervision plan will also ensure that the implementation of the Project is closely monitored and that appropriate remedial actions are taken expeditiously.

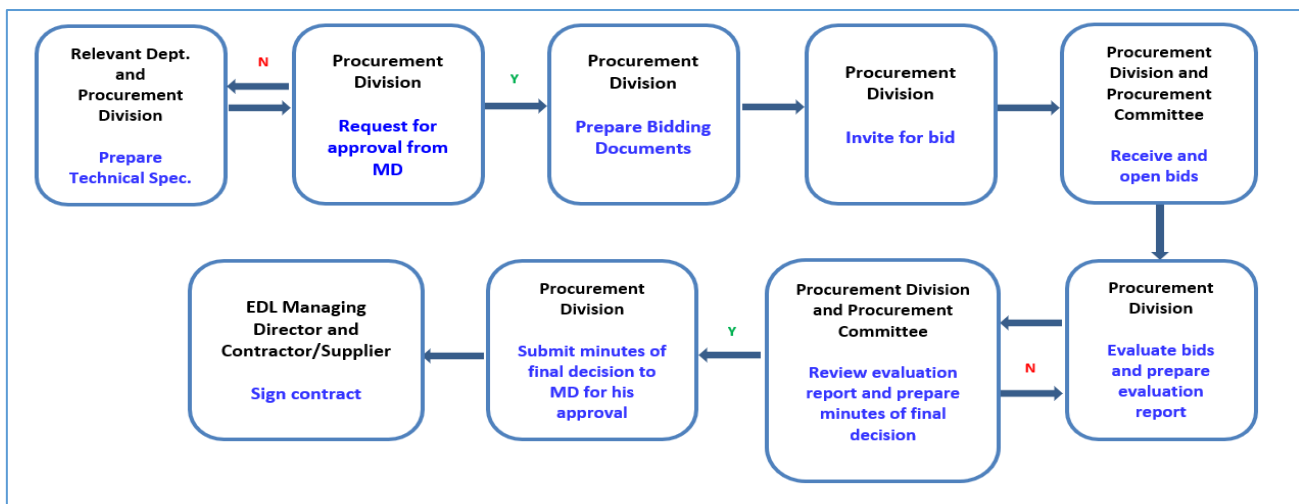
- d. **Procurement.** The procurement specialist is based in Vientiane. In addition to the prior review supervision to be carried out by the Bank, the capacity assessment of the implementing agency has recommended that a qualified national procurement consultant will be hired to assist the Procurement Division in implementing procurement activities and contract management specified in the project procurement plan. The consultant will also provide training on procurement to the staff of the Procurement Division of EDL.

**II. Procurement**

4. Procurement under Components 1 and 2 of the Project will be carried out in accordance with the World Bank Procurement Regulations for IPF Borrowers (November 2020). Lao harmonized standard open bidding documents dated July 2021 and requests for quotations dated July 2021 as agreed with the Bank shall be used for procurement of works, goods and non-consulting services with values under the RFB (National market approach) and RFQ respectively. The Bank Standard Procurement Documents will be used for all Request for Bids (International market approach) and selection of consultants involving international competition under the Project.

5. The Procurement Division of EDL will manage, coordinate, and monitor all procurement activities and communicate with the Bank with regards to procurement activities. Various EDL departments will provide inputs to technical assistance activities within their mandates. The responsibilities and flow of procurement activities at EDL summarized in the following diagram.

**Figure A1.1: EDL Procurement Responsibilities and Flow**





6. The World Bank carried out the procurement capacity and risk assessment of EDL in accordance with the guidelines on “Revised Instruction for carrying out assessment of agency’s capacity assessment to implement procurement, setting of prior review thresholds and procurement supervision plan” in March 2022.

7. The EDL has almost 20 years of experience implementing Bank financed projects. Since 2003, the assessment found that most of the experienced staff have moved on as result of retirement, promotion or restructuring, and the available staff is not completely familiar with World Bank procurement procedures. During the implementation of the PGI project, most of the procurements were carried out by an International Procurement Consultant. For the proposed Project, the limited exposure to World Bank procurement procedures among new staff and delays in providing technical inputs could result in delays in procurement processing and contract delivery.

8. The overall procurement risk is rated as **Substantial** after mitigation measures. The major risks and mitigation measures are summarized as follows:

**Table A1.1: Procurement risk mitigation measures**

No	Risk/problem	Risk mitigation measure	Responsibility	Deadline
1.	Delays in procurement process	(i) Careful procurement planning and scheduling, procurement advanced as much as possible; (ii) Procurement training provided by the procurement consultant and capacity development of EDL staff; and (iii) National procurement consultant to work under Procurement Division.	EDL  Procurement consultant; Procurement Division	During Project implementation
2.	Governance risks associated with possible conflict of interest, fraud and corruption practices	(i) Procurement monitoring using STEP; (ii) Closer coordination between Procurement Division, Managing Director Office and IDA, and supervisions and follow up by IDA; and (iii) EDL fiduciary staff provided with Integrity Training.	EDL  EDL, World Bank  EDL, World Bank	During Project implementation

9. **Procurement oversight:** In addition to prior review, field procurement supervision will be conducted as part of the regular implementation support missions, which will be conducted at least twice a year. The World Bank will periodically undertake the ex-post review by a procurement specialist, once a year if there are sufficient contracts for review.

10. **Procurement plan:** EDL has prepared a detailed procurement plan for the first 18 months of Components 1, and 2, which will provide the basis for the selected procurement procedures. The plan will be



updated with the Bank’s prior concurrence, as required, to reflect changes in implementation needs and improvements in institutional capacity. The procurement plan is summarized as follows:

**Goods and Works and non-consulting services.**

11. **Prior Review Threshold:** Procurement Decisions subject to Prior Review by the World Bank as stated in Appendix 1 to the Procurement Regulations:

**Table A1.2: Method and Prior Review Threshold**

Category	Procurement Method Thresholds		Prior Review Thresholds	
	Applicable thresholds (US\$)	Remarks	Applicable thresholds (US\$)	Remarks
<b><u>WORKS</u></b>				
RFB through Open International market approach	≥ 2.0 million	-	≥ 15 million	This has not been foreseen at the project preparation stage.
RFB through Open National market approach	≥ 200,000 - < 2.0 million	-	None	-
Request for Quotations	< 200,000	-	None	-
Direct Selection	None	No threshold; meet requirements of regulations 7.13-7.15	Same as for competitive selection	This has not been foreseen at the project preparation stage.
<b><u>GOODS AND NON-CONSULTING SERVICES</u></b>				
RFB through Open International market approach	≥ 0.6 million	-	≥ 4 million	This has not been foreseen at the project preparation stage.
RFB through Open National market approach	≥ 100,000 - < 0.6 million	-	None	Risk-based approach
Request for Quotations	< 100,000	-	None	
Direct Selection	None	No threshold; meet requirements of regulations 7.13-7.15	Same as for competitive selection	This has not been foreseen at the project preparation stage.

12. **Pre-qualification.** Not expected for the works/goods packages.



**Table A1.3 Cost Table**

No.	Contract (Description)	Category	Estimated Cost (US\$)	Procurement Arrangement and Method	Comments
<b>Component 1</b>					
1	Supply and Installation of Transformers and equipment for Substations	Goods	38,950,000	RFB (International market approach)	Substation construction works and supply and installation of transformers (Multiple lots as per geographical substations locations will be defined during Project implementation)
2	Supply and Installation of Wide Area Monitoring System (WAMS) & Protection Relay	Goods	3,050,000	RFB (International market approach)	ICT system related items, including training
3	Consultancy firm for design, tender and supervision of substations (Owner's Engineer)	Consulting Service	3,962,000	QCBC	Support for basic design, tender, supervision, monitoring, and completion
4	Environmental Safeguard Consultant	Consulting Services	19,000	IC	Retroactive financing (contract signed and under execution)
5	Social Safeguard Consultant	Consulting Services	19,000	IC	Retroactive financing (contract signed and under execution)
	<b>SUB-TOTAL COMPONENT 1</b>		<b>46,000,000</b>		
<b>Component 2</b>					
1	Consultancy firm for Corporate Financial Management, Accounting System and Change Management	Consulting Services	800,000	QCBS	To establish and implement FM and accounting systems
2	SAP System Implementor and Annual SAP fees for hardware and software maintenance	Goods and Non-Consulting Services	3,300,000	RFB (International market approach)	SAP System restructuring, addition of new modules and annual fees for proprietary software



3	CPA certification	Non-Consulting Services	150,000	RFQ	Contractual agreement with EDL staff to cover CPA training costs, examination fees, membership fees
4	External Financial Auditor	Consulting Services	350,000	CQS	Independent Audit firm for EDL corporate audit and Project audit for 5-year contract
5	Procurement Consultant	Consulting Services	200,000	IC	5-year contract anticipated; Retroactive financing possibility
6	Financial Management Consultant	Consulting Services	200,000	IC	5-year contract anticipated; Retroactive financing possibility
	<b>SUB-TOTAL COMPONENT 2</b>		<b>5,000,000</b>		
<b>TOTAL</b>			<b>51,000,000</b>		

**Table A1.4: Summary of the Procurement Packages planned during the first 18 months after Project effectiveness**

Ref. No.	Contract (Description)	Estimated Cost (US\$'000)	Procurement Method	Review by the Bank	Comments
1	Supply and Installation of Transformers and equipment for Substations (Multiple lots as per geographical substations locations)	38,950	RFB (International market approach)	Prior	Substation construction works and supply and installation of transformers.
2	Supply and Installation of Wide Area Monitoring System (WAMS) & Protection Relay	3,050	RFB (International market approach)	Prior	ICT system related items, including training
3	SAP System Implementor	3,300	RFB (International market approach)	Prior	ICT system restructuring, additional new modules, including training and operational support and annual fees for proprietary software.

**Selection of Consultants**

13. **Prior Review Threshold:** Selection decisions subject to Prior Review by Bank as stated in Appendix 1 to the Guidelines Selection and Employment of Consultants:



**Table A1.5: Prior Review Threshold**

No.	Selection Method	Contract Value Threshold (US\$)	Prior Review Threshold (US\$)	Comments
1	QCBS, QBS, FBS, LCS (Using the most appropriate market approach)	≥ 300,000	Shortlist of only National Consultants (Firms) for contract agreed in the PP	≥ 2.0 million
2	CQS (Open or limited competition through national or international market approach, specified in the PP and agreed with the Bank.	< 300,000	QCBS, QBS, FBS, LCS can be applied for contracts with value under \$300,000	None
3	Direct Selection of firms	None	No threshold; meet requirements of regulations 7.13-7.15	Same as for competitive selection
4	Individual Consultants	N/A depending on nature of services	Essential individual assignments will be defined in the Procurement Plan agreed with the Bank and in line with regulations 7.34-7.39 using the most appropriate market approach	≥ 400,000 and for the positions as specified in the PP agreed with the Bank

14. **Short list comprising entirely national consultants:** A short list of consultants for services, estimated to cost less than US\$200,000 equivalent per contract, may comprise entirely national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines.

**Table A1.6: Consultancy Assignments with Selection Methods and Time Schedule**

Ref. No.	Contract (Description)	Estimated Cost (US\$'000)	Procurement Method	Review by the Bank	Comments
1	Environmental Safeguard consultant	19,000	IC	Post	Retroactive financing (contract signed and under execution)
2	Social Safeguard consultant	19,000	IC	Post	Retroactive financing (contract signed and under execution)
3	National procurement consultant	200,000	IC	Post	Retroactive financing; 5-year contract anticipated
4	Financial Management Consultant	200,000	IC	Post	Retroactive financing; 5-year contract anticipated
5	Consultancy firm for Corporate Financial Management and Accounting Systems	800,000	QCBS	Post	Contract for consulting services to establish and implement FM and accounting systems
6	Consultancy firm for	3,962,000	QCBS	Prior	Support for basic design, tender,



	design, tender and supervision of substations				supervision, monitoring, and completion
7	Selection of financial auditor for project and EDL	350,000	CQS	Post	Independent Audit firm for EDL corporate audit and project audit for 5-year contract

**Support Plan**

15. The implementation support plan and staff skills mix are summarized in Table A1.7 and Table A1.8, respectively.

**Table A1.7: Implementation Support Plan**

Time	Focus	Resource Estimate	Staff Weeks
<b>First two years of the Project</b>	Component 1: Technical Review, procurement review, site review, bidding documents	Power Engineer/Energy Specialist	8
	Component 2: TORs review, procurement review, SAP contract documents, capacity building	FM Specialist with SAP expertise	8
	Project Procurement Review	Procurement Specialist	4
	Project FM Review	FM Specialist	4
	Social Safeguards supervision	Social Development Specialist	6
	Environmental safeguards supervision	Environmental Specialist	6
	Project Management and Task leadership	Task Team Leader	14
<b>Year 3 until completion</b>	Component 1: Engineering works supervision and capacity building for software use	Power Engineer/Energy Specialist	8
	Component 2: capacity building for SAP and FM	FM Specialist with SAP expertise	10
	FM disbursement and reporting	FM Specialist	4
	Social monitoring	Social Development Specialist	6
	Environmental monitoring	Environmental Specialist	6
	Project Management and Task leadership	Task Team leaders	14

**Table A1.8: Requisite Staff Skills**

Skills Needed	Staff Weeks (SW)	Number of trips	Comments
Power Engineer/Energy Specialist	16	Field Trips as required	International/Regional
FM Specialist with SAP expertise	18	Field Trips as required	International/Regional
Procurement Specialist	4	Field Trips as required	CO based
FM Specialist	8	Field Trips as required	CO based



Social Development Specialist	12	Field Trips as required	International
Environmental Specialist	12	Field Trips as required	International
Task Team	28	Field Trips as required	International/CO based

### III. Financial Management

16. **Public Financial Management (PFM) Environment.** The government faces serious PFM challenges. Weak and inefficient public sector management coupled with uneven reforms ownership have been binding constraints to the pace and the effectiveness of PFM reforms. Lao PDR is at the lower end of most governance indicators in the Association of Southeast Asian Nations region, particularly in terms of accountability, government effectiveness, regulatory quality, rule of Law and corruption. The importance of the overall PFM reform agenda to enhance quality and coverage in the delivery of public services is essential to the credibility of the policy-making agenda and to the mobilization of and support from the private sector and development community. The Public Financial Management Strengthening Program (PFMSP) adopted in 2005 was one of the important components of the Lao Government’s long-term framework for public finance reform and supported the “first-generation of reforms” (2000-13), such as the centralization of the National Treasury, customs and tax functions and the introduction of a Treasury Single Account (TSA) in 2006 and the upgrade and roll-out of the GFIS to the provincial level. After a gap of three years, “the second-generation reforms period” was initiated following the appointment of a new Government under a reform-oriented Prime Minister. With the top leadership’s commitment, including the new Minister of Finance - who is also Deputy Prime Minister - and his management team, the dialogue with the donor community has been revitalized and the pace of reform has taken off again. A key part of the reform program is building a solid PFM backbone through the implementation of the FMIS which is expected go live in 2024. Other reforms aim at improving allocative efficiency through the introduction of medium-term planning and improved budget preparation. Plans to improve governance of public resources are unlikely to yield immediate dividends unless major changes are made to strengthen government institutions to respond to new development opportunities and challenges.

17. A financial management (FM) capacity assessment was carried out in accordance with the principles-based Financial Management Practice Manual issued by the World Bank on February 4, 2015, and as further elaborated in the World Bank Guidance - Financial Management in World Bank-financed Investment Operations issued by the World Bank on February 24, 2015. Under World Bank Policy on IPF with respect to projects financed by the World Bank, the borrower and the project implementing agencies are required to maintain FM arrangements—including planning and budgeting, accounting, internal controls, funds flow, financial reporting, and auditing arrangements—acceptable to the World Bank to provide reasonable assurance that the proceeds are used for the purpose for which they were granted.

18. Although the Business Planning and Finance Department at the EDL has had experience implementing World Bank financed projects in the past, FM capacity remained an issue. The recent analytical work- EDL Corporate Governance and Financial Management Assessment ASA- has also highlighted weak accounting practices and corporate governance, coupled with gaps in IT systems and staff capacity in EDL. Further, the final Interim unaudited Financial Report (IFR) and final audit report of the recent PGI project were submitted with significant delays. Hence, the main FM risks identified included (1) systemic weaknesses in the financial reporting processes (2) an absence of qualified staff to oversee FM work and prepare timely financial statements and follow up on audit arrangements (3) a disconnect between the planning and finance unit and the accounting unit to enable efficient and timely processing of payments and recording of transactions (4)





absence of a consolidated FM procedures. These identified risks could result in a delay in the overall implementation of the Project and the ability to comply with Bank's FM requirements. Hence, the FM risk is assessed as High and reduces to Substantial after applying mitigation measures. The following measures will be put in place to mitigate the identified risks:

- (a) Hire qualified and experienced FM consultant (full time) to provide support to the EDL seconded staff to oversee and coordinate with the Planning and Finance Department of EDL on Project FM related work, including preparation of the IFR and annual financial statements for audit. TOR of this position is to be submitted to the Bank for no objection and will receive technical review before contract signing. The consultant should be in place within two (2) months of the Project becoming effective (dated covenant).
- (b) Assign from EDL three (3) staff: two (2) from the planning and finance department and one (1) from the accounting department to support the Project's FM work and as part of capacity building. One senior experienced staff from the planning and finance department will oversee the project's overall FM work, including compliance with project requirements, and two junior staff (one finance staff and one accountant) to take charge of the preparation, review of payment documents, requesting for funds to the designated account, making direct payments, recording of transactions for the Project and preparation of project's financial statements. These personnel should be identified and be assigned full time within one month of the Project becoming effective (dated covenant). TORs for these seconded positions should also be prepared and receive a no objection from the Bank. The assigned staff, along with the consultant, will receive training in the Bank's disbursement procedures and other FM requirements once the FM team of the PMU is formed.
- (c) Prepare an FM manual that consolidates the procedures, rules and regulations with regards to planning and budgeting, accounting, internal controls, funds flow, financial reporting, and auditing. The manual should also consider appropriate payment approval authority to ensure efficiency in the payment process. The manual should be in place and receive no objection from the Bank no later than three (3) months after the project's effectiveness.
- (d) Engage Project's auditors within six (6) months of the project's effectiveness (dated covenant). The TOR should also receive no objection from the Bank
- (e) Component 2 of the Project supports the strengthening of entity financial management and systems integration. The proposed technical assistance interventions that include strengthening of financial reporting capacity, development and rollout of a robust internal control framework, ERP/SAP system integration, accountancy skills augmentation and training will invariably improve the overall financial management environment of EDL during the implementation period, if pursued rigorously and consistently

19. **Organization and staffing for FM.** Prior project implementation experience indicated that there was an absence of qualified and experienced personnel to oversee the overall FM arrangements of the Project. There was no coordinating figure who is cognizant of the progress and status of the Project's FM arrangements. Different units within the Planning and Finance Department were working in silos. This led to delays in replenishing and reporting the use of funds, delay in the preparation of the IFR and annual financial statements, delay in the submission of the audit report. Hence, it is important to a designated FM unit or team responsible for FM of the Project. A PMU will be established at EDL's headquarters, responsible for overall management and control of the project execution, as well as monitoring and reporting in accordance with the Bank's requirements. It is proposed that an FM team consisting of one senior and experienced staff seconded from EDL to oversee the FM implementation of the Project, two (2) other junior staff to support the payment, disbursement, accounting and reporting work. The team will also be supported by a qualified and



experienced FM consultant to be hired by the Project. The EDL seconded staff and consultant will be part of the PMU team. The staff should be assigned full time so that capacity can be built. Terms of reference for the FM consultant and the three assigned staff shall be drafted by EDL and shall receive no objection from the Bank.

20. **Budgeting and planning.** A budget will be prepared by each component team based on their annual workplan. The budget will be consolidated by the PMU FM team. The budget will be prepared annually and cover the period of the GoL fiscal year (January to December). Budget shall be prepared with sufficient details (e.g., detailing activities, corresponding budget under each component/sub-component). This will facilitate the use of variable ceiling of the designated account based on six-month cash forecast. The process and timing of initiating the preparation and completion of the budget, revision of budget and approval levels shall be elaborated in detailed in the Project's FM manual. A budget template shall be unified to enable easy consolidation. To ensure annual workplan and budget and related six (6) months cash forecast received no objection from the Bank in time for project implementation, PMU is to submit the annual workplan and budget to the Bank no later than November 30 of each year. For travel budgeting purposes, the Project shall refer to the Ministry of Finance Ministerial Decision on Public Administrative Budget Expenditure Norms as applicable at the time of project implementation. The Project shall also observe the exceptions to this norm as issued by the Bank from time to time.

21. **Internal controls.** Designing, installing, and maintaining a system of internal controls is an integral part of the financial management function. Proper internal controls ensure i) the integrity of financial and accounting information, promote accountability, prevent fraud and ensure compliance with applicable laws and regulations, improve operational efficiency by improving accuracy and timeliness of financial reporting. The key features of the internal control system are segregation of duties; authorization limits; reconciliations and checks; restricted access; monitoring and review. These controls should be elaborated in the FM manual. Expenditure approval levels at PMU level and MD levels (in monetary terms) should be reviewed to ensure efficiency of payments. Assets purchased using Project funds should also be recorded and usage monitored. A staff needs to be assigned to monitor the recording and use of those assets. These were not done well during the implementation of the previous Bank financed project. EDL's Internal Audit department will expand its functions to include the monitoring of the project's compliance with the principles, processes and systems outlined in the POM. The Internal audit department is divided into two divisions: administration and management systems and fraudulent activities division and financial and accounting audit division. The internal audit is carried out on an ad-hoc basis or on request for problem projects. The internal audit will include the Bank financed project. The World Bank will request and review internal audit report. Component 2 of the Project will also further support the implementation of internal control framework.

22. **Funds flow.** Fund will flow from the World Bank to a DA to be opened at the Bank of Lao, managed by the National Treasury, Ministry of Finance. EDL/PMU shall submit request for payments to the National Treasury. An operating account (OA) will be opened to facilitate day to day small value payments with an account ceiling of US\$200,000. The OA will be replenished from the DA monthly. Payments from the DA shall follow the MoF procedures. Payments from the OA shall follow procedures specified in the FM Manual.

23. **Accounting.** Modified cash basis of accounting shall be applied. Receipts are recorded when funds are received into the bank account and expenditure recognized only when paid. Advances provided to staff for official field trip etc. shall be recognized as advance until liquidated. On the other hand, advances paid to contractor as part of the contract can be recognized as expenditure when paid. Interest expenses and related



payables to MoF as part of the subsidiary loan agreement shall not be recognized as part of the project's record. Assets purchased under the Project shall be recognized as expenditure upon payment. The Statement of Expenditure prepared for documentation of advance will be based on cash basis. Current SAP is not suitable to record project's transaction as it cannot segregate expenditure by Project component/sub-component and disbursement categories. Hence, a lighter off the shelf accounting software or a programmed Excel can be used to ensure that accounting records are up to date. Staff assigned to record project's transaction should not be involved in other financial process and should keep the records up to date. The software should be able to record project's receipts, expenditure, and cash/bank/advance balances and able to provide information for the preparation of the project's IFR and project's annual financial statements. The FM Manual is to include procedures and timeline for timely closing of the monthly accounts, preparation of the Interim unaudited Financial Reports (IFR) and annual financial statements.

24. **Financial reporting.** The project's financial reporting period will be January to December. IFR will be prepared by the PMU for the Project on a bi-annual basis (i.e. every six [6] months). Each IFR will cover a period of six (6) months (e.g. January to June and July to December). The IFR will be prepared based on a format agreed with the Bank. The IFR will report at minimum receipts, expenditure and fund balances and uses of funds by Project components/sub-components. Variance analysis between actual and budgeted expenditure will be performed and reported as part of the IFR. The IFR is to be submitted to the Bank no later than 45 days after each period end. Failure to submit the IFR on time is considered non-compliance with the requirement of the financing. The FM Manual is to include timing for preparation and submission of the IFR as well as preparation of the annual financial statements for audit.

25. **External Audit.** The Project will be subject to an annual audit by an independent and qualified auditor. The audit TOR will be prepared by the PMU and receive no objection from the Bank. PMU shall be responsible for contracting and arranging audit for the Project. The auditors shall be appointed no later than six (6) months after the Project becomes effective. The audit report together with a management letter will be submitted to the World Bank no later than six (6) months of each fiscal year end. The audited financial statement and audit opinion will also be subject to disclosure in accordance with World Bank Policy on Access to Information. The Bank will make available the audited financial statements to the public on its website upon submission and acceptance of the audit report by the Bank. The PMU will also upload the audit report on EDL's website.

26. **Fraud and Anticorruption.** The World Bank's "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants" dated October 15, 2006 and revised in January 2011 and as of July 1, 2016 will be applicable in addressing of fraud and corruption issues should they arise in the course of implementation. Guidelines cover fraud and corruption that may occur in connection with the use of Loan proceeds during the preparation and implementation of a project financed, in whole or in part, by the Bank. These Guidelines cover fraud and corruption in the direct diversion of Loan proceeds for ineligible expenditures, as well as fraud and corruption engaged in for the purpose of influencing any decision as to the use of Loan proceeds. All such fraud and corruption are deemed, for purposes of these Guidelines, to occur "in connection with the use of Loan proceeds". These Guidelines apply to the EDL and all other persons or entities which either receive Loan proceeds for their own use (e.g., "end users"), persons or entities such as fiscal agents which are responsible for the deposit or transfer of Loan proceeds (whether or not they are beneficiaries of such proceeds), and persons or entities which take or influence decisions regarding the use of Loan proceeds. All instances of fraud and corruption will be referred to the World Bank's Integrity Vice Presidency for investigation.



27. **FM implementation support plan.** FM supervision will be consistent with a risk-based approach. The FM Specialist is based in Vientiane. The supervision intensity is based initially on the assessed FM risk rating and subsequently on the updated FM risk rating during implementation. Given the substantial residual risk rating, on-site supervision will be carried out at least twice a year. On-site review will cover all aspects of FM, including internal control systems, the overall fiduciary control environment, carrying out transaction review of expenditure paid from the DA (as reported in the Statement of Expenditure) or through direct payment during the regular supervision or more frequently if needed to ensure expenditure incurred by the Project remain eligible. Supervision activities will also include desk review of the Project’s financial reports, internal audit reports, project’s audit report and management letters and timely follow-up of issues that arise and updating the FM rating in the Implementation Status and Results Report and the FM system. Additional target reviews may be conducted depending on emerging risks. The Bank’s project team will support in monitoring the timely implementation of the action plan. Regular reporting arrangement and supervision plan will also ensure that the implementation of the Project is closely monitored and that appropriate remedial actions are taken expeditiously.

**IV Disbursement**

28. **Disbursement Methods and Supporting Documentation Arrangements.** Disbursements under the Project may be under any of the following methods: (a) advance; (b) direct payment; (c) reimbursement; and (d) Special Commitment. Direct payments will be used solely for large contracts. Minimum application value for direct payment and reimbursement will be US\$500,000.

29. **Designated Account (DA).** A Pooled DA denominated in USD will be opened at the Bank of Lao PDR, managed by the National Treasury to receive advance from IDA blend term and Shorter Maturity Loan (SML) term. The DA will have a fixed ceiling of US\$3.5 million. Reporting of funds used from the DA shall be made quarterly or more frequently through submission of the Statement of Expenditure. Supporting documents required for each method of disbursement as well as reporting of expenditure paid from the DA will be spelt out in the Disbursement and Financial Information Letter.

30. The IDA Credit will fully finance all activities under Components 1, 2, and 3. Disbursement categories for the IDA Credit loan are presented in Table A1.9 below. Retroactive financing of up to SDR 7.6 million (US\$10 million equivalent) from the SML may be available for payments made prior to the signing date but on or after May 30, 2022, for eligible expenditures under Category 1. The World Bank Procurement Regulations must be followed.

**Table A1.9: Disbursement categories**

#	Category	Amount of the IDA Blend Credit allocated (SDR)	Amount of the SML allocated (SDR)	Percentage of expenditures to be financed (inclusive of Taxes)
1.	Goods, works, non-consulting services, consulting services, Training and Workshops, Operating Costs for Component 1 and Component 2	19,000,000	19,000,000	100%
2.	Emergency expenditures under Component 3	0	0	100%
	TOTAL	19,000,000	19,000,000	



31. The approved Annual Work Plan and Budget will specify the source of the financing (Blend or SML) to be financed for the Eligible Expenditures under Category 1. To the extent possible, SML proceeds shall be disbursed first.



## ANNEX 2: Substation (SS) Investment Plan

### 1. 115/22kV M (Muang). Kham SS, Xieng Khuang province

- Substation area was secured in 2011 and fundamental earthworks (flattering) was almost completed, and an old 115/22kV power transformer has been sitting, and the single 115kV line from Phonsavan SS to Xam Neua SS passes over the substation, but it is a merely temporary substation configuration.
- Resuming building a complete 115/22kV SS consisting of 2x30MVA new transformers, 115kV Main and Transfer Busbar configuration, a Shunt Reactor, two-line bays to Phonsavan SS (one bay is a future spare), one line bay to Xam Neua SS, two bays for transformer, one tie bus bay, and busbar potential transformer (PT) bay; 22kV conventional busbar configuration, a new main control building for the head of substation, and new operator houses. The layout is the conceptual design only and the basic tender design will be completed by OE at the design stage. All substation equipment and all buildings work can be done within the secured land area.
- Two tension towers (90-degree turn type) inside the secured land area will be used, and the existing line over the substation area will be cut and reconnected to 115kV gantries separately.
- Removal of the existing control building, existing 115/22kV 10MVA Transformer, switchgears, and 22kV cubicles inside the control building.

### 2. 115/22kV Kok Saad (Khok Sa At) SS, Vientiane capital

- Replacing existing 22MVA and 30MVA transformers with new two 50MVA transformers including the foundation reconstruction. Replaced transformers will be stored as an emergency spare or/and disposed. As 22kV side incoming and main busbar nominal current is 2,500A, no enforcement is necessary.

### 3. 115/22kV Pak Bo (Pakbo(r)) SS, Bolikhamxai province

- Replacing existing two 20MVA transformers with two 50MVA transformers including the foundation reconstruction.
- The CT of transformer bay (115kV side) shall be changed from 100-200/1A to be 200-400/1A
- The rated current of CB, DS-ES of incoming from transformer (22kV side) shall be changed from 1250A to 2000A.
- CT of 22kV incoming bay from transformer (22kV side) to be changed from 600/1A to be 1000-2000/1A
- 24kV XLPE cable from transformer to 22kV incoming bays.

### 4. 115/22kV Sa Pao Thong (Saphaonthong) SS, Attapeu province

- Replacing an existing 20MVA transformer having irregular tap changer with a new 20MVA transformer including the foundation reconstruction. Replaced transformer will be stored for the future use.

### 5. 115/22kV Bang Yo SS, Champasak province

- Replacing existing two 25MVA transformers with new two 50MVA ones including the foundation reconstruction. Replaced transformers will be stored for the future use.
- 115kV side equipment: Upgrading Disconnecter Switchgear with Earthing Switchgear (DS-ES) and Circuit Breaker (CB) for two transformer bays due to oldness.
- 22kV side equipment: Upgrading CB and DS-ES of the incoming transformer bays from 1250A to 2000A.

### 6. 115/22kV Nalea (Oudomxay) SS, Oudomxai province

- Replacing an existing 20MVA transformer<sup>36</sup> with a new 30MVA transformer, including foundation minor adjustment. Replaced transformer will be stored for the future use.

### 7. 115/22kV Sa La Phoukhoun SS, Luangprabang province

- Building 115/22kV substation inside the secured substation area. 115kV consists of main and transfer

<sup>36</sup> This transformer may have PCB contaminated oil (104ppm. Threshold:50ppm) while it is not sure the origin of sample oil was taken from this. After UNIDO project, it will be deemed as no PCB contaminated one. By considering oil-water separation pit, if one litter PCB contaminated oil leaks, the density of discharge outside substation is about 0.01ppm which is less than detection limit of a normal analyzer.



busbar configuration having one 20MVA Transformer, two 115kV line bays (one to Xieng Ngeun (Luangprabang 2) SS, and one to Kasi SS), one bus tie, and 22kV cubicles inside the control building which consists of one incoming transformer cubicle, four outgoing feeders' cubicles and one station transformer cubicle, and 1x250kVA station service transformer, control building for head of substation, and operator houses.

- New two tension (terminal) towers (one to Xieng Ngeun SS and one to Kasi SS) inside the substation area to tap the existing 115kV line to substation.
- The layout is the conceptual design only and the tender level basic design will be completed by OE.

**8. 115/22kV Vangvieng SS, Vientiane province**

- Replacing the existing a 16MVA and a 13MVA<sup>37</sup> transformers with two new 30MVA transformers including foundation reconstruction.
- Replacing Control and protection panels in control room.
- Installation one set of 22kV busbar section connection cabinet (cubicle).
- Replaced transformers will be stored for the emergency spare or/and disposed.

**9. 115/22kV Paksan (Pakxan) SS, Bolikhamxai province**

- Replacing an existing 16MVA with a new 30MVA transformer. Although the existing foundation can adopt new 1x30MVA transformer, but it does not have the oil dike so that foundation will be reconstructed. Replaced transformer will be stored as an emergency spare or/and disposed.

**10. 115/22kV Ban Na SS, Champasak province**

- Installation of an additional new 30MVA transformer. There are two existing transformer bays already and one is used (in the past one was relocated to other SS), thus related 22kV side equipment is not need or upgraded.

**11. 115/22kV Phonsavan SS<sup>38</sup>, Xiangkhouang Province**

- Installation of an additional 115kV line bay as a stand-by 115kV transmission line bay from Phonsavan SS to Xam Neua SS via M. Kham SS, and related control cabinets, protection etc. in the control room.
- The 1<sup>st</sup> phase local SCADA and the 2<sup>nd</sup> phase local SCADA installed at the expansion are not integrated and operated independently. To solve this, a new local SCADA system based on International Electrotechnical Commission 61850 series standard protocol will be installed with the control building expansion, and oscillogram systems will be procured to monitor line faults.

**12. 115/22kV Mobile SS**

- 2 set of the 115/22kV 20MVA complete mobile substation consisting of No.1 Trailer: 115kV transformer switchgear bay and 20MVA transformer, No.2 Trailer: 22kV incoming and feeder cubicles/panel, auxiliary transformer inside an air-conditioned container, local control unit, Remote Terminal Unit, and one trailer head fleet. All will be stored at a EDL's Vientiane warehouse's dedicated garage.

**Summary of the UNIDO project**

UNIDO has worked on PCB testing and supported the establishment of regulatory framework under the Environmentally Sound Management and Disposal of PBC project (GF/LAO/08/001). The UNIDO project set screening criteria for testing and decontamination process for suspected PCB-contaminated transformers, such as date of manufacture and maintenance history. The inventory list created through such screening process was included in the National Implementation Plan during 2016 – 2017 that followed United Nations Environment Programme guideline. Due to COVID-19 constraints, the import of PCB decontamination system

<sup>37</sup>The 33kV line was already installed in the past project but they did not install maximum capacity of transformer capacity, therefore adequate capacity for the increased power flow is already in place on the distribution lines.

<sup>38</sup> One transformer may have PCB contaminated oil (>50ppm) but this Project will not include this transformer.



experienced a huge delay. The system has since been imported and works are being prepared for implementation. The decontamination system is mobile and will be transported to regional sites to efficiently conduct the decontamination process.





### ANNEX 3: Economic and Financial Analysis

COUNTRY: Lao People's Democratic Republic  
Power Distribution Improvement Project

#### A. Economic Analysis

##### Focus of economic analysis

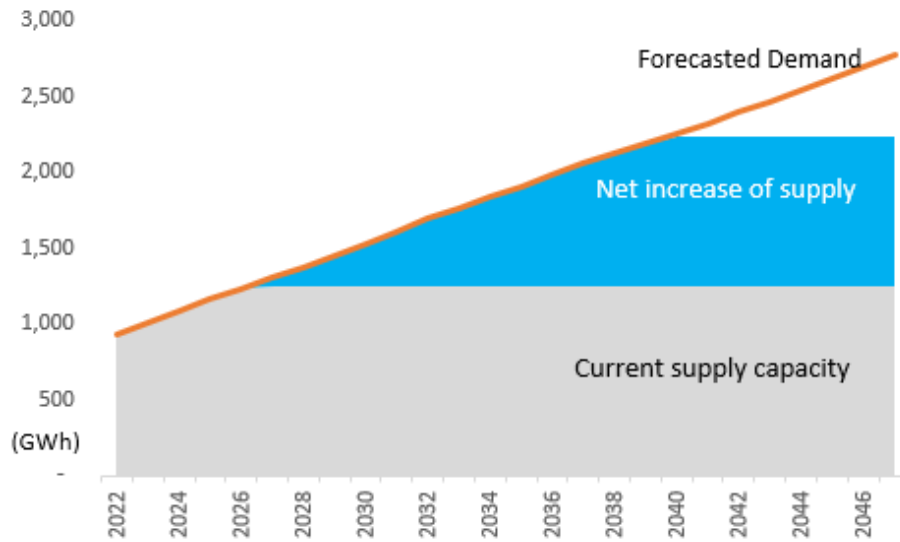
1. **The provision of the World Bank financing toward priority investments and TA for EDL is going to support the achievement of the development objective to strengthen the capacity and efficiency of the distribution system in the Project Areas and improve EDL's financial management capacity.** In particular, the project components for EDL will: i) increase power supply capacity at various substations (and its covering areas) in the country by introducing new transformers in the distribution networks, ii) improve efficiency at the target substations by replacing existing old transformers, iii) improve the distribution system's status monitoring function and the protection performance by installation of a monitoring system and protection relay units and EDL staff trainings for key systems operations, and iv) strengthen EDL's financial management capacity by providing staff trainings, creating standard operation procedures and system integration and implementation support.
2. **The analysis focuses on the quantifiable benefits resulting from the project– i) Incremental consumption in targeted areas as a result of increase in power supply, ii) energy savings from lower energy losses in the system and iii) Reduction in CO<sub>2</sub> emissions from lower energy losses.** EDL's financial management component has benefits such as improving quality of EDL's managerial decisions, saving staff/outsourcing costs for producing and compiling financial information, and improving debt management through accurate and timely financial reporting to internal and external stakeholders. However, it is not realistic to predict quantitative benefits of this component at this point.

##### Summary of economic benefits

3. ***Benefit of increase in power supply at various substations by introducing new transformers:*** The infrastructure expansion at the targeted 11 substations is expected to increase capacity of the distribution system and energy supply to the distribution system. The existing supply capacity of targeted substations will be capped at 1,252GWh in 2027 as the energy demand grows. The World Bank financed project will relieve the highly loaded substations and contribute to the alleviation of domestic network constraints that limit electricity demand growth in the country.



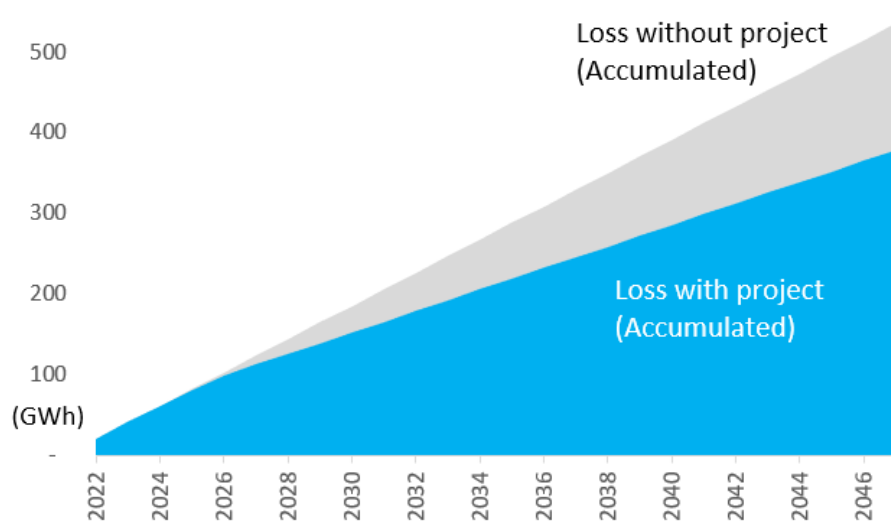
**Figure A3.1: Supply capacity projection in targeted areas**



(Source: World Bank Estimation)

4. **Benefit of energy savings from lower electricity losses in the system:** Investments in rehabilitation and upgrading of old transformers will reduce technical losses. The project aims to decrease relative power losses by 30 percent per unit at the targeted substations. With increasing demand, the cumulative energy savings due to reduction in losses amounts to about 150GWh by 2046.

**Figure A3.2: Accumulated loss reduction projection**



(Source: World Bank Estimation)

5. **Benefit of CO<sub>2</sub> reduction from lower energy losses:** Lower electricity generation resulting from a reduction in technical losses will also yield a reduction in CO<sub>2</sub> emissions since part of the generation comes from fossil fuel fired power plants. The emission factor used to calculate the avoided CO<sub>2</sub> emissions from



energy savings is based on the combined margin grid emission factor (EF) methodology as prescribed by the UNFCCC. The combined margin ED represents a multi-project baseline which already considers the potential GHG impact on grid power plants (existing and future) due to energy efficiency intervention. In this analysis EF is derived from UNFCCC's IFI dataset registered in Lao PDR in 2022. Using an EF of 555 tCO<sub>2</sub>/GWh and low estimate of recommended shadow price of carbon described in the guidance note on shadow price of carbon in economic analysis, the project leads to a cumulative economic benefit of US\$4.70 million by 2046.

### Key assumptions and methodology of economic analysis

6. **Demand growth:** Demand growth rates are based on "Business as usual (BAU)", the most conservative scenario, of the National Power Development Plan (NPDP) 2021-2030. This scenario does not consider upcoming governments' industry and EV development scenarios which may increase energy demand. The team made additional adjustments on BAU scenario, considering the capacity of existing grid capacity. As a result, in this analysis, the demand growth is estimated at 8 percent in 2023 and gradually decreases to 5 percent in the next 10 years.

7. **Incremental energy:** Incremental energy is calculated based on the increase in capacity of transformers in the targeted substation facilities due to the investment. Under existing operation, it is assumed that 1,252GWh is the maximum capacity with a power factor of 0.9 and a load factor (LF) at 0.8. After the investment, the max capacity will increase to 2,239GWh with the same PF and LF. Therefore, the incremental energy can be determined by the difference between the projected demand and the upper capacity limit of the existing transformers, 1,252GWh, capped at the max capacity of transformers, 2,239GWh, after the investment.

8. **Energy loss reduction:** Loss reduction is determined based on improvement of energy-loss efficiency by replacement of old transformers. Energy loss is assumed at 9.5kW per MVA for old transformers and 6.1kW per MVA for new transformers at a PF of 0.9.

9. **Value of incremental energy:** The benefit of incremental energy due to the project is valued based on the assumption that tariff will increase by 2 percent each year in line with the notice by Lao prime minister's office on February 26, 2022. The foreign exchange projections are estimated by the World Bank for valuing monetary impacts of incremental energy.

10. **Transformer capacity and operation:** Based on the information collected through site visits and hearing from EDL staff, it was found that EDL uses only one transformer if a substation has two transformers. The other transformer is used as a backup and is not in operation and this operation will continue after the project investment. Therefore, the capacity of transformers for measuring economic benefits is measured as half in this analysis.

11. **Project costs and investment schedule:** Project costs comprise all costs associated with substation rehabilitation and expansion. Taxes and physical/price contingencies of 10 percent are removed from the financial capital cost of infrastructure investment, US\$38 million, to yield an economic capital cost of about US\$34.2 million. The O&M cost of 2 percent is applied from the year 2028 one year after the commissioning. Infrastructure investment is assumed to be made 10 percent in the first two years, 30 percent in the third year, and 50 percent in the last year.



12. **Economic life of investments:** To be conservative, it is assumed that the project benefit will continue for 20 years. This is the same as the depreciation period of a typical substation facility, but transformers could be used for more than 30 years.

#### **Economic rate of return and sensitivity analysis**

13. **Based on the key assumptions and methodology above, the estimated NPV of the net economic benefit is US\$116.22m with a corresponding EIRR of 35.68 percent.** Results of the economic analysis are summarized in Table A3.1. The estimated EIRR is calculated with a 12.0 percent discount rate with CO<sub>2</sub> benefit in addition to financial benefits of the project. The sensitivity analysis is performed to identify how much variations of “Commission delay” and “Cost overrun” impact NPV and EIRR of this project. The detailed sensitivity analysis is summarized in Table A3.2. Under the worst scenario with 9 years of commission delay and 300 percent of cost overrun, NPV still stands positive at US\$6m with a corresponding EIRR of 15 percent.

### **B. Project Financial Analysis**

#### **Financial rate of return and sensitivity analysis**

14. **The project financial analysis is based on the financial costs and revenues for EDL.** On the cost side, the capital costs including taxes and contingencies total US\$38 million. The O&M costs are assumed at 2 percent annually and EDL’s on-lending financing term of 2.5 percent is applied to the disbursed amount. On the revenue side, the project gains revenues from two sources- i) higher electricity revenues from an increase in power supply and ii) revenue increase due to a reduction of power losses. The revenues are valued at forecasted electricity prices increase at a rate of 2 percent annually.

15. **Assumptions used to calculate financial rate of return are same as economic analysis described above and the estimated NPV of the project is US\$510 million with a corresponding FIRR of 33.04 percent.** Results of the financial analysis are summarized in Table A3.3. The estimated FIRR is calculated with a 3.3 percent discount rate, which is the average interest expenses EDL pays for its USD denominated debt obligations. The detailed sensitivity analysis is summarized in Table A3.4. The project is robust to changes in cost and concession delays. In the worst scenario with 9 years of commission delay and 300 percent of cost overrun, NPV stands at US\$94 million with a corresponding FIRR of 13 percent.



**Table A3.1. Economic costs and benefits**

Year	Costs		Benefits			USD: Million		
	Economic Capital Cost	O&M Cost	Total Cost	Increase in Sales due to supply capacity increase @ Avg. Tariff	Increase in Sales due to reduction in Losses @ Avg. Tariff	Value of Reduction in CO2 Emissions @ Shadow Price	Total Revenue	Net Benefits
2022	-	-	-	-	-	-	-	-
2023	3.42	-	3.42	-	-	-	-	(3.42)
2024	3.42	-	3.42	-	-	-	-	(3.42)
2025	10.26	-	10.26	-	0.11	0.05	0.15	(10.11)
2026	17.10	-	17.10	-	0.11	0.05	0.16	(16.94)
2027	-	-	-	3.38	0.41	0.19	3.98	3.98
2028	-	0.76	0.76	7.60	0.41	0.19	8.20	7.44
2029	-	0.76	0.76	12.01	0.41	0.20	12.63	11.87
2030	-	0.76	0.76	16.59	0.42	0.20	17.21	16.45
2031	-	0.76	0.76	21.50	0.42	0.21	22.12	21.36
2032	-	0.76	0.76	27.00	0.43	0.21	27.64	26.88
2033	-	0.76	0.76	31.67	0.44	0.21	32.33	31.57
2034	-	0.76	0.76	36.69	0.45	0.22	37.36	36.60
2035	-	0.76	0.76	42.07	0.46	0.23	42.76	42.00
2036	-	0.76	0.76	47.85	0.47	0.23	48.54	47.78
2037	-	0.76	0.76	54.03	0.48	0.23	54.75	53.99
2038	-	0.76	0.76	59.28	0.49	0.24	60.01	59.25
2039	-	0.76	0.76	64.84	0.50	0.25	65.58	64.82
2040	-	0.76	0.76	68.61	0.51	0.25	69.37	68.61
2041	-	0.76	0.76	69.98	0.52	0.26	70.76	70.00
2042	-	0.76	0.76	71.38	0.53	0.26	72.17	71.41
2043	-	0.76	0.76	72.81	0.54	0.27	73.62	72.86
2044	-	0.76	0.76	74.27	0.55	0.27	75.09	74.33
2045	-	0.76	0.76	75.75	0.56	0.28	76.60	75.84
2046	-	0.76	0.76	77.27	0.57	0.29	78.13	77.37
2047	-	0.76	0.76	78.81	0.58	0.29	79.69	78.93
<b>TOTAL</b>	<b>34.20</b>	<b>15.20</b>	<b>49.40</b>	<b>1,013.40</b>	<b>10.34</b>	<b>5.10</b>	<b>1,028.83</b>	<b>979.43</b>
							<b>NPV @ 12%</b>	<b>116.22</b>
							<b>EIRR</b>	<b>35.68%</b>

Source: World Bank calculations

**Table A3.2. Sensitivity analysis (Economic)**

		NPV Sensitivity (in USD million)									
		Commision Delay (Year +)									
		0	1	2	3	4	5	6	7	8	9
Cost Overrun	100%	116	100	86	73	62	52	43	35	28	22
	125%	111	95	81	69	58	49	40	32	26	20
	150%	106	91	77	65	55	46	37	30	24	18
	175%	100	86	73	62	51	43	35	28	21	16
	200%	95	81	69	58	48	40	32	25	19	14
	250%	84	71	60	50	41	33	27	20	15	10
300%	73	62	52	43	34	27	21	16	11	6	

		IRR Sensitivity (%)									
		Commision Delay (Year +)									
		0	1	2	3	4	5	6	7	8	9
Cost Overrun	100%	36%	36%	36%	35%	35%	35%	35%	35%	34%	34%
	125%	32%	32%	32%	32%	32%	31%	31%	31%	30%	29%
	150%	29%	29%	29%	29%	29%	28%	28%	28%	27%	26%
	175%	27%	27%	27%	26%	26%	26%	26%	25%	24%	24%
	200%	25%	25%	25%	25%	24%	24%	24%	23%	22%	21%
	250%	22%	22%	22%	22%	21%	21%	20%	20%	19%	18%
300%	20%	20%	20%	19%	19%	19%	18%	17%	17%	15%	

Source: World Bank calculations



**Table A3.3. Financial costs and revenues**

Year	Costs			Revenues			USD: Million	
	Capital Costs	Financing Fees	O&M Costs	Total Costs	Increase in Sales due to supply capacity increase @ Avg. Tariff	Increase in Sales due to reduction in Losses @ Avg. Tariff	Total Revenues	Net Revenues
2022	-	-	-	-	-	-	-	-
2023	3.80	-	-	3.80	-	-	-	(3.80)
2024	3.80	-	-	3.80	-	-	-	(3.80)
2025	11.40	-	-	11.40	-	0.11	0.11	(11.29)
2026	19.00	-	-	19.00	-	0.11	0.11	(18.89)
2027	-	-	-	-	3.38	0.41	3.79	3.79
2028	-	0.95	0.76	1.71	7.60	0.41	8.01	6.30
2029	-	0.90	0.76	1.66	12.01	0.41	12.43	10.77
2030	-	0.86	0.76	1.62	16.59	0.42	17.01	15.39
2031	-	0.81	0.76	1.57	21.50	0.42	21.92	20.35
2032	-	0.76	0.76	1.52	27.00	0.43	27.43	25.91
2033	-	0.71	0.76	1.47	31.67	0.44	32.11	30.64
2034	-	0.67	0.76	1.43	36.69	0.45	37.14	35.71
2035	-	0.62	0.76	1.38	42.07	0.46	42.53	41.15
2036	-	0.57	0.76	1.33	47.85	0.47	48.31	46.98
2037	-	0.52	0.76	1.28	54.03	0.48	54.51	53.23
2038	-	0.48	0.76	1.24	59.28	0.49	59.76	58.53
2039	-	0.43	0.76	1.19	64.84	0.50	65.33	64.15
2040	-	0.38	0.76	1.14	68.61	0.51	69.12	67.98
2041	-	0.33	0.76	1.09	69.98	0.52	70.50	69.41
2042	-	0.29	0.76	1.05	71.38	0.53	71.91	70.87
2043	-	0.24	0.76	1.00	72.81	0.54	73.35	72.35
2044	-	0.19	0.76	0.95	74.27	0.55	74.82	73.87
2045	-	0.14	0.76	0.90	75.75	0.56	76.31	75.41
2046	-	0.10	0.76	0.86	77.27	0.57	77.84	76.98
2047	-	0.05	0.76	0.81	78.81	0.58	79.40	78.59
<b>TOTAL</b>	<b>38.00</b>	<b>9.98</b>	<b>15.20</b>	<b>63.18</b>	<b>1,013.40</b>	<b>10.34</b>	<b>1,023.74</b>	<b>960.56</b>
							<b>NPV @ 3.3%</b>	<b>509.83</b>
							<b>FIRR</b>	<b>33.04%</b>

Source: World Bank calculations

**Table A3.4. Sensitivity analysis (Financial)**

NPV Sensitivity (in USD million)		Commision Delay (Year +)									
		0	1	2	3	4	5	6	7	8	9
Cost Overrun	100%	510	461	414	369	327	286	248	211	176	144
	125%	502	453	406	362	320	279	241	204	169	137
	150%	493	445	399	354	312	272	234	198	163	131
	175%	485	437	391	347	305	265	227	191	157	125
	200%	477	429	383	339	298	258	220	184	150	119
	250%	460	413	367	324	283	244	207	171	138	106
	300%	443	397	352	309	269	230	193	158	125	94
IRR Sensitivity (%)		Commision Delay (Year +)									
		0	1	2	3	4	5	6	7	8	9
Cost Overrun	100%	33%	33%	33%	33%	33%	32%	32%	32%	31%	31%
	125%	30%	29%	29%	29%	29%	29%	28%	28%	27%	27%
	150%	27%	27%	27%	27%	26%	26%	26%	25%	24%	24%
	175%	25%	25%	25%	24%	24%	24%	23%	23%	22%	21%
	200%	23%	23%	23%	23%	22%	22%	22%	21%	20%	19%
	250%	20%	20%	20%	20%	19%	19%	19%	18%	17%	16%
	300%	18%	18%	18%	18%	17%	17%	16%	16%	15%	13%

Source: World Bank calculations



### C. Financial analysis of the implementing agency EDL

**16. EDL is a state-owned utility company, responsible for power transmission and distribution in Lao PDR.**

EDL is also a single buyer of domestic electricity from independent power producers (IPP), neighboring countries, and EDL Generation Company (EDL-GEN), EDL's subsidiary for the power generation business.

**17. EDL's recent financial performance and position are difficult to analyze due to the limited reliable financial information.**

Audited financial statements are only available from 2015 until 2019. EDL's staff financial management and accounting capability are constrained due to a lack of staff with adequate accounting skills and a lack of a functioning financial management software, both of which will be addressed by this project under Component 2, by providing the technical assistance and capacity building required for strengthening EDL's financial management practices and for completing an effective functioning, integration, and adoption of the ERP system.

**18. For the above-mentioned reasons, the World Bank could only assess EDL's financial viability based on the limited information available.**

The key performance figures and financial position of EDL are summarized in Table A3.5 below. The EDL's main drivers to generate income would depend on its ability to i) produce revenues by charging appropriate domestic tariffs and power export price while keep acquiring new customers and energy buyers, ii) maximize gross profit margin by purchasing electricity at below cost recovery price and quantity for its sales volume, and iii) controlling operating and other expenses. On the balance sheet side, it is crucial to maintain reasonable levels of liquidity and solvency for the company's financial sustainability. On most of these aspects, there are signs of distress which are discussed below.

**19. Profitability:** The gross profit margin ratio was at a very low level of about 13 percent until 2019 and gross profit margin is concerningly low compared to its subsidiary, EDL-Gen (54 percent in 2022), and a peer company from a neighboring country, Électricité du Cambodge (29 percent in 2017). Although core power sales business has been making losses, net profit was positive in 2015, 2017 and 2019 due to other revenues from installation, service, sale of equipment, and meter rental.

**20. Liquidity and solvency:** The liquidity and solvency analysis is based on the company's financial position from 2015-2019 given the absence of audited financial statements thereafter (See Table A3.6). The current ratio, a company's capacity to meet its short-term obligations that are due within a year, is commonly used to measure a company's liquidity. EDL's current ratio has been decreasing from 2016 and reached its lowest level at 0.1 in 2019. This means EDL has only 10 percent of cash available to fulfill its debt obligation due within a year. In addition to EDL's short-term liquidity issue, leverage ratio is high at 3.9, which is concerningly high comparing a peer company Électricité du Cambodge (1.38 in 2017) and aggravated by volatile earnings, resulting in a shortage of cash to repay debt service obligations.

**21. Financial projections for EDL:** Due to the limited reliable financial data for the past three years (2020-2022), combined with the poor financial management capacity of EDL, the financial forecast of EDL's performance attempted by the World Bank has significant uncertainties. However, EDL's financial situation is expected to remain risky. Preliminary estimates show that the sudden Kip depreciation experienced in 2021 and 2022 will have a strong negative impact on EDL financial situation, which was already vulnerable before the FX shock. The decline in the value of Lao Kip will cause dollar denominated IPP payments and debt service obligations (repayments of foreign debt and interest payments) to rise. While these payments will be made in US dollar, EDL's main source of revenues are earned in Lao Kip, negatively affecting profits.



Table A3.5. Profit and Loss Statement of EDL (2015-2019)

Profit and Loss (USD mil)	2015	2016	2017	2018	2019
Domestic tariff revenue	409	445	469	512	563
Export revenue	25	58	72	104	74
<b>Revenues from power sales</b>	<b>433</b>	<b>503</b>	<b>541</b>	<b>616</b>	<b>637</b>
IPP costs	282	385	461	514	475
Energy import costs	93	47	26	16	79
Wheeling charges (EDL-T)	-	-	-	-	-
<b>Cost of power sales</b>	<b>375</b>	<b>432</b>	<b>487</b>	<b>530</b>	<b>554</b>
<b>Gross profit for power sales</b>	<b>58</b>	<b>71</b>	<b>54</b>	<b>86</b>	<b>84</b>
Gross profit margin (%)	13%	14%	10%	14%	13%
Operating expenses	150	254	294	309	369
<b>Income from core operation</b>	<b>(92)</b>	<b>(183)</b>	<b>(240)</b>	<b>(223)</b>	<b>(285)</b>
Operating income margin (%)	-21%	-36%	-44%	-36%	-45%
Other revenues	125	105	151	194	678
Other expenses	-	(0)	(196)	(3)	(49)
FX losses	(10)	13	93	104	238
<b>Net profit / (Loss)</b>	<b>44</b>	<b>(91)</b>	<b>14</b>	<b>(130)</b>	<b>203</b>
<b>EBITDA Calculation (USD mil)</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
<b>Net profit / (Loss)</b>	<b>44</b>	<b>(91)</b>	<b>14</b>	<b>(130)</b>	<b>203</b>
Depreciation	47	64	70	81	109
Interest expenses	34	45	85	93	104
Tax	-	-	-	-	19
<b>EBITDA</b>	<b>125</b>	<b>18</b>	<b>170</b>	<b>44</b>	<b>435</b>
FX losses	(10)	13	93	104	238
<b>EBITDA (without FX)</b>	<b>115</b>	<b>32</b>	<b>262</b>	<b>147</b>	<b>673</b>

Source: World Bank Team analysis of EDL audited financial statements 2015-2019

Table A3.6. Balance Sheet and Financial Ratios of EDL (2015-2019)

Balance sheet (USD million)	2015	2016	2017	2018	2019
Non-current assets	4,074	4,849	6,043	7,620	8,484
Current assets	209	789	482	291	216
<b>TOTAL Assets</b>	<b>4,284</b>	<b>5,638</b>	<b>6,525</b>	<b>7,911</b>	<b>8,700</b>
Non-current liabilities	1,365	3,481	3,627	4,508	4,982
Current liabilities	2,167	1,370	2,108	1,806	1,954
<b>TOTAL Liabilities</b>	<b>3,531</b>	<b>4,851</b>	<b>5,735</b>	<b>6,314</b>	<b>6,936</b>
<b>Shareholders' equity</b>	<b>752</b>	<b>787</b>	<b>791</b>	<b>1,597</b>	<b>1,764</b>
<b>Liabilities and equity</b>	<b>4,284</b>	<b>5,638</b>	<b>6,525</b>	<b>7,911</b>	<b>8,700</b>
<b>Ratios</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
Interest coverage ratio (EBITDA)	3.7	0.4	2.0	0.5	4.2
Current ratio(c. assets / c. liabilities)	0.1	0.6	0.2	0.2	0.1
Leverage (liabilities / equity)	4.7	6.2	7.3	4.0	3.9

Source: World Bank Team analysis of EDL audited financial statements 2015-2019