THE INTERNATIONAL REC STANDARD

Country Assessment Report

Country/Region name:

Lao PDR is situated in Southeast Asia; bordered by Myanmar, China, Vietnam, Cambodia and Thailand. It has a population over 6 million and GDP of $18 billion, with a growth rate of 6.2%.

(World Bank 2018)

Lao PDR is one of the fastest growing economies in the ASEAN region. The service sector accounts for 41.6% of the nation's GDP, with growth being recorded in wholesale and retail services, real estate and tourism. Industry contributes 31.53% to GDP and the construction materials business including steel, cement and bricks, given the demand in real estate. Lao PDR has been receiving increasing amounts of FDI through its expansion of SEZ's (special economic zones), attracting companies such as Nikon, Essilor, Toyota, Mitsubishi, and Polycom in recent years. Lao's rapid growth initially stemmed from the exploitation of natural resources such as copper and gold. It is now trying to diversify and green its economic growth model, concentrating on reforms surrounding sustainability and inclusivity. The agricultural sector accounts for 15.71% of the nation's GDP and mainly produces rice, vegetables, beans sugarcane and tobacco.

(Statista 2018; Santander 2020; World Bank 2020)

Generation and demand: (type, MW, TWh)

In 2017, installed capacity for domestic supply was 2,526 MW, with an estimated generation of 7 TWh. Capacity allocated for export was 4,550 MW with annual generation of 24.3 TWh. Lao PDR electricity generation mix is dominated by hydropower plants, contributing 73% of overall capacity. Lignite-fired plants are the next biggest generators, accounting for 26% of overall capacity, with sugarcane bagasse representing less than 1% capacity. Table 1 outlines the existing fleet of power plants in Lao PDR, as of 2017.

Plant Name	Region	Fuel	Capacity (MW)			COD
			Total	Domestic	Export	
Nam Dong	North	Hydro	1.0	1.0		1970
Nam Ko	North	Hydro	1.5	1.5		1996
Nam Boun 1	North	Hydro	0.1	0.1		1996
Nam Mong	North	Hydro	0.1	0.1		1996
Nam Ngay	North	Hydro	1.2	1.2		2001
Nam Nhone	North	Hydro	3.0	3.0		2011
Nam Tha 3	North	Hydro	1.3	1.3		2011
Houay Ngou	North	Hydro	0.0	0.0		2011
Nam Sae	North	Hydro	0.1	0.1		2012
Nam Long	North	Hydro	5.5	5.5		2013
Hongsa Lignite	North	Lignite	1,878.0	100.0	1,778.0	2015–2016
Nam Karn 2	North	Hydro	130.0	130.0		2015
Nam Ou 9	North	Hydro	0.5	0.5		2015
Nam Ou 2	North	Hydro	120.0	120.0		2016
Nam Beng	North	Hydro	36.0	36.0		2016
Nam Ou 5	North	Hydro	240.0	240.0		2016
Nam Ou 6	North	Hydro	180.0	180.0		2016
Nam Karn 3	North	Hydro	60.0	60.0		2016
Nam Peun 2	North	Hydro	12.0	12.0		2017
Nam Nga 2	North	Hydro	14.5	14.5		2017
		North	2,684.7	906.7	1,778.0	
Nam Ngum 1	Central 1	Hydro	155.0	155.0		1971
Nam San	Central 1	Hydro	0.1	0.1		1995
Nam Et	Central 1	Hydro	0.1	0.1		1995
Nam Sat	Central 1	Hydro	0.3	0.3		1999
Nam Leuk	Central 1	Hydro	60.0	60.0		2000
Nam Mang 3	Central 1	Hydro	40.0	40.0		2005
Nam Lik 1/2	Central 1	Hydro	100.0	100.0		2010
Nam Ngum 2	Central 1	Hydro	615.0		615.0	2012
Nam Song	Central 1	Hydro	6.0	6.0		2012
Nam Ngum 5	Central 1	Hydro	120.0	120.0		2012

Nam Ka 1/2	Central 1	Hydro	0.1	0.1		2013
Nam Ngiep 3A	Central 1	Hydro	44.0	44.0		2014
Tadlang (Nam Saen)	Central 1	Hydro	5.0	5.0		2014
Nam Ngiep 2	Central 1	Hydro	180.0	180.0		2015
Nam Sana	Central 1	Hydro	14.0	14.0		2015
Nam San 3B	Central 1	Hydro	45.0	45.0		2015
Nam San 3A	Central 1	Hydro	69.0	69.0		2016
Nam Mang 1	Central 1	Hydro	64.0	64.0		2016
Nam Kuen	Central 1	Hydro	0.0	0.0		2016
Nam Song	Central 1	Hydro	3.0	3.0		2016
Nam Ngiep 2C	Central 1	Hydro	14.6	14.6		2017
Nam Phal	Central 1	Hydro	86.0	86.0		2017
Naxaythong Solar Farm	Central 1	Solar	32.0	32.0		2017
		Central 1	1,653.1	1038.1	615.0	
Theun-Hinboun	Central 2	Hydro	220.0		220.0	1998
Nam Theun 2	Central 2	Hydro	1,075.0	75.0	1,000.0	2010
Nam Phao	Central 2	Hydro	1.7	1.7		2011
Nam Gnouang 8	Central 2	Hydro	60.0	60.0		2012
Tadsalen	Central 2	Hydro	3.2	3.2		2012
Theun-Hinboun Extension	Central 2	Hydro	220.0	0.0	220.0	2012
Mit Lao Biomass Factory	Central 2	Biomass	5.0	5.0		2012
		Central 2	1,584.9	144.9	1,440.0	
Selabam	South	Hydro	5.0	5.0		1969
Xeset 1	South	Hydro	45.0	45.0		1991
Houay Ho	South	Hydro	152.0	2.0	150.0	1999
Xeset 2	South	Hydro	76.0	76.0		2009
Houay Samong	South	Hydro	0.1	0.1		2013
Xekamman 3	South	Hydro	250.0	25.0	225.0	2013
Xe Namnoy 1	South	Hydro	14.8	14.8		2013
Houg Anh Biomass Power House	South	Biomass	20.0	20.0		2015
Houay Lamphangnay	South	Hydro	88.0	88.0		2015
Xe Namnoy 6	South	Hydro	5.0	5.0		2016
Xeset 3	South	Hydro	25.0	25.0		2016
Xenamnoy 2-Xekatam 1	South	Hydro	10.0	10.0		2017
Xekaman 1	South	Hydro	290.0	32.0	258.0	2017
Nam Kong 2	South	Hydro	66.0	66.0		2017
		South	1,046.9	413.9	633.0	
		National	6,969.6	2,503.6	4,466.0	

COD = commercial operation date, MW = megawatt.
Note: Numbers may not sum precisely because of rounding.
Sources: Government of the Lao People's Democratic Republic, Ministry of Energy and Mines. 2017. *Electricity Statistics 2016*. Vientiane; and Japan International Cooperation Agency. 2018. *The Study on Power System Network Master Plan in Lao PDR. Presentation prepared for a preliminary meeting for power export scenario setting*. Vientiane. April.

Table 1. Existing power plants in Lao PDR, as of 2017 (ADB 2019).

In 2017, electricity consumption in the Lao PDR was 4.97 TWh, with peak demand reaching 928.2 MW. When losses are accounted for, the generation peak is estimated at 955 MW.58. Lao PDR has experienced rapid growth for domestic demand of electricity, with a CAGR of around 9.5% between 2007–2017. During the same timeline, electricity consumption per capita rose from 218 kWh to 725 kWh.

(ADB 2019)

RE market potential:

Lao possesses vast reserves in hydropower because of its access to the Mekong River, high volumes of annual rainfall and mountainous topography which provides high levels of runoff (Figure 3). The country's exploitable hydro potential is estimated to be 23,000 MW, of which, 5,172 MW of hydropower capacity had been harnessed as of 2017 with several forthcoming projects at varying stages of development.

There is significant potential to harness the energy from biomass emanating from Lao's agricultural and forestry waste such as rice, straw, sawdust and corn. This has an estimated generation capacity of up to 938 MW.

Average solar irradiation is 4.4 kWh/square meter/day, which equates to 1,800–2,000 hours of sunlight per year. Conditions are most favourable across the south of the country, although overall potential is much lower than other ASEAN nations. The total technical generation potential for utility-scale, fixed-tilt solar PV ranges from 731 to 2,304 TWh/year with a corresponding potential installed capacity of 516 to 1,619 GW.

Wind potential is less promising in Lao, averaging around 1 m/s, excluding some mountainous regions. The technical potential for utility-scale wind turbines (100 m hub height) was assessed to range from 135 to 343 TWh/year with a corresponding installed capacity of 116 to 283 GW.

(USAID-NREL 2018)

Source	Target 2010–2015 (cumulative MW)	Target 2016–2020 (cumulative MW)	Target 2021–2025 (cumulative MW)
Small hydro	80	134	400
Solar	22	36	33
Wind	6	12	73
Biomass	13	24	58
Biogas	10	19	51
Municipal solid waste	9	17	36
	140	242	651

Lao PDR = Lao People's Democratic Republic, MW = megawatt.

Source: Government of the Lao PDR, Ministry of Energy and Mines, Institute of Renewable Energy Promotion. 2016. *Renewable Energy Data in Lao PDR.* Paper prepared for the East and Southeast Asia Renewable Energy Statistic Training Workshop. Bangkok. 12–14 December.

Table 2. Deployment targets for RE projects (ADB 2019).

Projects	Shareholding Structure	Capacity (MW)	Project Cost ($ million)	Debt/Equity Ratio	LHSE Equity ($ million)	LHSE (Funding Sources)
Nam Theun 2	EDF (France) 40% EGCO 35% LHSE 25%	1,080	1,297	72/28	112.5 (real drawdown 93.4)	ADB, AFD, IDA, EIB, GOL
Hongsa Mine Mouth Power	*Power Plant:* BANPU 40% RATCH 40% LHSE 20% *Mining:* BANPU 38% RATCH 38% LHSE 25%	1,878	3,710	75/25	217.8	Krung Thai Bank, Government Savings Bank
Xe Pian-Xe Namnoy	SK Group (Republic of Korea) 26% Korea Western Power 25% RATCH 25% LHSE 24%	410	1,020	70/30	100.6	Krung Thai Bank, Economic Development Cooperation Fund
Nam Ngiep 1	KPIC Netherlands B.V. (Japan) 45% EGAT International 30% LHSE 25%	290	906	71/29	103.5	JBIC, Thai EXIM Bank, Bangkok Bank
		3,658	6,933	73/27	534.4	

Note: Numbers may not sum precisely due to rounding.

ADB = Asian Development Bank, AFD = Agence Française de Développement, BANPU = Banpu Public Company Limited, EDF = Électricité de France, EGAT = Electricity Generating Authority of Thailand, EGCO = Electricity Generating Public Company Limited, EIB = European Investment Bank, GOL = Government of the Lao PDR, IDA = International Development Association, JBIC = Japan Bank for International Cooperation, LHSE = Lao Holding State Enterprise, MW = megawatt, RATCH = Ratchaburi Electricity Generating Holding Public Company Limited, Thai EXIM = Export–Import Bank of Thailand.

Source: LHSE. Project Investment. http://www.laoholding.com/Investment.aspx (accessed 27 February 2019).

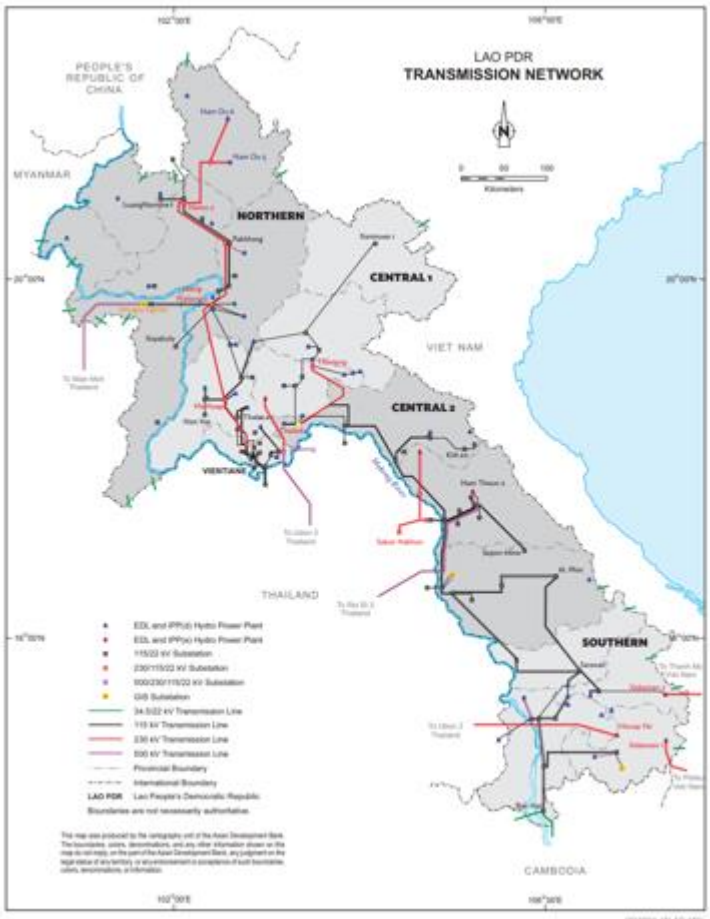
Table 3. LHSE's current RE project investments (ADB 2019).

Electrical Interconnection and import/export:

The Lao PDR's transmission network is operated by EDL and comprises four grid regions across the north, central 1, central 2, and south. 33 electrical interconnections currently exist with the following neighbouring countries:

- Cambodia (2)
- Myanmar (1)
- China (4)
- Thailand (17)
- Viet Nam (7)

The nation plans to construct 25 more transmission lines and associated substations by 2025, which include nine new cross-border high-voltage lines, six of which will be owned by EDL, including the first high-voltage transmission line for export to Myanmar. MOU's are in place to supply Thailand (up to 9 GW), Viet Nam (up to 5 GW),68 and Cambodia (up to 1.5 GW) by 2020.



Source: Électricité du Laos. 2017. *Electricity Statistics 2016*. Vientiane.

Figure 1. Map of Lao's Transmission Network (ADB 2019).

Historical support or development of renewables in the country/region:

Due to its vast hydropower resources, Lao PDR has historically prioritised hydroelectric production to ensure a secure, reliable, and affordable supply of energy to support economic development. The Ministry of Energy and Mines (MEM) is now supporting several initiatives to assess the country's potential for diversification.

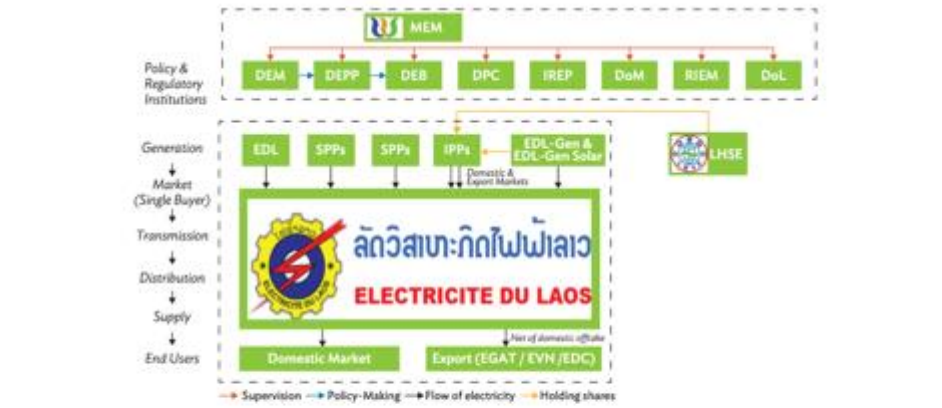
Since 2006, energy policies have gradually evolved from power sector policy to broader energy policies and the development of a sustainable energy sector. This is in part due to the strong support on energy policy from the Southeast Asian Nations (ASEAN) and other international organisations. These energy policies have been highly aimed at improving the country's electrification ratio to 95% in 2020 to eradicate poverty in the country.

As of 2020 some renewable energy projects in Lao had received commercial financing, while others had received development finance (from multiple countries and multilateral organizations).

Electricity market structure:

The power market in Lao has a single-buyer structure, with Électricité du Lao (EDL) being the sole buyer and retailer, as well as the grid operator. Power generation was partially liberalised in 2010, when the EDL spun off its large hydropower assets under EDL-GEN, in which it owns a stake of around 75%.

EDL, a vertically integrated electricity utility, is the country's sole off-taker and performs the functions of electricity generation, transmission, distribution and service provision to all electricity customers on the national grid. IPPs play a vital role in the country's power generation, providing more than 70% of the total generation capacity. IPPs have been responsible for roughly 90% of the new capacity additions since 2015. IPPs in Lao PDR are typically owned in part by EDL or holding companies under its control, with percentage of ownership varying by IPP and project.



DEB = Department of Energy Business, DEM = Department of Energy Management, DEPP = Department of Energy Policy and Planning, DOL = Department of Laws, DOM = Department of Mining Management, DPC = Department of Planning and Cooperation, EDC = Électricité du Cambodge, EDL = Électricité du Laos, EDL-Gen = EDL-Generation Public Company, EGAT = Electricity Generating Authority of Thailand, EVN = Vietnam Electricity, IPP = independent power producer, IREP = Institute of Renewable Energy Promotion, LHSE = Lao Holding State Enterprise, MEM = Ministry of Energy and Mines, RIEM = Research Institute for Energy and Mines, SPP = small power producer.

Figure 2. Market Structure of Power Market (ADB 2019).

Description of renewables support mechanism:

Feed-in-tariffs (FiTs) are not yet available in Laos. Currently, PPAs are possible for power developers (IPPs) for export to the EDL grid or to neighbouring countries. At the time of writing, stakeholders indicated that PPAs with EDL signed prior to 2015 did not make claims to ownership of environmental attributes (carbon or REC rights). At the time of writing, it was permissible for IPPs in Lao to enter PPAs with off-takers outside of Lao (for example, with the Thai utility, EGAT) where grid infrastructure is available and EDL handles wheeling. Further, as of 2021, there were no net energy metering schemes available to generators.

Responsible Government Department: (include key contacts)

Ministry of Energy and Mines (MEM) is responsible for the power sector in the Lao PDR, with jurisdiction over energy policy, strategy, and management of the energy and the mining industries across the country. It oversees the activities of several state-owned enterprises (SOEs) involved in the energy sector: EDL, EDL-Generation Public Company (EDL-Gen), and its subsidiary EDL-Gen Solar (the roles of these SOEs are detailed in section 3.2).

Department of Energy Policy and Planning (DEPP) falls within MEM and is mandated to formulate national energy policies and plans; introduce pricing policies for all types of energy supply; and support the DEB with environmental engineering, promotion, and review of hydropower projects during the MOU stage. Approval of power generation projects goes through DEPP.

The Ministry of Finance supports the role of MEM by ensuring financial management and accountability within the energy sector. It also charged with formulating the strategy and investments of SOEs as well as Lao Holding State Enterprise (LHSE).

The Ministry of Planning and Investment and Ministry of Natural Resources and Environment also provide additional oversight to MEM.

(ADB 2019)

Existing/Planned Energy Legislation: (is there a CPO)

Bilateral and multilateral donors are currently piloting various mechanisms and incentives, and provided support to study possibilities to an RE auction system. The highly subsidised retail electricity price can hinder the financial sustainability of non-hydropower RE projects. The permitting procedures for RE projects are cumbersome and the existing policy and regulatory frameworks favour hydropower technology.

The Electricity Law – initially passed in 1997, but later revised in 2008, 2011, and 2018, provides the legal framework underpinning the Lao PDR's power sector, establishing the principles, regulations, and measures that govern activities therein. It promotes the sustainable and efficient use of energy resources to support socioeconomic development. The law also requires that electricity development plans be developed at a strategic level and over long-, medium-, and short-term time frames, with the dual objective of promoting cross-border power exports and meeting domestic electricity requirements to drive socioeconomic growth. The 2018 revision necessitated the development of a 10-year power development strategy to set out the road map for the sector.

Environmental Legislation for RE:

In 2011, national government commissioned the "Renewable Energy Development Strategy" to provide a roadmap for the country's strategy and targets for RE developments towards 2025. The government plans to achieve the following by 2025: - increase the share of RE (excluding large hydropower) to 30% of the total energy consumption from about 7% in 2015; - reduce total energy consumption by 10% compared to business-as-usual by promoting energy efficiency and conservation; - increase its power exportation to neighbouring countries (Thailand, Viet Nam and Cambodia) to 15,000 MW by 2020.

Environmental Protection Law passed in 19999, but later revised in 2012 and 2013, (2012 and 2013 revisions) to require an environmental assessment for any projects that affect, conserve, or utilize natural resources. Later expanded from 2010 onward to include specific requirements, regulations, and guidelines for the environmental assessments. For example, the Decree on Environmental Impact Assessment (2010) established that any hydropower project above 15 MW requires an EIA (environmental impact assessment), with those projects less than 15 MW needing an initial environmental examination.) 2013 revision states that a strategic environmental assessment is required when developing policies, strategic plans, and programs in the energy sector.

(ADB 2019)

Existing/Planned Certificate Systems: (purpose, extent)

Currently there is no EAC market or tracking system in place in the country including the voluntary IREC and TIGR. No Green Tariffs are available.

There are several CDM-approved hydro power projects in Lao. Installed capacity and issuance volumes are provided below:
(source: https://www.hobomaps.com/LaosCDMhydroProjects.html) :

Clean Development Mechanism (CDM) Hydropower Projects in Laos

Date CDM Filed	Hydroelectric Project	Capacity Megawatts / MW	Annual Tons of CO2 Reduction
2011-12-21	Xe Kaman 3	250	499,481
2012-05-12	Nam Lik 2	100	207,512
2012-05-30	Xeset 2	76	155,983
2012-12-22	Nam Ngum 5	120	248,501
2013-01-17	Nam Sim	9	17,995
2014-01-30	Nam Ngiep 3	44	85,604
2014-02-21	Xenamnoy 1	15	47,558
2014-03-24	Xe Katam (Xenamnoy 2-Xe Katam 1)	81	46,438
2014-09-30	Nam Long 1	5	24,035
2014-11-20	Nam Lik 1	65	122,145
2014-12-31	Nam Sana	14	25,335
2015-07-23	Xenamnoy 6	5	15,107
2015-12-31	Nam Pha Gnai	19	62,184
2015-12-31	Nam Pha Gnai	19	62,184
2016-05-11	Nam Nga 2	14	35,019
2017-02-09	Nam Ngiep 2	180	387,174
2017-05-19	Nam Kap	12	30,252
2017-06-15	Nam Sor	4	10,630
2017-08-17	Nam Mang 1	64	125,775
2017-12-27	Nam Ngao	15	45,375
		----------	----------
	19 CDM projects totals	1092	2,192,103
		Output Capacity Megawatts / MW	Annual Tons Carbon Dioxide Emissions Reduction

There are also Gold Standsard carbon projects for hydro projects in Lao. See for example: https://www.natureoffice.com/_Resources/Persistent/d5519132659e7a5b59ecbdd543ffc1b7cc56e657/180816-KSP-Saysetha%20Small%20Hydropower%20Project_EN.pdf

Extent of engagement with government:

In February 2020, EDL discussed the use of EAC systems in the context of Lao with stakeholders active in the region. The call was facilitated by a non-profit deeply engaged with EDL, knowledgeable about the country context, and interested in helping attract FDI into the country. At the time of the conversation, there was no material interest from potential buyers in the country, and EDL expressed lack of interest in participating in the market (as a Registrant or Participant), unless there was clear and demonstrable interest from buyers. However, EDL expressed was preliminary interest in acting as an issuer, if and as demand materialized and the market grows.

At the time of writing, in August 2021, there is clear interest from IPPs, Market Participants, and buyers in getting I-RECs approved for issuance and consumption, both within Laos and potentially for onward redemption in neighbouring countries (in line with the sale of green electricity from Lao to neighbouring countries).

Representatives from the I-REC Standard Foundation have contacted the NGO counterparts to set up a second meeting with EDL, to discuss their potential role as an Issuer, or to seek recommendations on the appropriate domestic entity to serve this function. EDL is centrally placed in power market, with close ties to both Ministry counterparts and private sector actors.

Furthermore, an Issuer in a Southeast Asian countries has expressed willingness to support Lao and EDL (if interest exists) in establishing themselves as an Issuer; or in acting as the Issuer for Lao if no domestic interest exists in establishing a local entity as Issuer. The authors note that the Issuer in question is likely capable of performing Issuer functions in the Laos, given a high degree of bilateral communication between the countries with specific reference to energy sector policy and infrastructure development.

The Issuer mentioned above, as well as two different project developers with assets in Laos, have further expressed willingness to connect the Foundation to government and/or utility representatives in Lao, upon request. Conversations and progress to engage domestic stakeholder may be delayed by COVID-19 travel restrictions; however, the Foundation is confident in the ability to engage domestic actors over time, as travel permissions resume in 2021 and onward.

Response from Government in relation to attribute tracking systems:

Please see above.

Demand-side market potential or strategic nature of market development:

Lao PDR has relatively less industrial production than neighbouring countries, including Thailand, Vietnam, and China. However, I-REC end-users and traders alike have requested access to RECs in the local market. At the same time, as Lao expands electricity exports to regional neighbours (most notably, to Thailand) there is increased demand from power off-takers (utility-scale off-takers) for power to be accompanied with RECs. As such, the development of I-REC markets in Lao will, in the first instance, service domestic demand from a select few, large-scale power consumers; and potentially in the medium-term, I-RECs can help denominate environmental attribute transfers across borders as regional power systems become more integrated.

Domestic demand for I-RECs.

Domestic demand for renewable electricity. Lao PDR has been committed to improve rural electrification from 16% in 1995 to 70% in 2010, and to 95% in 2020. Relatively recent connection to the grid of the rural residential sector should result in an increase of electricity demand in the future. The total final energy consumption of the Lao PDR is forecasted to increase at a rate of 4.7% per year

from 2015 to 2040, with the electricity demand being expected to be the fastest growing energy sector (8.1%).

Regional demand for renewable electricity and associated I-RECs. The export target, particularly to Thailand is predicted to reach 53% of Laotian electricity production by 2040, resulting in additional demand for electricity produced in Lao PDR. At the same time, as neighbouring countries currently importing hydropower from Lao PDR experience increased demand for I-RECs, there is a growing need to track the movement of clean power across borders and into neighbouring power pools. This is evidenced by requests from consumers in neighbouring countries, as well as by discussions with project developers in Lao PDR, which have also received requests for EACs to support proof of clean power delivery.

Other factors. The latest energy outlook (ERIA) for Lao PDR recommends implementation of a road transport electrification policy as a mean to mitigate CO_2 emissions and reduce dependency on foreign import of fossil fuel. Would such policies be implemented in future energy master plans, the demand for renewable electricity will probably rise further.

(ERIA, Energy and Mines, 2018)

Analysis of political disruptions or market risks:

EDL is currently suffering from a rising dept to equity ratio, which has now probably become unsustainable. In 2016, EDL Group could not fully service its debt and violated its financial covenants. Accelerating liabilities has reduced EDL's capacity to finance projects in the power sector. One of the main issues is the lack of cost-reflective tariffs. In 2015, 82% of domestic consumers paid tariff rates below the market price of electricity, placing significant pressure on EDL's profits.

Another key challenge is the disproportionate investment in transmission and distribution infrastructure, which are in need of significant enhancements for excess power generated to be evacuated. The government currently regard the issues of overcapacity as an opportunity to export, but this aspiration may be greater than tangible demand for such exports.
(ADB 2019)

Power sector reforms and planning have largely been outsourced from domestic entities to international development partners, and as such, there may be limited domestic capacity to implement and manage a REC program, without initial support. As a mitigant, use of a central issuer (such as GCC) or an existing Issuer in a nearby market may be advisable in the first instance. Subsequently, if and as domestic interest in managing the market materializes, capacity building provided by existing Issuers and Foundation representatives can help transfer relevant skills in managing Issuance processes.

Analysis of regulatory risks including linkages with carbon markets and support systems:

There are a number of CDM and other carbon credit projects active in Lao, which presents risks of double issuance, if not monitored carefully. As a mitigant, the Issuer(s) should be instructed to search public records of carbon projects at the stage of new project registration for I-REC projects. Even though contracts between Registrants and the Issuer may have a clause to warrant that the Registrant has full ownership of all environmental attributes, and that the project is not registered in another registry (including CDM); limited knowledge or understanding of environmental attribute markets may warrant additional due diligence from the Issuer to safeguard against double counting. Furthermore, to the knowledge of the authors and reviewers, existing PPAs do not mention environmental attribute ownership, which may lead early-stage disputes in the market, seen in the infancy stages of other Southeast Asian REC markets.

Current Environmental Reporting in Energy: DEPP maintains electricity data based on the Electricity Yearbook published by the EDL Generation Public Company, which collects power generation data from stakeholders.
Mechanisms in place to support the reliable verification and issuance of I-RECs: Power generation is tracked by meters installed at the point of electricity sale, such as switchyards, whereby generators invoice EDL directly. Preliminary conversations with generators in the country indicate that meters are of revenue-grade quality, which should provide adequate data on which to review issuance requests.
Local organizations of importance and their opinion on local I-REC market development: EDL is the primary domestic entity likely to support EAC market implementation. A market participant (listed as a contributor below) made an introduction to the I-REC Standard on 30 September 2021. The I-REC Standard subsequently contacted EDL to invite them to discuss potential collaboration as a Local Issuer on 1 October, and again on 14 October 2021. At the time of publication (November 2021) EDL had not responded. The Foundation will continue to contact EDL, and pending no reply by December 2021, will identify other potential domestic entities to partner with.
Any other Relevant Information: In the first quarter of 2021, the Foundation received requests from at least three project developers and multiple Participants in establishing Lao PDR as an approved issuance country. This is atop increased supply chain relocation form China to Southeast Asia, and assumed concurrent increases in demand from brands with supply chains entering Lao PDR.

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