



Renewable Energy Financing in Cambodia, Lao PDR and Myanmar

Support Framework, Challenges and
Policy Recommendations



One Community
For Sustainable
Energy

Renewable Energy Financing

in Cambodia, Lao PDR and Myanmar

Support Framework, Challenges and
Policy Recommendations

ISBN 978-979-6978-53-1



Editors:

- ASEAN Centre for Energy (ACE)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
- South Pole, Indonesia

Published by:

ASEAN Centre for Energy (ACE)

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

ACE Building, 6th floor

Complex Directorate General of Electricity

Jl. HR. Rasuna Said kav.7-8 Jakarta, Indonesia

Tel: (62-21) 527 8027 | Fax: (62-21) 529 6382

www.agep.aseanenergy.org | facebook.com/sustainableenergyforasean

www.aseanenergy.org | facebook.com/aseanenergy

August 2019



Acknowledgement

The Renewable Energy Financing in Cambodia, Lao PDR and Myanmar: Support Framework, Challenges and Policy Recommendations was prepared under the guidance of Christopher G. Zamora, acting Executive Director of the ASEAN Centre for Energy (ACE) and Maria-José Poddey, Principal Advisor of the ASEAN German Energy Programme (AGEP), GIZ. The study development was managed by Septia Buntara Supendi (ACE), and Alin Pratidina (GIZ).

The study was developed in cooperation with South Pole, the sustainability service provider, under the assistance of Dr. Martin Stadelmann, Johannes Spaleck, and Umdatul Mujahidah.

Valuable feedback was also provided by the Renewable Energy Sub-Sector Network (RE-SSN) Focal Points from Cambodia, Lao PDR and Myanmar (CLM), Beni Suryadi and Yudiandra Yuwono (ACE), Rizky Fauzianto and Melati Wulandari (GIZ).

The report also gained indispensable insights from focus group discussion (FGD) participants representing RE-SSN Focal Points from CLM, financial institutions, project developers and international organisations active in the CLM states during the FGD on Policy Recommendation on Renewable Energy Financing Support Mechanisms in CLM on 23-24 August 2018 in Phnom Penh, Cambodia.

FGD participants include: Cambodia: Sarasy Chiphong, Ngov Veng Cheng, Arjen Luxwolda, Morten Kvammen, Parinha Sok, Vanna Pheng, and Rogier van Mansfelt; Lao PDR: Sengdavone Bangonesengdet, Phonephet Manichith, Dr. Seumkham Thoummavongsa, Nalin Silavongsith, Somphet Arounsavath, and Chanthadeth Atanaphone; Malaysia: Dato Ir Muhamad Guntor Tobeng; Myanmar: Min Chan Win, Benjamin Frederick, Sanda Kyaw, Thida Oo, Sandar Htwe, New Mar Aye, Nu War Phyto Wai, Moe Thandar, and Than Soe.

The FGD was jointly organised with the Department of New and Renewable Energy, Ministry of Mines and Energy Cambodia. Special thanks to Mr. Sarasy Chiphong for his great support.

Disclaimer

The Renewable Energy Financing in Cambodia, Lao PDR and Myanmar: Support Framework, Challenges and Policy Recommendations was prepared by the ASEAN Centre for Energy (ACE), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and South Pole, as consultants, with the support of the German Federal Ministry for Economic Cooperation and Development (BMZ) through the ASEAN-German Energy Programme (AGEP).

This publication and the contents featured herein are provided "as is".

All reasonable precautions have been taken by ACE to verify the reliability of the material featured in this publication. Neither ACE nor any of its officials, agents, data or other third-party content providers or licensors provides any warranty, including as to the accuracy, completeness, or fitness for a particular purpose or use of such material, or regarding the non-infringement of third-party rights, and they accept no responsibility or liability with regard to the use of this publication and the material featured therein. The ASEAN Member States (AMS) or the individuals and institutions that contributed to this report are not responsible for any opinions or judgements the report contains.

The information contained herein does not necessarily represent the views, opinions or judgements of AMS or of the individuals and institutions that contributed to this report, nor is it an endorsement of any project, product or service provider. The designations employed, and the presentation of material herein do not imply the expression of any opinion on the part of ACE concerning the legal status of any region, country, territory, city or area or of its authorities, or of its authorities, or concerning the delimitation of frontiers or boundaries.

Foreword

As the sixth largest economy in the world, the economic development of the Association of Southeast Asian Nations (ASEAN) Member States (AMS) has grown rapidly. This is reflected by the average annual real gross domestic product (GDP) growth rate of 5.3% from 2007 to 2015. As a result, the primary energy demand between the period of 2007 to 2015 has increased at an average of 3.6% annually, according to the 5th ASEAN Energy Outlook (AEO).

The increased of energy demand offers opportunities for investors to enter the ASEAN Renewable Energy (RE) market. As a response, the AMS have intensified their efforts to increase the renewable energy component to 23% by 2025 in the ASEAN energy mix.

To seize such valuable opportunities, each AMS shall provide support to the private investors that would like to enter the RE market, especially for countries that are newly opening their RE markets, such as Cambodia, Lao PDR and Myanmar (CLM), given their abundant RE potential.

As a new market, the CLM governments shall ensure the creation of an enabling environment to attract private sector investments through policy and financial support frameworks, such as feed-in tariff, grid connection, fiscal incentive, soft loan, etc.

In order to support the great efforts of CLM governments in providing applicable policy and financial support frameworks, the ASEAN-German Energy Programme (AGEP)—a jointly implemented project by ASEAN Centre for Energy (ACE) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the Federal Ministry for Economic Cooperation and Development (BMZ)— has completed a study on The Renewable Energy Financing in Cambodia, Lao PDR and Myanmar: Support Framework, Challenges and Policy Recommendations. This study supports the RE Programme under the ASEAN Plan of Action for Energy Cooperation (APAEC) and aims to provide a reference for policymakers and other related and interested stakeholders to explore RE policy and financial support mechanisms in CLM.

We believe this study could be a good start for CLM to enhance the availability and quality of RE policy and financial support frameworks and increase privately-invested RE projects to gradually reach the countries' RE target in the future. In addition, we would like to reiterate our efforts to increase the promotion of RE financing mechanisms through studies and recommendations that support the ASEAN's energy development to achieve energy security, affordability, and accessibility within the framework of sustainable development.

Maria-José Poddey
Principal Advisor for AGEP
GIZ

Christopher G. Zamora
Acting Executive Director
ASEAN Centre for Energy



Solar PV-ISPP Cambodia

Table of Contents

Acknowledgement	1
Disclaimer	1
Foreword	2
List of Tables	5
List of Figures	5
Abbreviations	6
Key Terms	8
Executive Summary	10
1 Introduction	12
1.1 Background and Objective	12
1.2 Methodology	13
2 Renewable Energy Financing Support Framework and Challenges in ASEAN	14
2.1 National Renewable Energy Targets of ASEAN Member States	14
2.2 Existing Renewable Energy Support Mechanisms in ASEAN	15
2.2.1 Renewable Energy Policy Support Mechanisms	16
2.2.2 Renewable Energy Financial Support Mechanisms	17
2.3 Challenges in Financing Renewable Energy Projects in ASEAN	19
3 Renewable Energy Financing Support Framework and Challenges in Cambodia, Lao PDR and Myanmar	22
3.1 Cambodia	22
3.1.1 Renewable Energy Support Framework	22
3.1.2 Challenges in Financing Renewable Energy Project	25
3.2 Lao People's Democratic Republic	27
3.2.1 Renewable Energy Support Framework	27
3.2.2 Challenges in Financing Renewable Energy Project	29
3.3 Myanmar	31
3.3.1 Renewable Energy Support Framework	31
3.3.2 Challenges in Financing Renewable Energy Project	32
4 Measures to Improve the Renewable Energy Support Framework in Cambodia, Lao PDR and Myanmar	36
4.1 Improving the Renewable Energy Support Framework in Cambodia, Lao PDR and Myanmar	38
4.2 Specific Measures for Cambodia	39
4.3 Specific Measures for Lao PDR	40
4.4 Specific Measures for Myanmar	41
5 Case Studies on Successful Renewable Energy Support Mechanisms	42
5.1 Feed-in Tariff, Public Sector Guarantees, and Mezzanine Financing for Geothermal in Indonesia	42
5.2 Guaranteed Offtake through Power Purchase Agreement and Multilateral Guarantee for Hydro in Vietnam	44
5.3 World Bank Soft Loans, Government Guarantee and Sub-national Equity for Hydropower in India	45
5.4 Feed-in Tariff and Crowdfunding for Wind Power in Germany	47
6 Conclusions	48
7 Annexes	50
Annex I: Input from Focus Group Discussion	50
8 Bibliography	54

■ List of Tables

Table 1: National Renewable Energy Targets in ASEAN Member States	15
Table 2: Renewable Energy Policy Support Mechanisms in ASEAN Member States	16
Table 3: Renewable Energy Financial Support Mechanisms in ASEAN Member States	18
Table 4: Challenges in Financing Renewable Energy Projects in the ASEAN Region	20
Table 5: Key Support Framework for Renewable Energy Development in Cambodia	24
Table 6: Challenges in Renewable Energy Financing in Cambodia	26
Table 7: Key Support Framework for Renewable Energy Development in Lao PDR	28
Table 8: Challenges in Renewable Energy Financing in Lao PDR	30
Table 9: Key Support Framework for Renewable Energy Development in Myanmar	32
Table 10: Challenges in Renewable Energy Financing in Myanmar	34
Table 11: Measures to Address Challenges in Improving Renewable Energy Support Framework in the ASEAN region	37
Table 12: Common Measures to Improve the Renewable Energy Support Framework in Cambodia, Lao PDR and Myanmar	38
Table 13: Measures to Overcome Key Challenges in Renewable Energy Financing in Cambodia	39
Table 14: Measures to Overcome Key Challenges in Renewable Energy Financing in Lao PDR	40
Table 15: Measures to Overcome Key Challenges in Renewable Energy Financing in Myanmar	41

■ List of Figures

Figure 1: Sarulla Geothermal Project Financing Structure	43
Figure 2: Hoi Xuan Hydropower Project Financing Structure (MIGA, 2018)	44
Figure 3: Rampur Hydropower Project Financing Structure	45
Figure 4: Ingersheim Project Financing Structure	47

|| Abbreviations

ACE	ASEAN Centre for Energy
ACMF	ASEAN Capital Markets Forum
ADB	Asian Development Bank
AEO	ASEAN Energy Outlook
AFD	<i>Agence Française de Développement</i> (French Development Agency)
AGEP	ASEAN-German Energy Programme
AMS	ASEAN Member States
APAEC	ASEAN Plan of Action for Energy Cooperation
ASEAN	Association of Southeast Asian Nations
BAU	Business-as-usual
BMZ	<i>Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung</i> (German Federal Ministry for Economic Cooperation and Development)
BPP	<i>Biaya Pokok Pembangunan</i> (Generation cost of electricity)
BVGL	Business Viability Guarantee Letter
CLM	Cambodia, Lao PDR and Myanmar
CSR	Corporate Social Responsibility
DICA	Directorate of Investment and Company Administration of Myanmar
EDL	<i>Electricité du Laos</i> (Laos State Utility Company)
EEG	<i>Erneuerbare-Energien-Gesetz</i> (Renewable Energy Sources Act)
EPC	Engineering, Procurement and Construction
EPF	Environmental Protection Fund
ERR	Economic Rate of Return
ESCO	Energy Service Company
EVN	Vietnam Electricity
FGD	Focus Group Discussion
FiT	Feed-in Tariff
GBP	Green Bond Principles
GBS	Green Bond Standards
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIZ	<i>Deutsche Gesellschaft für Internationale Zusammenarbeit</i> (German International Cooperation)
GoI	Government of Indonesia
GTFS	Green Technology Financing Scheme
GW	Gigawatt
GWh	Gigawatt-hour
IBRD	International Bank for Reconstruction and Development
ICMA	International Capital Market Association
IIGF	Indonesia Infrastructure Guarantee Fund (<i>PT Penjaminan Infrastruktur Indonesia</i>)
IPP	Independent Power Producer
IRR	Internal Rate of Return
ISPP	International School of Phnom Penh

JBIC	Japan Bank for International Cooperation
JOC	Joint Operating Contract
KfW	<i>Kreditanstalt für Wiederaufbau</i> (German Development Bank)
kWh	kilowatt-hour
MIGA	Multilateral Investment Guarantee Agency
MME	Ministry of Mines and Energy of Cambodia
MOEE	Ministry of Electricity and Energy of Myanmar
MoF	Ministry of Finance
Mtoe	Million tonnes of oil equivalent
MW	Megawatt
MWh	Megawatt-hour
MYR	Malaysian ringgit
NAMA	Nationally Appropriate Mitigation Action
NJHP	Neelum Jhelum Hydropower Project
NSHFO	Non-Honoring of Sovereign Financial Obligations
OECD	Organisation for Economic Co-operation and Development
PGE	PT Pertamina Geothermal Energy
PPA	Power Purchase Agreement
PT PLN	<i>PT Perusahaan Listrik Negara</i> (Indonesian State Utility Company)
PV	Photovoltaics
R&D	Research and Development
RBF	Result-based Finance
RE	Renewable Energy
RE-SSN	Renewable Energy Sub-Sector Network
REF	Rural Electrification Fund of Cambodia
REF	Rural Electrification Development Fund of Lao PDR
SEPF	Sustainable Energy Promotion Fund
SGD	Singapore dollar
SHS	Solar Home Systems
SNV	<i>Stichting Nederlandse Vrijwilligers</i> (Netherlands Development Organisation)
SOL	Sarulla Operations Limited
TFEC	Total Final Energy Consumption
TPES	Total Primary Energy Supply
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollar
VAT	Value-added tax
VNECO Hoi Xuan	VNECO Hoi Xuan Investment and Electricity Construction Joint Stock Company
WB	World Bank

■ Key Terms¹

Concessional loan: a loan that is extended on terms substantially more generous than market loans. Concessional loans typically have below-market interest rates and longer grace periods.

Dedicated RE grants: non-repayable funds disbursed or given by one entity, usually the government or international donors, to RE project developers.

Dedicated RE loans: an amount of money given to RE project developers in exchange for future repayment of the loan value amount along with interest or other financial charges. Dedicated RE loans often originate from funds specifically allocated for RE projects and are provided by the government or international donors.

Dedicated RE equity: an amount of money invested in RE projects, usually by a government's institution or international donors, that results in the investor's rights to ownership of the RE project in an amount equal to their percentage of investment.

Dedicated RE guarantee: a loan guarantee agreement under which a guarantor pays the lender in cases the RE project fails to deliver the specified performance.

Economic Rate of Return (ERR): an interest rate at which the cost and benefits of a project, discounted over its life, are equal. ERR differs from the financial rate of return (i.e. IRR) in that it takes into account the effects of factors, such as price controls, subsidies, and tax breaks, to compute the actual costs of the project to the economy.

Feed-in-tariff: payments made by utility to RE project owners for every unit of electricity produced, including for self-consumption usage. Feed-in-tariff is usually applied over a fixed number of years. Financial incentives: monetary stimulus usually provided by the government to RE project developers to promote the expansion of RE.

Fiscal incentives: measures which reduce the annual income tax of project owners or consumers who invest in RE. These measures can include tax credits, tax deductions or accelerated depreciation (for industrial and commercial sectors).

Government guarantee: a government-guaranteed loans in which the government is required to repay any outstanding amount of loans in the event of default.

Green bond: a bond specifically earmarked for climate and environmental projects, including but not limited to RE projects. Green bonds are essentially standard bonds with "green" features. The eligibility criteria for such projects depend on the issuer and existing regulations/guideline for such bonds issuance in the country.

Guarantee: an agreement by the guarantor to pay part of the costs or losses incurred by a project in case of a specified event happening in return for the payment of a fee or premium. It is a three-way relationship in which a guarantor offers the guarantee to an entity (the financier) against the performance of another entity (recipient of the funds).

Innovative financial support mechanisms: financial mechanisms that are not yet common in the market and often comprise of a new, innovative financing approach. These can include mechanisms, such as green bonds, crowdfunding, result-based finance, emission and renewable energy certificate trading, and specialised insurance products such as RE resource insurance, etc.

Market-based intervention: a set of policy framework specifying the outcome to be delivered by market actors, without prescribing the delivery mechanisms and the measures to be used.

¹Key terms are self-defined based on the understanding of applied terms in the financial market and specifically for RE market.

Mezzanine financing: a combination of debt and equity financing that gives the lender the right to convert to an equity interest in the company in case of default, generally after venture capital companies and other senior lenders are paid.

Net-metering: a billing mechanism that credits RE system owners (e.g. rooftop PV owners) for the electricity they add to the grid. Net-metering allows RE system owners to offset their energy use, i.e. the system owner only pays for the net consumption from the grid, which is the consumption from grid minus the electricity fed into the grid over a specific period.

Permits and licensing: refers to the availability of procedures/guidelines in acquiring permits and licenses for RE power projects.

Price-driven regulations: government regulations under which no quantity goals are targets are established. It focuses on providing RE projects with monetary support, such as through investment subsidies, soft loans or through fixed payments for every unit electricity produced (e.g. feed-in tariffs).

Quantity-driven regulations: government regulations under which the policy makers set a desired quota or goal, usually with a target date, to encourage the market penetration of RE. These include tendering for a specified power capacity from a specified type of RE sources and RE certificate schemes which obligate entities in electricity supply to acquire a certain percentage of electricity from RE sources in their energy mix.

RE auctions/bidding: a mechanism whereby the government issue a call for tenders to install a certain capacity of RE electricity with project developers submitting a bidding price at which they can realise the project. The government will sign a power purchase agreement with the winning bidder.

Regulatory interventions: government's interventions to accelerate RE market penetration through RE.

RE financial support mechanism: financial mechanisms for RE project that provide one of the following instruments: (i) access to finance (e.g. dedicated RE fund, bank credit line and result-based finance), (ii) transfer financial risks to third parties (e.g. insurance and guarantees) or (iii) reduce direct financing costs (e.g. soft loans and grants).

RE policy support mechanism: public policy, regulatory or programmatic interventions that build the framework in which investments into RE can occur. These can include (i) regulatory interventions, such as transparent grid connection procedure, technical standards and labelling, or clear administrative licence procedures; (ii) market-based support intervention, such as feed-in tariff (FiT), net-metering, tax exemptions or RE auction models; (iii) other interventions, such as specific education or training programmes on research and development initiatives.

RE support framework: represents the overall supporting environment for RE in a given region or country. Such a framework may refer to institutions, actors, policies, laws, RE endowment, specific policy or financial mechanisms etc. which in some way contribute to the development of RE.

Result-based Finance (RBF): an instrument that links financing to pre-determined results, with payment made only upon verification that the agreed-upon results have actually been delivered; e.g. amount of installed capacity in MW or electricity generated in MWh from a RE power plant.

Soft loan: a loan with no interest or a below-market interest rate.

Tax incentives: deduction, exclusion or exemption from a tax liability to encourage investments in RE projects.

Traditional financial support mechanisms: financial mechanisms that are familiar to most customers and contractors given their common use in the market, such as common loans, grants, concessional loans or dedicated credit lines.

|| Executive Summary

Some ASEAN Member States (AMS), such as Indonesia, Malaysia, the Philippines, Thailand, and Vietnam, have fairly developed markets for renewable energy (RE). In these AMS, investments are incentivised through RE policy and financial support mechanisms that encourage the involvement of private actors and financial institutions in RE project development. However, other AMS, such as Cambodia, Lao PDR and Myanmar (CLM), have not seen much private sector investments into RE and are just starting to open their markets to new incentives and models for RE deployment. Considering this, the study provides insights on key challenges that hinder RE development, an overview of existing RE support framework in CLM as well as recommendations on key policies and financial interventions to overcome these identified challenges in each of the three AMS.

RE project development in Cambodia, Lao PDR and Myanmar, is a new market and, with a limited usage of financial risk transfer instruments, is developing slowly. Across the three AMS, the common challenges, that have become a major issue in hindering RE project development, are the high financing costs and unavailability of the power market. High financing costs is one of the key challenges due to limited access to funding and limited know-how and capacity of financial institutions on RE projects. At the same time, the existing and powerful fossil fuel industry perceives RE as business competition and uses its influence to hold back and delay the development RE market.

In addition to that, one single buyer or off-taker e.g. the national utility creates unfavourable situation to the RE market development as the negotiation of power prices happens on a case-by-case basis. Furthermore, uncertainty in the RE market outlook and unclear permitting procedures are a burden to potential investors despite abundant RE resources and business opportunities.

Apart from these common constraints across all CLM, each country also has challenges specific to its domestic context. In Cambodia, RE is seen as a threat for the power market due to perceived grid stability issues during RE integration. Furthermore, RE regulations and permitting procedures in Cambodia are seen as partly unclear and economically inefficient, particularly the recently introduced capacity charge for rooftop PV². In Lao PDR, the transmission network is not fully developed yet, while in Myanmar the power grid faces severe technical and transmission issues. Both Lao PDR and Myanmar have low, partly subsidised electricity tariffs in place, which makes it difficult for RE to become economically viable. In Lao PDR and Myanmar, the currency risk is a relevant challenge, as investment and lending are often conducted in hard currency³, while power purchase is handled in local currency.

In terms of policy support mechanisms, it is notable that CLM have, in some form, integrated RE development in their future development strategies and policy planning. Yet, they still rely on government incentives to bolster RE development and have not established a more developed RE support mechanism to draw in private sector investments, such as net-metering, standardised auction models or feed-in tariffs (FiTs).

The existing support mechanisms for financing RE project is limited to a few mechanisms in each country. In CLM, RE financial support mechanisms have been prioritising small-scale rural electrification, particular through low capacity solar home systems (SHS). Cambodia and Lao PDR have also seen support for larger RE projects with a concessional debt package from the Asian Development Bank for Cambodia's first solar farm, and the use of green bonds for RE projects in Myanmar.

²The rooftop photovoltaic (PV) regulation was introduced in Cambodia in January 2019.

³Hard currency; safe-haven currency is a currency that is expected to be stable and not to fluctuate greatly in value e.g. USD.

The recommendations to support investments into RE in CLM take into consideration the roles and actions of the stakeholders have to take on, hence recommendations are divided into (i) recommendations for governments on policy support mechanisms; (ii), donors on building capacity about financial support mechanisms and (iii) multilateral, bilateral or national development finance institutions on directly deploying financial support mechanisms.

Recommendations for Governments to build a Supporting Framework for RE Investments:

Recommendations	Cambodia	Lao PDR	Myanmar
Consider allowing on-site sale of electricity and sales via the grid to enhance the possibility of optimal producer-buyer relationships	✓	✓	✓
Adopt clearer RE targets beyond large hydro	✓	✓	
Assign publicly-owned utilities to provide PPAs in hard currency		✓	✓
Consider net-metering and other incentives for small-scale RE (e.g. feed-in tariffs), to build a strong local project developer market	✓	✓	✓
Integrate RE in Power Development Plan	✓		
Streamline processes for permits and build on-stop-permit facilities	✓	✓	✓
Collaborate with donors and development banks on capacity building efforts	✓	✓	✓

Recommendations for donors to develop capacity on financial support mechanisms and related to key investment risks (in all three CLM states):

- Provide capacity building on RE financing for local and commercial financial institutions; particularly on available currency risk mitigation instruments
- Provide capacity building on political risk mitigation instruments (e.g. from multilateral development banks) for governments, commercial financial institutions and project developers
- Build know-how on grid integration of RE for the government

Recommendations for multilateral, bilateral or national development finance institutions on financial support mechanisms (in all three CLM states):

- Provide credit lines and loan guarantees to commercial banks' lending to RE
- Provide specific guarantees for power purchase agreement (PPA) payments
- Collaborate with donors and governments on capacity building efforts

1. Introduction

1.1 Background and Objective

The Association of Southeast Asian Nations (ASEAN) region is an economic zone of around 630 million people. Its regional gross domestic product (GDP) of USD 2.4 trillion (2015) has an annual growth rate of 5.3% (ASEAN Energy Outlook, 2017). The demand for energy is immense, not only due to the economic drive in the region, but also rapid industrialisation. ASEAN has collectively become the third fastest growing region in the world. Its accelerated growth has resulted in increased energy demand with a projected growth of 2.3 times over long-term projections to 2040 (ASEAN Energy Outlook, 2017). However, the energy demand is not proportionally shared between the ASEAN Member States (AMS) with Indonesia, Malaysia and Thailand, accounting for around 70% of the total energy demand.

In order to successfully reduce the fossil fuel usage and move forward to a clean and sustainable future, the renewable energy (RE) deployment in AMS needs to be accelerated and scaled up. The policy and financial support mechanisms play a crucial role in enabling this transition.

Reflecting the ever-increasing demand for energy and ensure the region's sustainability, through the ASEAN Plan for Action on Energy Cooperation (APAEC), AMS agreed to aim for an aspirational target of 23% of renewable energy within the ASEAN energy mix by 2025. Correspondingly, installed RE capacity has experienced a tremendous growth of nearly 2.5 times between 2005 to 2015, rising up to 50 gigawatt (GW) and projected to reach 93 GW in 2025 and up to 183 GW in 2040 (ASEAN Energy Outlook, 2017). Despite such growth, RE currently accounts only 12,7% of the ASEAN energy mix.

It must be acknowledged that RE development in AMS is still hindered by several challenges such as high financing cost, investment risks, missing infrastructure, limited institutional capacities, or non-supporting regulatory environments. However, while many similarities conditions, be it economic to geo-political, are shared amongst AMS, the level of problems are vastly different. Thus, there is no single solution to solve these problems regionally.

Considering the characteristic similarities of untapped RE market potential and the opportunities for sustainable development impacts through RE deployment, this report will focus mainly on three member states; Cambodia, Lao PDR, and Myanmar (CLM). The challenges in CLM mostly revolve around the formulation of the fundamental RE support framework and institutional capabilities. Series of policy, socio-economic, and technical challenges are selected as the focus points.

The objectives of this report are to;

- provide a comprehensive overview of the existing policy and financial support framework for RE in Cambodia, Lao PDR, and Myanmar;
- identify remaining challenges in financing RE projects in these AMS;
- present a set of recommendations on new or adapted policy and financial support mechanisms to enhance RE investments in these AMS
- provide a complementary overview of the existing policy and financial support framework in ASEAN.

The report is focused on Cambodia, Lao PDR and Myanmar due to their still untapped RE market potential and opportunities for sustainable development impacts through RE deployment.

1.2 Methodology

This study is elaborated based on a thorough desk review of relevant policy documents, technological RE developments, previous researches, as well as on primary information received during a two-day focus group discussion (FGD) with representatives from Cambodia, Lao PDR, and Myanmar.

The aim of the desk review was to identify, map out and summarize the current RE policy and financial support mechanisms; ultimately it aims to identify associated key challenges that hinder the RE deployment in CLM and ASEAN region. The government representatives, financial institutions and RE project developers of CLM are then able to verify the information and consequently deepen their understanding on the RE support frameworks and challenges in CLM. Furthermore, they provide a set of recommendation to address existing risks and challenges.



Koh Sla Cambodia. Credit: ACE

2. Renewable Energy Financing Support Framework and Challenges in ASEAN

To pursue the ASEAN aspiration on renewable energy (RE) of achieving 23% in the energy mix by 2025, most ASEAN Member States (AMS) have put their efforts through the enactment of national RE targets, policies and support framework and incorporation into their policy support mechanisms e.g. national RE target, Feed-in Tariff (FiT), fiscal incentives, etc., and financial support mechanisms, such as dedicated loans for RE, guarantee scheme, etc.

It is understood that existing RE targets, policies and support frameworks vary between AMS due to the different political, social and economic conditions. These, in turn, provide different RE project development challenges between each member state.

Certain ASEAN member states, which only recently opened their RE markets to private investments, are facing different challenges compared to other AMS which have already started their RE markets since 2000s. Cambodia, Lao PDRs and Myanmar are still relying on public funds and starting to create enabling environment to attract private investments on RE technologies. These member states are anticipating profound challenges as a newly opened RE market.

To describe the efforts and challenges of AMS in supporting RE development in the region, an overview of the AMS' targets, support frameworks and challenges in financing RE project is described in this Chapter.

2.1 National Renewable Energy Targets of ASEAN Member States

All ASEAN member states have put in place RE targets (or a specific target for one RE technology, such as hydropower or solar photovoltaic (PV), and have enacted a series of laws, acts and regulations to achieve those targets (Table 1). AMS in the greater Mekong region, such as Cambodia, Lao PDR, Myanmar, Thailand and Vietnam, have focused their RE targets on hydropower plants, while Singapore puts its attention on increasing its solar PV capacity. Furthermore, the ASEAN member states have also set an ambitious regional RE target of 23% in the ASEAN energy mix by 2025 (ASEAN Centre for Energy, 2015).



Tapioka Starch Plant. Credit: GIZ

Table 1: National Renewable Energy Targets in ASEAN Member States

Country	Reference documents	RE Targets of ASEAN Member States
ASEAN region	APAEC (2016-2025)	Increase the RE component to 23% by 2025 in the ASEAN energy mix
Brunei Darussalam	Energy White Paper 2014	Achieve 10% of electricity generation from renewables by 2035 (124 gigawatt-hour (GWh) of RE by 2017 and 954 GWh by 2035).
Cambodia	Power Development Plan 2008-2021	Increase capacity of hydropower to 2,241 MW by 2020
Indonesia	National Energy Policy (Government Regulation No. 79/2014)	Increase share of new and renewable energy in primary energy supply to 23% by 2025 and 31% by 2050.
Lao PDR	RE Development Strategy Policy 2016	Achieve 30% share of renewables in primary energy supply by 2025.
Malaysia	National RE Policy and Action Plan, and 11 th Malaysia Plan	RE generation targets of 20% by 2030 and 34% (11,544 MW) by 2050. Formulation of Renewable Energy Transition Roadmap (RETR) 2035.
Myanmar	National Energy Policy 2014	Setting RE targets: (i) hydro 38% (8,896 MW) and (ii) other RE sources 9% (2,000 MW) of total power generation mix by 2030.
The Philippines	National RE Programme Roadmap 2010-2030	Triple the installed capacity of renewables-based power generation from 2010 level to 15 GW by 2030.
Singapore	Sustainable Blueprint 2015	Increase solar PV capacity to 350 MW by 2020.
Thailand	Alternative Energy Development Plan 2015-2036	By 2036, increase share of renewables in final energy consumption to 30%; increase share of renewables-based power generation capacity to 20%, and increase share of renewables in transport fuel consumption to 25% (focus on hydro and solar PV)
Vietnam	Decision 428/QĐ-TTg dated 18 th March 2016	Increase share of small hydro and other renewables-based power generation capacity to 12.5% by 2025 and 21% by 2030.

2.2 Existing Renewable Energy Support Mechanisms in ASEAN

The ASEAN member states have set up various support mechanisms to accelerate RE deployment. The mechanisms presented in this Section are those commonly used among AMS. The support mechanisms are further classified into RE policy support mechanisms and RE financial support mechanisms.

2.2.1 Renewable Energy Policy Support Mechanisms

RE policy support mechanisms in this study are defined as public policy, regulatory or programmatic interventions that build the framework in which investments into RE can occur. These can include (i) regulatory interventions, such as transparent grid connection procedure, technical standards and labelling, or clear administrative licence procedures; (ii) market-based support interventions, such as FiT, net-metering, tax exemptions or RE auction models; (iii) other interventions, such as specific education or training programmes on research and development initiatives.

Government policy support mechanisms used to support RE deployment in the ASEAN region are most commonly found in form of fiscal incentives (e.g. tax credit and tax exemption), quantity-driven regulations (e.g. RE auction/bidding in which governments set a certain RE quota and allow private project developers to bid to supply RE capacity), or price-driven regulations (e.g. FiT or standardised selling price of RE generation).

RE policy support mechanisms deployed in the region also include permits and support for RE electricity connection to the grid, guidelines and standards for permits and licensing for RE power generation, priority/guaranteed access of RE connection to the grid, grid code standards for intermittent RE sources, as well as net-metering schemes⁴. Further overview of existing RE policy support mechanisms in AMS is presented in Table 2 below.

Table 2: Renewable Energy Policy Support Mechanisms in ASEAN Member States

Country	RE Targets	RE Auctions / Bidding	Fiscal Incentives ⁵	Permits and Licensing	Technical Aspect	Net-metering	Feed-in Tariffs
Brunei Darussalam	X	-	-	-	-	-	-
Cambodia	X ⁶	-	-	X	X	-	-
Indonesia	X	X	X	X	X	X	X ⁷
Lao PDR	X	-	X	X	X	-	-
Malaysia	X	X	X	X	X	X	X
Myanmar	X	-	X	-	-	-	-
The Philippines	X	-	X	X	X	X	X
Singapore	X ⁸	-	X	X	X	X	-
Thailand	X	X	X	X	X	-	X
Vietnam	X	-	X	X	X	-	X

Sources: (ASEAN Centre for Energy, 2016), (ASEAN Energy Outlook , 2017); enhanced through discussion with Focal Points and other stakeholders

⁴Net-metering is a billing mechanism that credits RE system owners (e.g. rooftop PV owners) for the electricity they add to the grid. Net-metering allows RE system owners to offset their energy use, i.e. the system owner only pays for the net consumption from the grid, which is the consumption from grid minus the electricity fed into the grid over a specific period.

⁵For example tax credits or exemption from import duty

⁶Cambodia's target is only for hydropower as shown in Table 1.

⁷The Government of Indonesia (GoI) revised the FiT mechanisms where the tariff determination is now based on regional baseline generation cost (BPP = Biaya Pokok Pembangkitan) in 2017.

⁸Singapore's target is only for Solar PV as shown in Table 1.

Table 2 shows that all AMS have set national RE targets (or definite target for specific RE technology), even though the availability of RE support frameworks varies considerably in each member state. In the case of Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam, these member states have more developed RE policy support mechanisms with instruments, such as FiTs and net metering. Furthermore, these AMS also offer fiscal incentives.

Indonesia, for example, offers incentives which include income tax exemption and reduction for 5 or 6 years, tax deduction for 6 years, and exemptions on value-added tax (VAT) and import duty fees. The Philippines offers a 7-year income tax holiday, zero-percent VAT rate and 10-year duty free RE equipment and materials, as well as accelerated depreciation. Its financial institutions, such as the Development Bank of the Philippines, Land Bank of the Philippines, or the Phil-Exim Bank, also provide financial support by providing preferential financial packages, for example dedicated credit lines (International Financial Law Review, 2009) for RE development, utilisation, and commercialisation.

Singapore also provides tax and non-tax incentives for investors. The Singapore Productivity and Innovation Credit offers tax deduction and/or cash incentives to encourage research and development (R&D) in green technology. 400% of tax deduction on the first SGD 400,000 is offered to eligible R&D projects for each assessment year and additional 150% of tax deduction on expenditure beyond the first SGD 400,000 (Rikvin, 2014)⁹.

The Government of Vietnam offers incentives in form of a preferential tax rate of 10% (the normal tax rate is 20%), tax exemption for the first four years and tax reduction for the subsequent years as well as exemptions on import duty fees. Exemptions and reductions in land rent are also offered to investors for RE plants, power lines and transformer stations (ASEAN Centre for Energy, 2016).

For Brunei Darussalam, policy support mechanisms for RE development are not existent as the country's development plan focuses on oil and gas industry. However, the Government of Brunei Darussalam has started to develop support frameworks to stimulate private investments in RE projects, especially in solar PV (ASEAN Centre for Energy, 2016). Along with Brunei Darussalam, the member states with newly opened RE markets, such as CLM, have yet to develop their RE policy support mechanisms. In these member states, net-metering and FiTs are not established, and they rely largely on government incentives to bolster RE development. In Myanmar, the Government offers incentives, such as tax holiday and import duty exemptions, to attract foreign investors, although these are not dedicated to RE projects.

2.2.2 Renewable Energy Financial Support Mechanisms

There are several types of financial support mechanisms which aim to assist RE projects in becoming bankable, i.e. mechanisms that seek to provide access to finance (e.g.: dedicated RE fund, bank credit line and result-based finance), transfer of financial risks to third parties (e.g.: insurance and guarantees) or reduce direct financing costs (e.g. soft loans and grants).

Since RE is still a developing market in most of the ASEAN member states, i.e. compared to more advance markets, such as China, Europe, or the US, there are significant difficulties in accessing finance and risks associated with RE project development. The AMS governments have been using more traditional financial support mechanisms to break challenges in financing and reduce project risks. The widely used financial mechanisms in the ASEAN region include grants, loans, equity and risk-sharing mechanism (i.e. loan guarantee). Table 3 provides an overview of existing RE financial support mechanisms in the ASEAN region

⁹This potential tax deduction will be applied to the total income of the institution.

Table 3: Renewable Energy Financial Support Mechanisms in ASEAN Member States

Country	Dedicated RE Grants	Dedicated RE Loans	Dedicated RE Equity	Dedicated RE Guarantee
Brunei Darussalam	-	-	-	-
Cambodia	X	X	-	-
Indonesia	-	X	-	X
Lao PDR	X	X	-	-
Malaysia	-	-	-	X
Myanmar	X	-	-	-
The Philippines	-	X	-	-
Singapore	-	X	-	-
Thailand	-	X	X	X
Vietnam	-	-	-	-

Source: (ASEAN Centre for Energy, 2016), enhanced through discussion with Focal Points and other stakeholders

Note: The Government of Vietnam plans to establish the Energy Development Fund that will provide investment credits with a favourable rate to investors in RE projects. The Government also plans to establish Sustainable Energy Promotion Fund (SEPF) which will provide grants to RE projects in total and isolated areas. However, as of August 2018, these funds are not established yet.

Table 3 above distinctly shows that there are limited financial support mechanisms for RE projects in the ASEAN region, with most AMS using only half or less of the available RE financing instruments. Only a small number of AMS have developed RE-dedicated financial mechanisms, such as dedicated loans, grants, or guarantees. Certain AMS, such as Indonesia, Malaysia, Singapore and Thailand, have created dedicated schemes for financing RE projects.

Indonesia has several dedicated funds for RE projects. The Government has set up the Geothermal Fund Facility to provide support in risks mitigations associated with geothermal explorations. This fund will enhance the availability of high-quality geological data on proven resources which will attract investors due to reduced project risks. The Indonesian government, through the Ministry of Finance, provides guarantee to RE Independent Power Producers (IPPs) in case of payment default from PT Perusahaan Listrik Negara (PT PLN), the Indonesian state utility company. The Government has also established the Indonesia Infrastructure Guarantee Fund (IIGF) to encourage private investments in RE projects. The fund provides political risk guarantees to investors and offers joint-cooperation with international multilateral agencies to provide additional funding assistance. Furthermore, the French Development Agency (AFD) through the government-owned PT SMI provides soft loans, grants and loan guarantees for RE projects (PT SMI, 2018).

Malaysia launched the Green Technology Financing Scheme (GTFS) in 2010, providing attractive financing instruments to promote green investments and stimulate green technology industries in Malaysia. It operates through a loan guarantee scheme that offers an annual rebate of 2% on interest or profit rates charged by financial institutions, as well as a guarantee of 60% on financing provided by financial institutions. The GTFS ended in 2017¹⁰ (Malaysian Green Technology Corporation, 2018).

Singapore has set up the Solar Capability Scheme, an SGD 20-million scheme dedicated to encourage companies to install solar systems in new private, commercial, and industrial buildings. The minimum system rating is set at 150 kilowatt-peak. Each company is eligible for assistance of up to 40% of the total project cost, capped at SGD 1 million.

Thailand established the Energy Conservation Fund as a financial support to introduce and promote RE. The Department of Alternative Energy Development and Efficiency established the Energy Service Company (ESCO) Revolving Fund which not only promotes investments into energy efficiency, but also encourages investment in RE projects through its two main financing instruments, i.e. equity investments and long-term equipment leasing.

CLM, on the other hand, do not have any comprehensive RE financial support mechanisms in place yet. A few traditional financial mechanisms are available in the form of soft loans and grants, targeting small-scale rural electrification, in particular through low capacity solar home systems (SHS). These mechanisms are mostly provided by international donors, and bilateral and multilateral partnerships. However, they have very limited scope and funding and cannot support a wide RE transition in the country. Overall, there are currently no supporting domestic financial markets in place where RE investors can easily access debt and equity finance. Combined with the under-developed policy support systems, a certain focus is needed in order to move RE development further in Cambodia, Lao PDR, and Myanmar.

2.3 Challenges in Financing Renewable Energy Projects in ASEAN

Combined with the different state of government supports, distortion in the power market has been one of the most prominent challenges in financing RE projects. Abundant fossil fuel resources and government subsidies have hindered RE development. Furthermore, utilities in these AMS are state-owned with monopoly positions in power distribution and transmission, which effectively restricts RE development and support due to government's preferential treatment of fossil fuels and large centralised power plants.

Inadequate power infrastructures i.e. limited power network transmission and distribution in AMS, such as in Cambodia, Myanmar, and the archipelagic AMS (Indonesia and the Philippines) also hamper the RE development in the region. Some of these AMS have not established RE grid codes to ensure secure and safe grid integration of these intermittent electricity sources. In addition, existing grid networks in some of these AMS are outdated and insufficiently maintained, further posing technical challenges for RE projects.

Although some AMS have established a functioning financial support framework for RE projects, such as Malaysia and Singapore, the difficulty in accessing debt and equity finance is still a dominant challenge for the rest of the ASEAN region as programmes need to be adjusted to suit the situation in each individual AMS. This situation creates a condition where higher awareness by project developers are needed in facing limited capacity by the governments in developing, implementing, and monitoring such support programmes. Furthermore, underdeveloped financial markets in the region and limited capacity in financial institutions in administering RE projects further exacerbate the challenge in accessing finance.

¹⁰Following the success of GTFS, the Government launched GTFS 2.0 in May 2018 and earmarked RM 5 billion throughout its 5-year implementation period. However, the implementation of the GTFS 2.0 has been cancelled after the change in the Government and it is unclear when it will start or whether the funds will remain at the original earmarked amount.

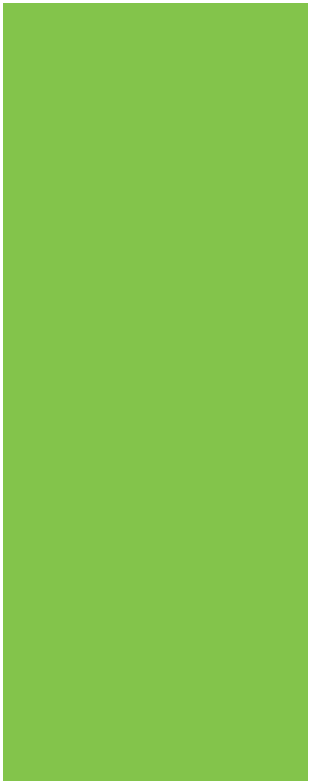
Table 4 provides an overview of investment-related challenges faced by RE projects in ASEAN. These challenges are also valid for other regions due to the nature of RE projects itself. Based on the elaboration above, the main RE development challenges in ASEAN are mostly related to the power market, grid transmission, and limited financing options. However, the challenges vary from country to country and depend on the specific domestic environment.

Table 4: Challenges in Financing Renewable Energy Projects in the ASEAN Region

Type of Challenges	Definition
Power Market	Challenges arising from limitations and uncertainties in the energy market, and/or sub-optimal regulations to address these limitations and promote energy markets.
Permits	Challenges arising from the public sector's inability to efficiently and transparently administer renewable energy-related licensing and permits, including land acquisition.
Grid Transmission	Challenges arising from limitations in grid management and transmission infrastructure.
Hardware	Challenges arising from limitations in the quality and availability of RE hardware; issues arising from inefficiencies in the customs process.
Off-taker	Challenges arising from the off-taker's poor credit quality and RE power producers' reliance on payments.
Labour	Challenges arising from unskilled and unqualified potential employees.
Financing	Challenges arising from general scarcity of investor capital (debt and equity) in the particular country, and investors' limited information and track record in renewable energy.
Project Developer	Challenges arising from limitations in RE power producers' management capability and ability to execute on financing and business plan.
Currency	Challenges arising from currency mismatch between hard currency debt/equity and domestic currency revenues.
Sovereign	Challenges arising from a mix of cross-cutting political, economic, institutional, and social characteristics in the particular country which are not specific to RE.

Source: (Waissbein et. al, 2013)

Following the above overview on target, support framework and challenges in ASEAN, further elaborations on existing policy and financial mechanisms, that includes overall RE support framework and challenges in financing RE project specifically for Cambodia, Lao PDR and Myanmar, are elaborated in the following chapter.



■ 3. Renewable Energy Financing Support Framework and Challenges in Cambodia, Lao PDR and Myanmar

As a new market for renewable energy (RE), Cambodia, Lao PDR and Myanmar are starting to provide opportunities for private investments to enter the market by creating an enabling environment for RE project development. Financing RE project in the newly opened RE market entails challenges that should be managed appropriately to ensure the RE investment is taking place in the country. In this regard, CLM are implementing the new incentives and models for RE deployment.

This chapter provides an overview of the existing RE support framework and challenges in RE financing in these three AMS.

3.1 Cambodia

3.1.1 Renewable Energy Support Framework

Cambodia's power sector is characterized by rising electricity demand, the dominance of coal- and hydro-based power generation, and energy imports from neighbouring AMS, particularly during dry season. Cambodia's power market is liberalized, with independent power producers (IPPs) significantly embedded in the country's power generation landscape. Cambodia has approximately 2,300 MW in installed generation capacity, with 81% of total power generation originating from hydro and coal (Ministry of Mines and Energy 2018). Solar photovoltaic (PV) and biomass contribute only marginally to the country's power generation.

Currently, the national consumer grid tariff ranges from USD 12 – 19 cents per kilowatt-hour (kWh), depending on the type of consumers (industry, commercial or residential) and voltage (low, medium, high) (Ministry of Mines and Energy, 2014). Electricity subsidies are provided for rural, low-income households, but there is no further RE subsidisation in place. Overall, the annual energy demand is projected to increase rapidly by 10-20% up to 2020 and beyond (Ministry of Mines and Energy, 2016). This growth of demand is mostly towards the electrification of rural areas throughout the country.

Cambodia has made rapid progress in increasing access to electricity for villages, households and other consumers. 97.6% of Cambodian households have access to at least one source of electricity, with 71.5% to grid electricity, and 26.1% to off-grid electricity (World Bank, 2018). Going forward, the Government aims to provide basic electricity access to all villages by 2020, and grid-quality electricity access to 90% of all households by 2030 (MME, 2018).

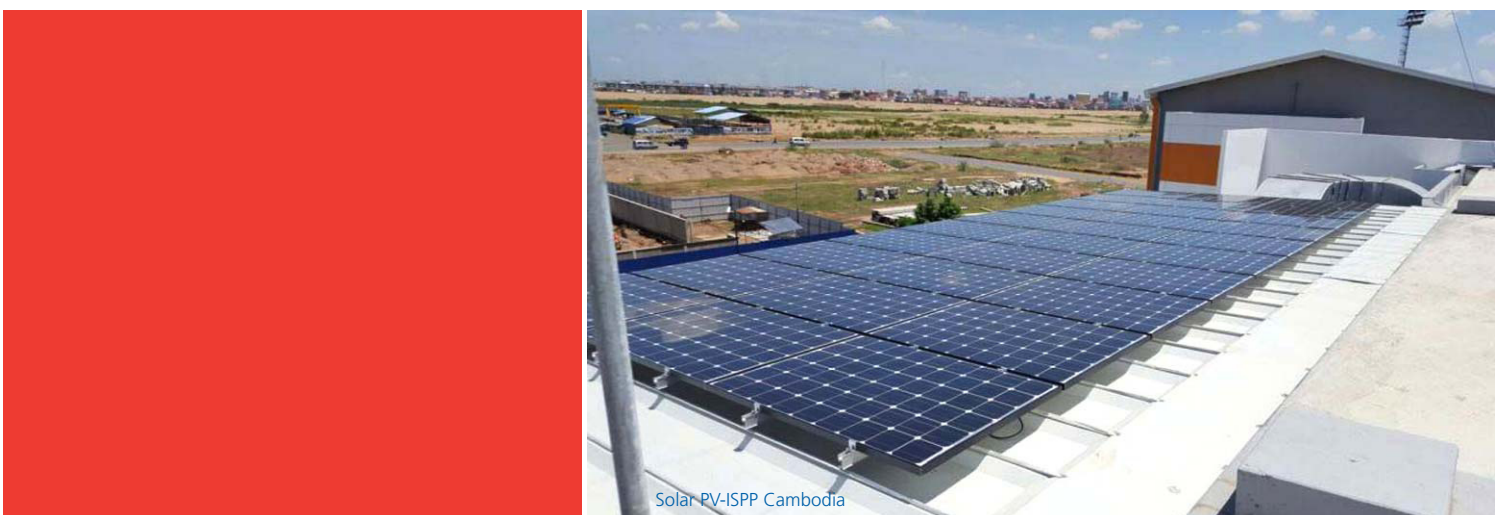
Besides the aim to increase the hydropower capacity to 2,241 MW by 2020, there are currently no official targets for overall RE development in Cambodia. With abundant solar resources of 5 kWh/m²/day (World Bank and Solargis (2017), Cambodia is actually well-positioned for investments in RE projects. RE, especially solar PV, provides the opportunity to meet Cambodia's rapidly growing electricity demand, advance Cambodia's electrification via innovative off-grid technologies and business models, and can also support Cambodia's contributions to climate change under the United Nations Framework Convention on Climate Change (UNFCCC).

Cambodia has developed several policies as a foundation for their RE development. The National Green Growth Roadmap (2009), for example, provides intervention strategies for sustainable economic development in Cambodia and access to RE. Some of the key intervention strategies include establishing a Ministerial Green Growth Council, developing incentive schemes (e.g. green taxes), micro-financing for rural communities, capacity building on green growth for workers, integrating green growth concept in its education system, and public awareness-raising on green growth.

In addition, the National Policy on Green Growth (2013) and National Strategic Plan on Green Growth 2013-2030 aim to ensure a sustainable economic development in Cambodia. The Strategic Plan further outlines action plans including promoting RE and attracting green investors.

Despite the numerous regulatory frameworks, the Government of Cambodia has not yet introduced instruments commonly used to accelerate RE deployment, such as FiT and net metering. Instead, RE projects are treated similarly to other infrastructure projects. For example, RE investments in Cambodia¹¹ are entitled to 100% exemption of export tax, 100% exemption of import duties on construction materials, equipment, raw materials and spare parts (if the company is government-owned); reduced corporate tax and corporate tax exemption of up to 8 years depending on the project's characteristics, as well as permit for land use of up to 70 years, which can be renewed on request (Law of Investment, 1994).

In contrast to the insufficient support for on-grid RE projects, assistance from international donors are available for rural RE electrification projects, such as the Rural Electrification Fund (REF). The REF is managed by the World Bank (2004-2012), GEF, KfW and the Cambodian Government. It provides grants and loans for technical assistance, project finance and operations for mini/micro hydro, biomass and solar PV. In addition, the Green Microfinance Programme, which is managed by AFD, the European Union (EU) and SNV, assists villagers to take out loans to purchase solar energy systems and helps build the capacity of local technicians, to install solar panels, and small business entrepreneurs to retail them¹². The programme receives concessional loans from AFD and EU to offer along with the Cambodian Micro-finance Institutions, the first low-interest consumer loans for investment in Solar Home Systems in Cambodia.



¹¹These incentives are not exclusive to RE investments i.e. they are also applicable to other investments

¹²See <http://www.goodsolarinitiative.org/about.html> for more details

Table 5 outlines the key policy documents and measures, as well as existing financial mechanisms in RE development in Cambodia.

Table 5: Key Support Framework for Renewable Energy Development in Cambodia

Key Policy Documents	
<ul style="list-style-type: none"> • Cambodia Green Growth Roadmap 2010 (2009) • Electricity Law 2001 (amended in 2007 and 2015) • Law on the Investment of the Kingdom of Cambodia (1994) • National Climate Change Strategic Plan 2014-2023 (2013) • National Policy and Strategic Plan for Green Growth 2013-2030 (2013) • National Policy on Green Growth (2013) • National Policy on Rural Electrification by Renewable Energy (2007) • National Strategic Development Plan Update 2009-2013 (2009) • National Strategic Development Plan 2014-2018 (2014) • National Strategic Plan for Green Growth (2013) • Power Development Plan 2008-2020 (2007) • Rural Electrification Master Plan (2006) 	
Key Policy Measures ¹³	
RE targets	<ul style="list-style-type: none"> • No overall RE target; there is a Plan to increase the capacity of hydropower to 2,241 MW by 2020¹⁴
National energy policy targets	<ul style="list-style-type: none"> • All villages in the country should have access to electricity by 2020 • At least 90% of total households in the country should have access to quality grid electricity by 2030 • Provide reliable and safe electricity with low impacts to the environment for rural communities • Provide adequate resources, mechanisms and training for rural communities to participate in rural electrification • Formulate electricity tariff by promoting differentiated tariffs based on cost-recovery principles • Promote energy security through RE • Promote green investment and green jobs creation
Renewable energy policy targets	<ul style="list-style-type: none"> • Promote RE electricity generation of the least cost for rural communities through R&D and pilot projects • Enable and encourage private sector participation in rural electrification through renewables • Encourage efficient transmission and distribution systems from RE sources • Promote appropriate technology transfer for RE • Develop decentralised energy systems with application of RE technologies and focusing on solar energy
Existing RE Financial Mechanisms	
<ul style="list-style-type: none"> • Rural Electrification Fund¹⁵ • Green Microfinance Programme¹⁶ • Electricity Distribution Fund¹⁷ 	
Existing Financial Incentives for RE	
<ul style="list-style-type: none"> • Multilateral and bilateral concessional finance (e.g. ADB concessional debt finance for Bavet solar farm; AFD and EU soft loans for the Green Microfinance Programme) • 100% exemption of import duties on RE construction materials, equipment, raw materials and spare parts¹⁸ • RE investments in Cambodia are entitled to 100% exemption of export tax¹⁹ • Corporate tax reduction or exemption of up to 8 years depending on the project's characteristics²⁰ • Permit for land use up to 70 years, which can be renewed on request²¹ 	

¹³Key policy measures are salient points from key policy documents enacted by the Cambodian Government.

¹⁴According to Cambodia's Power Development Plan 2008-2021

¹⁵Managed by the World Bank (2004-2012), GEF, KfW and the Cambodian Government

¹⁶Managed by AFD, EU and SNV

¹⁷Funded and managed by Investing in Infrastructure (3I), a team from the Palladium Group on behalf of the Australian Department of Foreign Affairs and Trade

¹⁸For government-owned institutions only

¹⁹Not exclusive to RE investments

²⁰Not exclusive to RE investments

²¹Not exclusive to RE investments

3.1.2 Challenges in Financing Renewable Energy Project

Cambodia faces several challenges in promoting and financing RE investments in the country. One of the main challenges is the insufficient regulatory framework to accelerate RE deployment, in particular the one related to the uncertainties of the market outlook as the Government has not yet set official targets for RE in the country. The absence of standardised power purchase agreements (PPAs) and information on geographical grid extension plans also create uncertainties regarding market access and prices. Furthermore, the Government of Cambodia has entered into long term PPAs with coal and large hydro power plants, thus restricting and preventing large-scale opportunities for non-hydro RE in Cambodia²². Investment periods for coal and large hydro are very long (up to 30 years) and PPAs between the investors and government are usually aligned to these long periods. With a limited grid absorption capacity, the chance is reduced for other RE projects to be approved by the Government.

High upfront costs for RE project investments, and difficulty in accessing finance often deter prospective investors. This is further intensified by the limited financial incentives provided by the Government. The Government has not introduced common instruments to accelerate RE deployment, such as FiT, standardized auction models or net metering. Although there is a recent regulation on rooftop PV grid integration which provides more clarity and legal ground for such rooftop PV investments, there remains significant pressure on project profitability because a capacity charge for rooftop PV was also introduced along the new regulation. This causes smaller projects to be economically unviable. Based on the interactions with several project developers in the country, there are currently only a few of high-quality RE project developers with proven track record in Cambodia. The growth of the project developer market is further restricted by insufficient support of RE industry associations and the absence of a centralised and reliable information platform on existing project developers²³.

Apart from these financial challenges, RE deployment in Cambodia is also facing technical challenges, which could also affect a higher financing cost for related RE project in the country. The Government of Cambodia has not yet established grid code standards for RE, which would allow a safe and reliable grid integration.

This is particularly important for RE due to its intermittency nature. Furthermore, detailed grid network expansion plans are not publicly available, and a perceived uncertainty in the grid absorption capacity of Cambodia's power grid further hinders RE financing in the country.

²²Investment periods for coal and large hydro are very long (up to 30 years) and PPAs between investors and the government are usually aligned to these long periods. With a limited grid capacity, the chance is reduced for other RE projects to be approved by the Government.

²³The absence of support for such associations and platforms means that private RE developers have no strong voice in the country and only very limited influence on political decision-making.

Further details on the identified challenges in RE financing in Cambodia and highlighted key challenges are provided in Table 6.

Table 6: Challenges in Renewable Energy Financing in Cambodia

Types of Challenges	Underlying Conditions ²⁴
Power market	<ul style="list-style-type: none"> • Uncertainty in the outlook and no official targets for RE (other than hydro) • Long-term contracts with dominating coal and hydro industry hinder additional RE development • No standardised PPA • No designated national and state off-grid electricity service areas and information on geographical national grid extension plans • No auction model for utility-scale tendering • No FiT/net-metering for rooftop PV
Permits	<ul style="list-style-type: none"> • Early-stage, cumbersome permitting system (time and cost for securing permits) • Potential land permitting issue in future
Grid transmission	<ul style="list-style-type: none"> • Uncertainty on Cambodia's grid absorption capacity for RE integration • Uncertainty on official transmission line planning and development • No grid-code standards for RE
Hardware	<ul style="list-style-type: none"> • Frequent problems during custom clearing • Double import taxation (general VAT and specific import duties on hardware) • Insufficient access to information on quality, reliability and cost of RE hardware
Off-taker	<ul style="list-style-type: none"> • Only one potential off-taker for large-scale power generation • Difficulty to judge credit-worthiness of commercial and industrial electricity end-users. • Limited ability of end-users to pay for electricity services
Labour	<ul style="list-style-type: none"> • Unskilled domestic labours, and engineering, procurement and construction (EPC) contractors, • Inefficiencies in public and private training programmes
Project developer	<ul style="list-style-type: none"> • Only few high-quality RE project developers with proven track record. • No centralised, reliable information platform on existing project developers. • Insufficient support and communication with RE industry association.
Financing	<ul style="list-style-type: none"> • High-financing costs for RE (15%+ for equity, 12%+ for debt) • Insufficient experience and awareness from local financial institutions on RE opportunities • Inadequate capacity to properly evaluate risk • Difficulty in accessing local debt finance, i.e. no domestic debt financing market for RE exists • No financial or fiscal incentives for RE development
Sovereign	<ul style="list-style-type: none"> • Difficulty of investors to judge the sovereign situation reliably

Note: Underlying conditions in **bold** are considered key challenges.

²⁴These are short-described conditions for each type of challenge based on in-depth analysis and discussions with related stakeholders. Details of each underlying conditions need to be further elaborated.

3.2 Lao People's Democratic Republic

3.2.1 Renewable Energy Support Framework

Between 2002 and 2017, Lao PDR has experienced robust economic growth averaging 6.8–8.0% annually (ADB, 2017). The energy sector is one of the most important driving forces of social development and economic growth. Mining and hydropower investments have increased significantly in recent years, making important contributions to economic growth. As a result, traditional energy sources (mostly fuelwood and charcoal) are giving way to electricity and petroleum. However, the country still relies heavily on traditional biomass and fossil fuels: in 2014, 59% of the energy consumption was from biomass, 32% petroleum, 6% electricity (mostly hydropower), and 3% from coal and natural gas (Phouthonesy, 2015).

Even though the country large RE development potential, yet the share of other RE technologies in the country's energy mix is almost negligible, apart from large-scale hydropower. The country is facing an increasing need to diversify its energy mix by scaling up non-hydro renewable resources and is putting a strong focus on the promotion of large-scale hydropower, which has led to uneven market conditions for other technologies.

Under these circumstances, the Government adopted the Renewable Energy Development Strategy in 2011, which encourages domestic and foreign investments in other RE technologies besides large-scale hydropower, particularly at the local (village) level to enable better electricity supply, create socio-economic benefits and sustain an environmentally and socially sustainable development. The strategy sets a target of 30% renewable share in the total energy consumption by 2025, (excluding large hydro >15 MW capacity) and 10% biofuels target of total fuel consumption for the transport sector. The RE Development Strategy is aligned with the National Programme on Rural Electrification and the 8th National Socio-Economic Development Plan (2016-2020), which aim at expansion of electricity coverage to at least 90% of the total number of households in the country by 2020.

The Rural Electrification Programme through its several initiatives, such as the Solar Home Systems (2004-2009) and Power to the Poor (2008-2012) provided electricity to more than 39,000 formerly unconnected households. Furthermore, under the Programme, the Rural Electrification Development Fund (REF) was established to support rural electrification by making equipment affordable and provide financial support for parts of the projects' capital expenditure. While the REF was designed for rural electrification in general, currently the fund is mainly limited to supporting solar home-based solutions.

Another financing scheme available for RE projects in Lao PDR is the Environmental Protection Fund (EPF). Originally established in 2005 by the Asian Development Bank (ADB), the EPF manages the endowment fund from ADB and serves as a vehicle for managing sinking funds from other donors (e.g. the World Bank and UNESCO), and has a successful track record in financing small-scale projects aimed at strengthening environmental management, waste management, and pollution control. The EPF also manages private sector voluntary contributions from hydropower development.

In addition to the financing schemes, the Government of Lao PDR also offers several incentives for investments in RE projects. Investments in RE projects are entitled to i) duty free import for production machinery, equipment, and raw materials, ii) duty free import for chemical materials necessary for biofuels production within seven years, iii) profit tax exemptions (depending on the investment promotion zones), and iv) profit tax exemption in the following accounting year, if the net profits are used for business expansion. Additional incentives for large and small hydropower projects are also provided, including free access to land (including potential flooding zones), waiver on land conversion fees (USD 15,000 per hectare) and waivers or reduced rates on import duty for materials, equipment and supplies (Law on Investment Promotion, 2016).

Table 7 outlines the key policy documents and measures, as well as existing financial mechanisms in RE development in Lao PDR.

Table 7: Key Support Framework for Renewable Energy Development in Lao PDR

Key Policy Documents	
<ul style="list-style-type: none"> • Climate Change Action Plan (2013-2020) • Customs Law (2005) • Decree on Biofuels No. 410/GO (2016) • Electricity Law (1997, amended 2012) • Law on Investment Promotion (2009) • Nationally Determined Contribution to the UNFCCC's Paris Agreement (2015) • National Policy on Sustainable Hydropower Development in Lao PDR (2015) • National Strategy on Climate Change (2010) • Renewable Energy Development Strategy (2011) • Rural Electrification Programme (2004-2015) and Prime Minister's Decree on the Local and Rural Electrification Development Fund (2005) • Socio-economic Development Strategy until 2025 and Vision until 2030, and 8th National Socio-economic Development Plan (2016-2020) • Value Added Tax Law (2006) 	
Key Policy Measures ²⁵	
RE targets	<ul style="list-style-type: none"> • Achieve 30% share of renewables (excluding hydropower >15 MW) in primary energy supply by 2025. • Achieve 10% biofuels consumption for the transport sector
National energy policy targets	<ul style="list-style-type: none"> • Expand electricity coverage to provide access to electricity for 90% of families in rural areas by 2020 • Ensure power stability for domestic use and competitiveness in the region • Expand electricity sector by an average of 32% per year • Develop projects to export energy to foreign countries through construction of new projects • Limit electricity imports of no more than 20% of the country's usage by 2020 • Encourage increased use of RE and alternative energy sources (solar power, wind power, bioenergy, biogas) • Facilitate improvement of people's participation mechanism in management and reduce government's subsidy while moving towards privatisation
Renewable energy policy targets	<ul style="list-style-type: none"> • Develop cultivation areas for RE crops • Encourage and support investments in RE and alternative energy sources • Promote the use of new environmentally-friendly technologies and support development and greater use of clean energy • Determine electricity prices • Provide awareness and technical assistance for rural electrification • Harmonise the support for RE in Lao PDR through funds
Existing RE Financial Mechanisms	
<ul style="list-style-type: none"> • Energy Access Solar Home Systems Fund • Environmental Protection Fund²⁶ • Laos Energy Promotion Fund • Rural Electrification Development Fund²⁷ 	
Existing Financial Incentives for RE	
<ul style="list-style-type: none"> • Import tax exemption on RE production machinery, equipment, and raw materials • Import tax exemption for chemical materials necessary for biofuels production • Profit tax exemptions on RE investments • Free access to land • Waiver on land conversion fees 	

²⁵Key policy measures are salient points from key policy documents enacted by the Government of Lao PDR.

²⁶Managed by the Ministry of Natural Resources and Environment

²⁷The Rural Electrification Development Fund, Laos Energy Promotion Fund and the Energy Access Solar Home

3.2.2 Challenges in Financing Renewable Energy Project

Similar to Cambodia, the Lao PDR is confronted with various challenges in scaling up RE investments in the country. Current electricity tariffs in the country are very low as they are subsidized by the government and therefore do not reflect actual generation costs. This makes it very difficult for RE investments in Lao PDR to be cost-competitive and financially viable. The absence of an independent regulatory authority for tariff formulation and regulation increases the transaction costs for small producers of electricity, further increasing the costs for such projects²⁸.

High upfront costs for RE projects combined with unavailable access to equity and debt funding from the domestic market also prevent investments into RE in Lao PDR. This challenge is compounded by the scarcity of incentives and financial support framework from the Government, which is currently relying on international donors to promote green investments.

Complex bureaucracy has also been cited as one of the main challenges in RE deployment in Lao PDR. RE projects may only be developed upon approval of the Government. For projects of less than 15 MW (but more than 100 KW), approval must be obtained at the provincial level. Projects up to 100 MW are approved at the central level, while projects larger than 100 MW require approval by the National Assembly (Hubbard, 2017). Furthermore, limited existing transmission infrastructure and difficulty in accessing remote locations poses challenges for RE investments.



Nam Ngum hydroelectric power station in Lao

²⁸Retail tariffs have to be approved by the Ministry of Energy and Mines based on a proposal submitted by the state-owned electric utility Electricité du Laos (EDL). Tariffs to sell electricity from independent RE generating stations to EDL are determined through negotiations on a case-by-case basis, which generally increases the transaction costs for power producers (OECD, 2017).

A compiled summary of challenges and their underlying conditions in financing RE projects in Lao PDR is described in Table 8.

Table 8: Challenges in Renewable Energy Financing in Lao PDR

Types of Challenges	Underlying Conditions ²⁹
Power market	<ul style="list-style-type: none"> • Current framework favours hydropower technology • Limited RE policy, implementation plans and support mechanisms to promote RE development • Very low subsidised retail electricity prices • High transaction costs for small electricity producers • Setback in off-grid programmes caused by demand and pricing issues
Permits	<ul style="list-style-type: none"> • RE projects may only be developed upon approval from the government • Cumbersome permitting procedures • No coordination between government stakeholders
Grid transmission	<ul style="list-style-type: none"> • Limited existing transmission network
Hardware	<ul style="list-style-type: none"> • Frequent problems during custom clearing • Insufficient access to information on quality, reliability and cost of RE hardware
Off-taker	<ul style="list-style-type: none"> • Difficulty to judge credit-worthiness of commercial and industrial electricity end-users • Only one potential off-taker for large scale power generation • Limited availability of end-users to pay for electricity services
Labour	<ul style="list-style-type: none"> • Unskilled domestic labour and EPC contractors, and current inefficiencies in public and private training programmes
Project developer	<ul style="list-style-type: none"> • Only few high-quality RE project developers with proven track record. • Unavailability of centralised and reliable information platform on existing project developers. • Insufficient support and communication with RE industry association.
Financing	<ul style="list-style-type: none"> • High capital risks for the projects' promoters • High financing costs for RE projects • Almost no financial or financial incentives offered by the government • Government dependency on donor's contributions to finance green investments
Currency	<ul style="list-style-type: none"> • Usage of local currency for local PPAs deter foreign investors
Sovereign	<ul style="list-style-type: none"> • Difficulty for investors to reliably judge the sovereign situation

Note: Underlying conditions in **bold** are considered key challenges.

²⁹These are short-described conditions for each type of challenge based on in-depth analysis and discussions with related stakeholders. Detailed of each underlying condition need to be further elaborated.

3.3 Myanmar

3.3.1 Renewable Energy Support Framework

Myanmar has undergone major transformations in its economy and political landscape since the regime change in 2011. This has led to a strong economic growth and an increase in energy demand in the country. Consequently, the Government of Myanmar is now considering other sources of RE to address issues in energy supply and security. The Government has opened up and reengaged with international development agencies. ADB, for example, has set up its first country strategy with Myanmar, assisting the Government of Myanmar in promoting sustainable and inclusive economic development (ADB, 2018). ADB, along with other international development agencies provided technical assistance for the Government to develop several regulatory frameworks to help accelerate the development of RE in the country.

In the National Energy Master Plan and National Energy Policy, the Government has set specific targets for RE, which heavily focuses on hydropower plant development (totalling 38% of total expected installed capacity). Due to a limited transmission line network, other RE technologies, such as solar and wind energy, will be utilised in suitable areas for decentralised systems for rural electrification projects. The Government also encourages RE awareness and training programmes, as well as research and development projects by establishing cooperation with universities and engaging technology transfer with more advanced AMS.

One of the Government's more significant objectives and work programmes is to encourage investment in RE. The Government has not yet adopted FiT and net metering schemes, which are commonly used to bolster RE investment in other AMS. In the Renewable Energy Policy draft, the Government plans to introduce universal FiT rates for all technologies and capacities at 150 K/kWh and establish a more advanced tariff structures in due time.

RE investors, however, have access to existing financial incentives³⁰, such as (i) income tax exemption based on project locations i.e. seven years for projects in least developed regions (zone 1), five years for moderately developed regions (zone 2), and three years for adequately developed regions (zone 3); (ii) exemptions or reduction of import taxes on machinery, equipment, instrument, spare parts and raw materials; (iii) accelerated depreciation (1.5 times higher than the normal depreciation rate) and (iv) deduction in R&D expenses.

Due to unavailability of government-supported financing sources in the country, many international donors, such as ADB, the Japan Fund for Poverty Reduction and the World Bank, have provided financial support in form of soft loans and grants, mostly targeted to upgrade the national power grid. Several international non-governmental organisations and charity bodies (e.g. PACT and the Rockefeller Foundation) have also provided financing assistance and established several financing schemes, particularly focusing on solar home projects in rural areas (e.g. Village Development Fund and Smart Power Myanmar).

³⁰These incentives are not dedicated to RE projects i.e. they are also applicable to investments in other sectors.

Table 9 outlines the key policy documents and the policy measures, as well as existing financing schemes and incentives for RE development in Myanmar.

Table 9: Key Support Framework for Renewable Energy Development in Myanmar

Key Policy Documents	
<ul style="list-style-type: none"> • Myanmar Investment Law (2016) • Myanmar Investment Rule (2017) • Myanmar National Electrification Project (2014) • National Climate Change Policy – DRAFT (2017) • National Climate Change Strategy and Action Plans 2016-2030 – DRAFT (2017) • National Energy Policy – DRAFT (2014) • Renewable Energy Policy – DRAFT (2014) 	
Key Policy Measures ³¹	
RE targets	<ul style="list-style-type: none"> • 15-20% share of RE in total installed capacity by 2020 • 38% of total energy mix originating from hydropower by 2030 (9.4 GW) • 9% of total energy mix originating from other renewable sources by 2030
National energy policy targets	<ul style="list-style-type: none"> • 100% electrification ratio by 2030 • Secure stable and reliable energy supply in a long term • Create effective investment climate • Employ innovative technologies • Discover ways to get stable and strong power system • Generate energy at the lowest cost • Encourage technological transfers to the country
Renewable energy policy targets	<ul style="list-style-type: none"> • Minimise environmental impacts in utilisation of natural resources • Encourage local and foreign investments • Define energy pricing by observing energy pricing policy regionally in the ASEAN and internationally • Ensure the energy pricing is stable and fair for consumers while guaranteeing economic benefits to energy producers and distributors. • Increase electricity generation capacity • Meet energy demand in remote areas through off-grid generations
Existing RE Financial Mechanisms	
<ul style="list-style-type: none"> • Japan Fund for Poverty Reduction Programme³² • Smart Power Myanmar • Village Development Fund³³ 	
Existing Financial Incentives for RE	
<ul style="list-style-type: none"> • Income tax exemptions for investments in RE projects • Import tax exemption on RE production machinery, equipment and raw materials • Accelerated depreciation • Deduction in R&D expenses 	

3.3.2 Challenges in Financing Renewable Energy Project

Government subsidies on electricity tariffs reach around USD 300 million per year, exacerbating the imbalance in the country's power market. In addition, there is uncertainty in the RE market outlook and prices as current regulatory frameworks for RE deployment are insufficient and do not have clear strategies to achieve RE targets. This holds back potential investors despite abundant resources and business opportunities. Another major challenge related to the power market is the limited number of off-takers, as the national utility is the main or even sole off-taker with power prices negotiated on a case-by-case basis (Tin, 2017).

³¹Key policy measures are salient points from key policy documents enacted by the Government of Myanmar.

³²Managed by JICA

³³The Village Development Fund and the Smart Power Myanmar scheme are managed by PACT Myanmar



Hydropower, Nay Pyi Taw, Myanmar. Credit: ACE

Existing regulatory frameworks also do not provide specific and comprehensive guidance for IPPs, causing uncertainty among prospective investors. Further, the permit process is cumbersome as project developer needs to obtain an additional permit from the Ministry of Electricity and Energy (MOEE) for any grid connected power generation and power plants with generation capacity of more than 30 megawatts (DICA, 2016). The application process often takes longer than the limit set by the Government (70 days) (Taylor, 2018). The current investment law also does not provide guarantees for investors against land expropriation without compensation. Disputes often arise in large projects, since land ownership rights are not well established (GAN Integrity, 2018).

The financial market in Myanmar is among the least developed in the region with only about 10% of the population having a personal bank account (Aung et al., 2015). The Government only recently liberated the financial sector and allowed foreign banks to operate in the country (Mukawa & Naing, 2018). This underdeveloped domestic financial market limits the access to RE projects funding. Financial institutions also often do not have enough knowledge on RE projects financing which reduce their willingness to provide finance.

In addition to limited grid availability, the existing grid in Myanmar faces severe technical and reliability challenges with frequent power outages. Transmission and distribution losses are high, with around 20% losses of total output (World Bank, 2014). This is a constraint in RE deployment, since reliable electricity transmission is crucial for RE power integration. The absence of RE grid code standards in Myanmar further adds to the problems³⁴.

The central bank of Myanmar requires all business transactions to be made in Myanmar Kyat, leading to a substantial currency exchange risk for foreign investment (Mukawa & Naing, 2018).

³⁴The grid code in Myanmar is negotiated on a case-by-case basis (feedback from local project developers).

The summary of current challenges in RE financing in Myanmar is elaborated in Table 10.

Table 10: Challenges in Renewable Energy Financing in Myanmar

Types of Challenges	Underlying Conditions ³⁵
Power market	<ul style="list-style-type: none"> • Unclear strategies to achieve RE targets due to absence of regulatory frameworks in RE power sector (enactment of Renewable Energy Policy is still pending) • Electricity prices are heavily subsidised • No standardised PPAs • No standardised build-operate-transfer (BOT) contracts • Government focuses on national electrification through coal and hydro
Permits	<ul style="list-style-type: none"> • Additional permit from the Ministry of Electricity and Energy (MOEE) is required for any grid connected power generation and power plants with a generation capacity of more than 30 megawatts
Grid transmission	<ul style="list-style-type: none"> • Limited grid availability and low power stability • No RE grid code standards • Existing distribution network is still using outdated and impractical connections • Very high transmission and distribution losses, approximately 20% of total output
Hardware	<ul style="list-style-type: none"> • Frequent problems during custom clearing • Insufficient access to information on quality, reliability and cost of RE hardware
Off-taker	<ul style="list-style-type: none"> • Difficulty to judge credit-worthiness of commercial and industrial electricity end-users • Only one potential off-taker for large scale power generation • Limited availability of end-users to pay for electricity services
Labour	<ul style="list-style-type: none"> • Unskilled domestic labours and EPC contractors, and current inefficiencies in public and private training programmes
Project developer	<ul style="list-style-type: none"> • Only few high-quality RE project developers with proven track record • Unavailability of centralised and reliable information platform on existing project developers. • Inefficient support and communication with RE industry associations • Unclear treatment of independent power producers
Financing	<ul style="list-style-type: none"> • Underdeveloped financial system • High debt interest in local market (13%) • High collateral required by banks. Foreign companies are not allowed to take immovable property as collaterals • Difficult project financing, only 1% of fixed-asset investments are funded by banks • Development agencies often direct their fund to non-RE sectors
Currency	<ul style="list-style-type: none"> • Usage of local currency for local PPAs deter foreign investors
Sovereign	<ul style="list-style-type: none"> • Difficulty for investors to reliably judge the sovereign situation

Note: Underlying conditions in **bold** are considered key challenges.

³⁵These are short-described conditions for each type of challenge based on in-depth analysis and discussions with related stakeholders. Detailed of each underlying condition need to be further elaborated.



Credit: ACE

4. Measures to Improve the Renewable Energy Support Framework in Cambodia, Lao PDR and Myanmar

As challenges in RE financing vary within the ASEAN member states (AMS), the recommendations formulated to address them will also need to be customised. There are some member states that face nearly the same challenges, thus similar solutions may also be applicable in addressing them.

In most AMS, fossil fuel subsidies have been a main challenge in RE deployment, as energy prices stay low and RE can hardly compete with fossil fuels. Therefore, it is imperative for the government of these AMS to reform fuel subsidies and introduce market-based pricing. Financial institutions should introduce financial products (e.g. concessional loans or mandatory loan quota for RE projects) to assist independent power producers to gain access to fundings. Regulators should also reform reserve requirement to enable investors to have access to long-term domestic fundings.

ASEAN member states should consider allowing on-site electricity and wheeling³⁶ to address the issue of limited number off-takers. They should also provide payment guarantees in cases where the state-utility company is the main or sole off-taker of RE power generation.

Challenges arising from sovereign issues, such as political or socio-economic conditions, can be addressed by introducing risk-sharing mechanisms. International donors should provide capacity building for political guarantee provision to all stakeholders including governments, commercial financial institutions, and project developers.

Table 11 provides a set of potential measures to address individual challenges for RE development in the ASEAN region that also covers CLM where the RE market is still new. This list may serve as a first orientation on measure to be done.

Further elaboration on measures and recommendations for CLM is depicted in the sub-chapters below. Apart from that, follow-up studies in individual AMS could then be conducted to build a customized approach taking into consideration the specific national AMS context.



³⁶Wheeling refers to the transfer of electrical power through transmission and distribution lines from one utility service area to another. Wheeling allows the sale of electricity from the point of generation to a user far away.

Table 11: Measures to Address Challenges in Improving Renewable Energy Support Framework in the ASEAN region

Types of Challenges	Measures to Address Challenges
Power Market is defined as challenges arising from limitations and uncertainties in the energy market, and/or sub-optimal regulations to address these limitations and promote energy markets.	<ul style="list-style-type: none"> • Establish transparent, long-term national renewable energy strategy and targets • Establish a harmonized, well-regulated energy market, with cornerstone instruments, such as feed-in tariffs or auctioning, to address price and market-access risk for renewable energy projects • Balanced treatment across sectors and reform of fossil fuel subsidies
Permits is defined as challenges arising from the public sector's inability to efficiently and transparently administer renewable energy-related licensing and permits, including land acquisition	<ul style="list-style-type: none"> • Streamline processes for permits • Establish one-stop service facility
Grid Transmission is defined as challenges arising from limitations in grid management and transmission infrastructure	<ul style="list-style-type: none"> • Include a "take-or-pay"³⁷ clause in the standard PPA • Develop a grid code for new renewable energy technologies • Develop grid management study • Technical support and software on grid management and planning • Establish response timing targets for connection of new renewable sources to the grid
Hardware is defined as challenges arising from limitations in the quality and availability of RE hardware; issues arising from inefficiencies in the customs process	<ul style="list-style-type: none"> • Financial products by banks to assist domestic manufacturers in gaining access to capital • Streamlined, consistent and facilitated customs procedures; considered approach to customs tariffs • Develop certification and technology standards, and enforce standards
Off-taker is defined as challenges arising from the off-taker's poor credit quality and an IPP's reliance on payments	<ul style="list-style-type: none"> • Government and/or development bank guarantees for PPA payments
Labour is defined as challenges arising from unskilled and unqualified potential employees	<ul style="list-style-type: none"> • Conduct capacity building by offering RE-specialised courses to current workforce • Integrate RE courses/training in school/universities curriculum
Financing is defined as challenges arising from general scarcity of investor capital (debt and equity) in the particular country, and investors' limited information and track record in renewable energy	<ul style="list-style-type: none"> • Liberalise domestic financial sector • Reform reserve requirements for domestic lending to businesses • Introduce incentives, targets and mandatory lending requirements for renewable energy • Strengthen domestic investors' (debt, equity, institutions, intermediaries) capacity and familiarity with RE aggregative financing models (e.g. funds, bonds) • Financial products by banks to assist IPPs to gain access to capital/funding – including concessional loans, mandatory loan quota for RE projects
Project Developer is defined as challenges arising from limitations in the IPP's management capability and ability to execute on financing and business plan	<ul style="list-style-type: none"> • Conduct capacity building in RE project management and financing
Currency is defined as challenges arising from currency mismatch between hard currency debt/equity and domestic currency revenues	<ul style="list-style-type: none"> • Risk sharing mechanisms to address currency risk: e.g. partial indexing of local currency tariffs in PPAs, so that IPPs are reimbursed for local currency depreciation of tariff • Capacity building on existing currency risk mitigation instrument (e.g. hedging instruments)
Sovereign is defined as challenges arising from a mix of cross-cutting political, economic, institutional, and social characteristics in the particular country which are not specific to RE	<ul style="list-style-type: none"> • Risk sharing products by development banks / government: provision of political risk insurance to equity holders covering (i) expropriation, (ii) political violence, (iii) currency restrictions and (iv) breach of contract to address political risk

³⁷A contract structure where the off-taker has an obligation to take the power generated or pay a specific amount.

4.1 Improving the Renewable Energy Support Framework in Cambodia, Lao PDR and Myanmar

According to the discussions held with private and public stakeholders, since Cambodia, Lao PDR and Myanmar are facing similar challenges, several common measures seem particularly effective to improve the RE support framework, such as limited access to financing, high financing costs, grid integration and so on. At the same time, the Governments of CLM are currently revising their RE targets, outlooks, and policies as well as constructing the RE support framework to attract RE investments. In addition, these member states are still in their early phase of integrating RE (non-hydro) technologies into the national grid.

Development finance institutions should work together with local financial institutions to provide dedicated credit lines and loan guarantees to RE projects and address the issues on limited access to RE finance and high financing costs. Furthermore, national governments and international donors should provide capacity building for local commercial financial institutions to increase their capacities to evaluate and monitor lending to RE projects adequately. Additionally, improvement on communication regarding RE business permit requirements and streamlining permitting processes are also important and can help reduce bureaucracy and project risks.

It will be important for all three AMS to build the necessary technical grid infrastructure and knowledge on RE grid integration capacity and clarity on integration limitations in order to gradually move from finite fossil fuel-based electricity generation to clean energy, and address common concerns on the grid stability and integration of intermittent RE sources to the grid.

Table 12 below compiles similar key challenges from Table 6, Table 8 and Table 10 in Chapter 3 and common measures on how to address these challenges. Specific key challenges faced by CLM are elaborated in the sub-chapters further below.

Table 12: Common Measures to Improve the Renewable Energy Support Framework in Cambodia, Lao PDR and Myanmar

Key Challenges to be Addressed	Common Measures to Address Challenge in Cambodia, Lao PDR and Myanmar
High financing costs / limited access to funding	<ul style="list-style-type: none"> • Multilateral, bilateral or national development finance institutions to provide credit lines and loan guarantees to commercial banks' lending to RE • Implement financial aggregation vehicles • Increase domestic public financing through specialized financial institutions • Reform collateral requirement of banks' lending to RE projects.
Early-stage domestic financial markets and limited knowledge on RE financing	<ul style="list-style-type: none"> • National governments and international donors to provide capacity building for local commercial financial institutions
Limited number of potential off-takers	<ul style="list-style-type: none"> • Allow on-site sale of electricity and wheeling³⁸ to enhance the possibility of optimal producer-buyer relationships
Unclear and cumbersome permitting processes	<ul style="list-style-type: none"> • Streamline processes for permits and build one-stop-permit facility
RE seen as competition for fossil fuel industry	<ul style="list-style-type: none"> • Build know-how on grid integration and grid absorption capacity • Develop understanding on real costs of fossil-fuel based power generation, i.e. cost of externalities, such as environmental, social, and economic impacts
Uncertainty of the future political, economic and social situation of the country	<ul style="list-style-type: none"> • Donors and governments to build capacity on political risk mitigation instruments (e.g. from multilateral development banks) • Governments to provide political risk mitigation instruments in fast and transparent manner

Note: measures in **bold** are considered as high-priority; based on stakeholder feedback

³⁸Wheeling refers to the transfer of electrical power through transmission and distribution lines from one utility service area to another. Wheeling allows the sale of electricity from the point of generation to a user far away.

To conclude, Cambodia, Lao PDR, and Myanmar should work together to ease the process for potential financial support institutions in creating suitable programmes. Consequently, more opportunities for both financing institutions and project developers could be further explored. However, in order to do so, there are several specific improvements required for each country. The below sections elaborate the specific measures necessary in Cambodia, Lao PDR, and Myanmar.

4.2 Specific Measures for Cambodia

Cambodia should look at a few additional measures aiming to address specific challenges in the Cambodian context, in addition to the common proposed measures described in the section above, which are all important and applicable to the country.

It is important for the Government of Cambodia to set official mid- and long-term RE targets that go beyond the mere expansion of large-scale hydropower. Official targets with clear implementation strategy would ensure coordinated efforts to accelerate national RE deployment. The Government should also consider publishing grid extension plans and available grid absorption capacity information to provide critical information needed for RE investment decisions. Furthermore, the establishment of standardised PPAs and a transparent RE auction model would reduce uncertainties in the power market.

The Government should also consider introducing incentives for RE project, such as a FiT or net metering system and re-evaluating the current capacity charge introduced in the recent solar rooftop PV regulation of 2018. This would attract businesses to invest in RE projects in Cambodia and stimulate the domestic market growth.

It is important to overcome challenges on technical power grid aspect, apart from addressing challenges in financing and insufficient regulatory frameworks. To do so, the Government should consider establishing a RE grid code to ensure safe and reliable integration of diverse RE sources and clarify Cambodia's grid integration and grid absorption capacity.

The specific measures to address key challenges in RE financing in Cambodia and responsible stakeholder groups are shown Table 13.

Table 13: Measures to Overcome Key Challenges in Renewable Energy Financing in Cambodia

Key Challenges to be addressed	Measures to address Challenges		
	Policy Mechanism	Financial Mechanism	Responsible Stakeholder(s)
Uncertainty regarding RE market outlook and price	<ul style="list-style-type: none"> Establish long-term RE targets 	N/A	National government
Limited RE market	<ul style="list-style-type: none"> Adapt current capacity- and energy charge tariff for rooftop PV Introduce RE incentive schemes (feed-in tariffs, net metering) to promote the developer market 	N/A	National government
Uncertainty on Cambodia's grid absorption capacity for RE integration	<ul style="list-style-type: none"> Conduct/publish study on grid integration and grid absorption capacity 	N/A	National government

4.3 Specific Measures for Lao PDR

Insufficient regulatory framework, which favours the treatment of hydropower plants, is the key challenge in RE financing in Lao PDR. The Government should establish a comprehensive, integrated energy policy to promote RE (besides large-scale hydropower) and outline overall goals and periodic targets for grid-connected and off-grid RE projects to encourage diversified RE investments into other technologies.

They also should consider revising the Electricity Law to include provisions for electricity generated from renewable sources.

Capacity building on risk mitigations instruments, e.g. currency hedging and currency swaps, for local financial institutions, the government and project developers, is a must in order to address the currency risk for RE investments. International development and finance institutions can support these types of trainings and potentially facilitate currency transactions. Utilities should offer PPAs in hard currency denomination to mitigate currency risk for investments made in such currency.

Furthermore, to stimulate the growth of RE market a comprehensive pricing mechanism with favourable pricing conditions for RE projects (e.g. feed-in tariff and net metering) could be implemented.

The specific measures on enhancing RE financing in Lao PDR and responsible stakeholder groups are shown in Table 14 below.

Table 14: Measures to Overcome Key Challenges in Renewable Energy Financing in Lao PDR

Key Challenges to be addressed	Measures to address Challenges		
	Policy Mechanism	Financial Mechanism	Responsible Stakeholder(s)
Uncertainty regarding RE market outlook and price	<ul style="list-style-type: none"> • Clearer policies and regulations; clear coordination with RE actors 	N/A	National government
Currency risks	<ul style="list-style-type: none"> • Build capacity on the available currency risk mitigation instruments (Currency Exchange Fund - TCX, currency swaps) • Utilities to provide PPAs in hard currency 	<ul style="list-style-type: none"> • Financial institutions to provide currency risk mitigation instruments 	<ul style="list-style-type: none"> • National government • Development/ Financial institutions • International donors
Limited RE market	<ul style="list-style-type: none"> • Governments to consider introducing RE incentive schemes (feed-in tariffs, net metering, further grants) to build a strong RE market 	N/A	National government

4.4 Specific Measures for Myanmar

As discussed in section 3.3.2 uncertainties in the market outlook and insufficient regulatory framework are major obstacles for RE investments in Myanmar. Since a lot of RE policy documents (e.g. Renewable Energy Policy) are still under review, good coordination is necessary with other stakeholders, such as private sectors and academics. This would ensure effective and comprehensive regulatory frameworks.

Currency hedging methods in Myanmar are still limited, therefore, international donors should also support capacity building on available currency risk mitigation instruments (e.g. the Currency Exchange Fund - TCX and currency swaps) for local financial institutions. Utilities should consider setting up PPAs in hard currency to reduce currency risk for foreign investments.

The Government should consider introducing RE incentives schemes, such as a FiT, net-metering, concessional finance and in some cases investment grant infusions, to build financial stimulus and hands-on experiences as Myanmar's RE market overall is still small. This opportunity would enable Myanmar to skip the development process as it will get more difficult to shift into these systems as the market and demand grow larger.

The measures to overcome the key challenges in RE financing in Myanmar and the responsible stakeholder groups are shown in Table 15.

Table 15: Measures to Overcome Key Challenges in Renewable Energy Financing in Myanmar

Key Challenges to be addressed	Measures to address Challenges		
	Policy Mechanism	Financial Mechanism	Responsible Stakeholder(s)
Uncertainty regarding RE market outlook and price	<ul style="list-style-type: none"> • Clearer policies and regulations; clear coordination with RE actors 	N/A	National government
Currency risks	<ul style="list-style-type: none"> • Build capacity on the available currency risk mitigation instruments (TCX, currency swaps) • Utilities to provide PPAs in hard currency 	<ul style="list-style-type: none"> • Financial institutions to provide currency risk mitigation instruments 	<ul style="list-style-type: none"> • National government • Development/ Financial institutions • International donors
Limited RE market	<ul style="list-style-type: none"> • Introduce RE incentive schemes (feed-in tariffs, net metering, further grants) to build a strong RE market 	N/A	National government

5. Case Studies on Successful Renewable Energy Support Mechanisms

Cambodia, Lao PDR and Myanmar can learn from experiences in other AMS during the designing stage of new RE support mechanisms. This Chapter provides an overview of successful case studies in the ASEAN region and beyond.

Putting in place policy and financial support mechanisms has been proven to be effective in accelerating RE deployment in the ASEAN region (ASEAN Centre for Energy, 2016). The key policy mechanisms include medium to long-term RE targets, well-structured feed-in tariffs (FiTs) and fiscal incentives.

FiTs in particular have effectively accelerated RE deployment in Indonesia, Malaysia, the Philippines, Thailand and Vietnam. After the introduction of FiTs in 2011 in Malaysia, an increase of 139 MW in solar PV installed capacity by 2014 could be observed. Solar PV in Thailand also started gaining momentum after the adder scheme³⁹ was introduced in 2007. The Government of Thailand replaced the adder scheme with FiTs in 2013. Private sectors were not deterred in investing in RE projects even though the FiT rates were less than the adder scheme, due to their confidence in the domestic solar market which has been stable since 2010.

Besides the policy support mechanism, dedicated RE financing instruments have the power to unlock significant RE investments and enable the scale-up of RE deployment. The following three case studies from the ASEAN region, Germany and India, showcase the successful applications of such financing instruments.

The presented instruments comprise of a combination of public and private sector guarantee and insurance products, concessional loans, mezzanine finance, government equity participation, green bonds and crowdfunding. All of the presented financing structure and instruments hold potential for replication in the CLM.

5.1 Feed-in Tariff, Public Sector Guarantees, and Mezzanine Financing for Geothermal in Indonesia

The Sarulla Geothermal Power Generation Project, a 3 X 110 MW geothermal power plant, is owned and operated by Sarulla Operations Limited (SOL). SOL has a joint operating contract (JOC) with Pertamina Geothermal Energy (PGE) to acquire the rights to use the concession and develop the power plant. The previous developer successfully produced high-quality exploration data but had to hand over the project back to PT PLN (the Indonesian state utility company) in the wake of the global crisis. SOL was willing to take over the project from PT PLN due to data availability and thus, reduced risk. The project started its construction in 2014 and all three units are now in full operation.

This project is fully funded with indirect support from the Indonesian government in form of guarantees and a FiT. The project is funded with equity from sponsors and loans from both commercial and development banks, with the Japan Bank for International Cooperation (JBIC) providing loan guarantees for the commercial banks. There are also concessional mezzanine loans from ADB Clean Technology Fund (USD 80 million) and ADB Canadian Climate Fund (USD 20 million). These mezzanine loans were pivotal in reaching financial close.

³⁹The adder scheme was an incentive available for RE producers, offering a price premium payable in addition to normal electricity price paid to the RE producers.

SOL is implemented under the Energy Sales Contract with PT PLN for 30 years and a 30-year JOC with PT Pertamina Geothermal Energy (PGE). The Ministry of Finance (MoF) of Indonesia also provides a 20-year guarantee with a business viability guarantee letter (BVGL) under which the MoF of Indonesia guarantees the viability of PT PLN to fulfil its financial obligation under the PPA with the concession owner. The scope of financial obligations included the obligation on the payment of electricity output and the obligation on the payment of non-electricity output due to political risk or PT PLN's non-remedial events. The BVGL increased the creditworthiness of PT PLN and thus effectively addressed investors' bankability concerns (Rakhmadi & Sutiyono, 2015). The project financing structure is illustrated in the following figure:

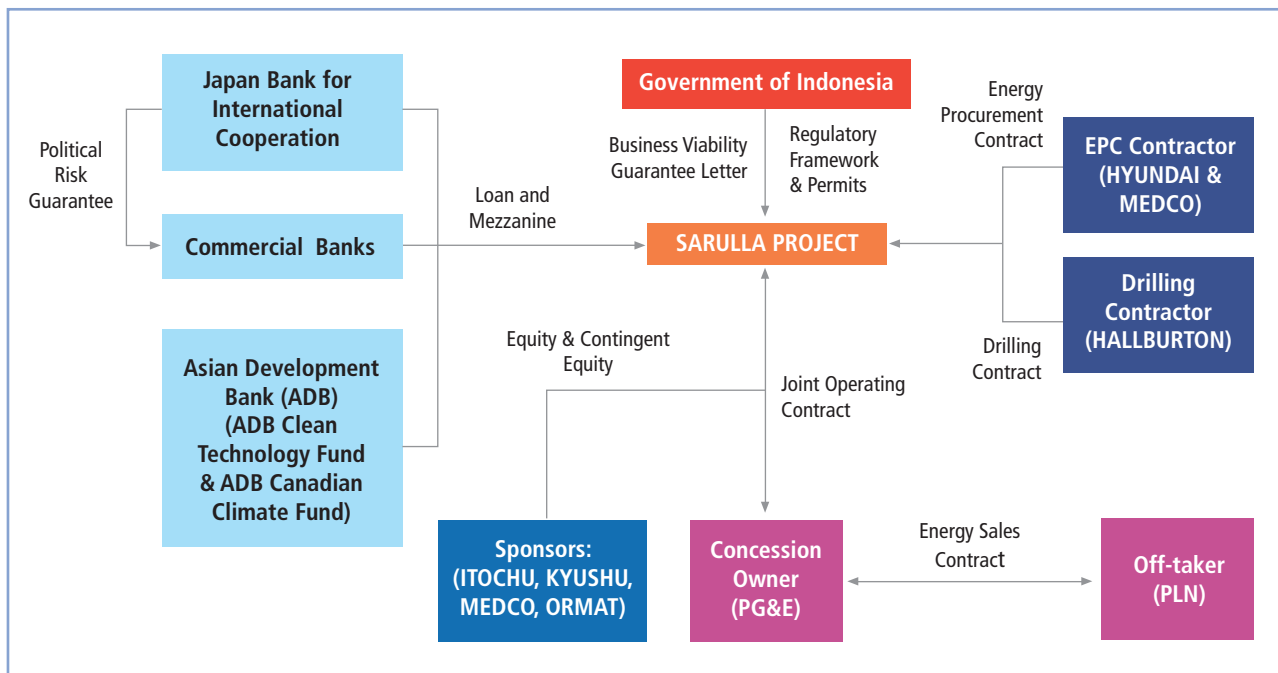


Figure 1: Sarulla Geothermal Project Financing Structure

Source: South Pole elaboration based on (Rakhmadi & Sutiyono, 2015)

The 30-year feed-in tariff provided a certain revenue stream and a reasonable return to the project while the government guarantee and the mezzanine loans enabled the project to source an attractive financial package and reach financial closure. Without the support from the Government, the final project's Internal Rate of Return (IRR) of 14-16% would have decreased by approximately 4% to 10-12%, causing the project to be unviable. The provision of guarantees and feed-in tariff is also crucial in increasing private sector's investments in the project. The Sarulla Geothermal project helps the Indonesian Government to increase geothermal capacity by 20% and renewable capacity by 5%. The project also brings benefits to local community with SOL's Corporate Social Responsibility (CSR) projects.

5.2 Guaranteed Offtake through Power Purchase Agreement and Multilateral Guarantee for Hydro in Vietnam

Hoi Xuan Hydropower Project, a run-of-river hydropower project is located on the Ma River, Vietnam. Three turbines with a total capacity of 102 MW are planned to be installed on site. The project is expected to produce 432 GWh of electricity per year. VNECO Hoi Xuan Investment and Electricity Construction Joint Stock Company (VNECO Hoi Xuan) is undertaking the project construction.

The project debt financing was arranged by Goldman Sachs and led by the Bank of Tokyo-Mitsubishi UFJ Ltd.. In 2015, the Multilateral Investment Guarantee Agency (MIGA), issued a guarantee cover under Non-Honoring of Sovereign Financial Obligations (NSHFO) with respect to the government's guarantee to lenders; in case of failure to make a payment due to unconditional financial payment obligation. The amount the MIGA guarantee covers is USD 239.7 million with a tenor of up to 15 years. Vietnam Electricity (EVN), the state-owned utility, has entered a PPA with the project developer under which the electricity generated from the project will be purchased by EVN and thus provide a steady revenue for the project. In addition, the Government of Vietnam, through its Ministry of Finance (MoF), provides a guarantee to the consortium lenders against the risk of payment failure from EVN. MoF, in turn, is secured through the MIGA guarantee and therefore is able to provide the guarantee to the consortium leader – leading to significantly increased project's bankability. The project financing structure is illustrated in Figure 2 below.

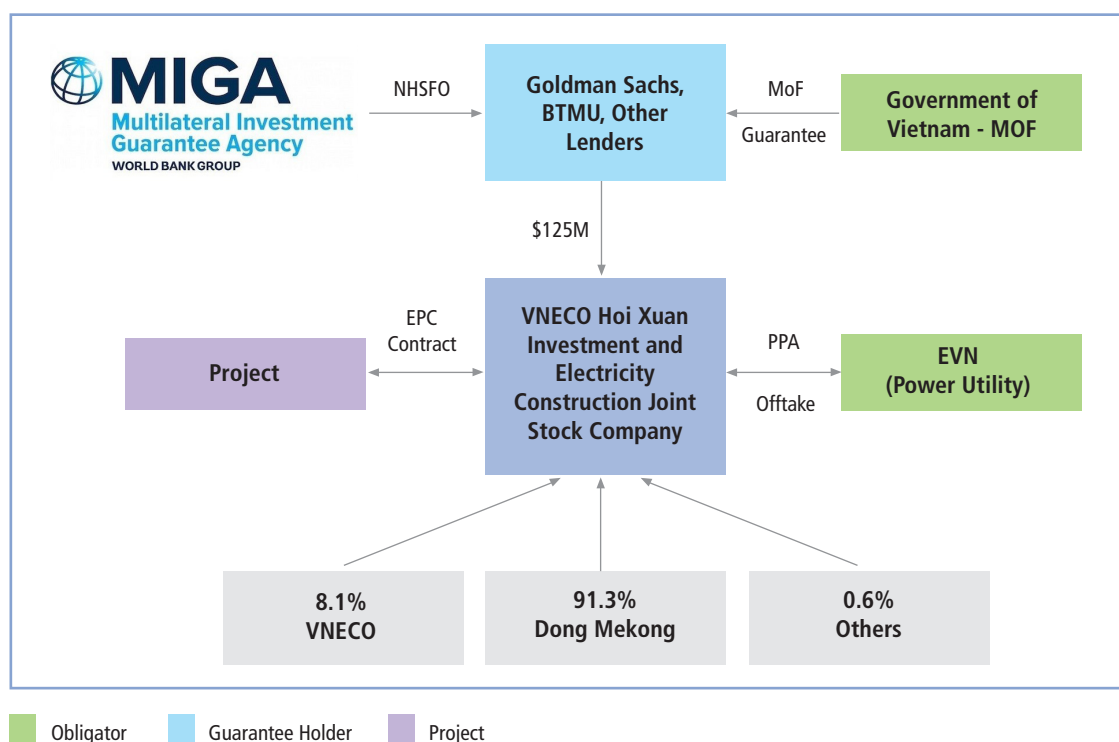


Figure 2: Hoi Xuan Hydropower Project Financing Structure (MIGA, 2018)

The MIGA guarantee enabled private banks to provide debt and clean development mechanism subsidies, which in turn increased the project IRR from 6 to 13%. The project can offset approximately 68,161.4 tCO₂ per year. The project construction created between 1,565 and 2,879 jobs and an additional of 141 permanent jobs during plant operations.

5.3 World Bank Soft Loans, Government Guarantee and Sub-national Equity for Hydropower in India

The Rampur Hydropower project in India has a total capacity of 412 MW. The project developer is Satluj Jal Vidyut Nigam Limited, a joint venture between the Government of India and the State Government of Himachal Pradesh.

The World Bank, through the International Bank for Reconstruction and Development (IBRD), committed to provide a USD 400 million soft loan to the project⁴⁰ while the project developer paid for the remaining cost. The loan was guaranteed by the Government of India.

The project financing structure is illustrated below.

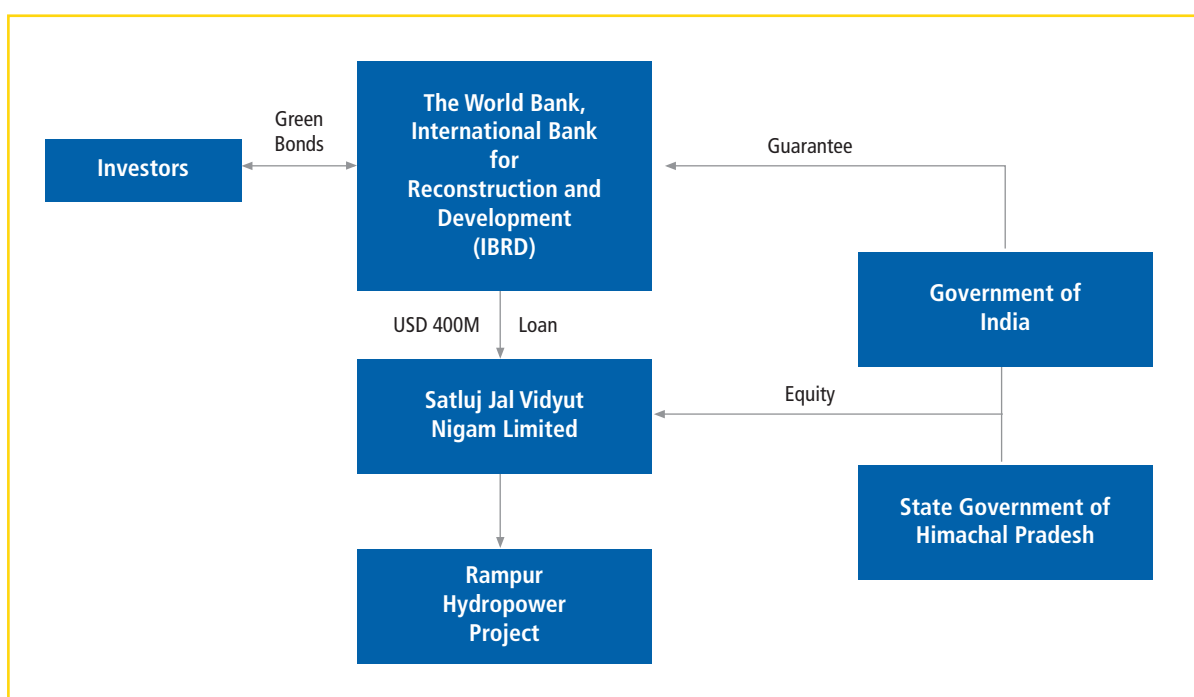


Figure 3: Rampur Hydropower Project Financing Structure

Source: South Pole elaboration, based on World Bank (2016)

The loan guarantee by the Government made it more attractive for the World Bank to invest; World Bank low cost loans using green bond proceeds offered an attractive condition for investment, enabling a project with an Economic Rate of Return (ERR)⁴¹ of at least 14-18.5%. The project is expected to produce 1,770,000 MWh of electricity and reduce 1.4 million tCO₂ emission per year. Rampur Hydropower Project is a cascade of the much larger 1,500 MW Neelum Jhelum Hydropower Project (NJHP). Together with NJHP, the Rampur Hydropower Project has helped to improve the reliability of India's Northern Grid with days of outage decreasing from 32 to 4.6 days.

⁴⁰The soft loan was financed through proceeds from World Bank's issuance of green bonds. A green bond is a bond specifically earmarked to be used for climate and environmental projects and the World Bank is a major issuer of green bonds.

⁴¹The ERR is an interest rate at which the cost and benefits of a project, discounted over its life, are equal. ERR differs from the financial rate of return (i.e. IRR) in that it takes into account the effects of factors, such as price controls, subsidies, and tax breaks, to compute the actual costs of the project to the economy.

Green Bonds

Corporates/RE project developers may raise financing through the issuance of green bonds. A green bond is a bond specifically earmarked to be used for climate and environmental projects. These bonds are typically RE asset-linked and backed by the issuer's balance sheet and are also referred to as climate bonds. An issuer of green bonds typically needs to fulfil a certain credit rating standard and adhere to national green bond issuance regulations. Although green bonds issuance may have additional transaction costs for issuers (i.e. for tracking, monitoring and reporting the use of proceeds), the benefits of green bonds can offset such costs. These benefits include highlighting their green assets/business, good marketing and diversifying their investor base as they can now attract Responsible Investment specialist investors. Investors have huge demands for green bonds as they can fund green projects without taking any additional risks and they will know the exact sustainable impacts of their investments.

The ASEAN Capital Markets Forum (ACMF) introduced the ASEAN Green Bond Standards (GBS) in November 2017. This initiative, which is co-led by the Securities Commission Malaysia, and the Philippines Securities and Exchange Commission, aims at developing green asset class in the region. The ASEAN GBS are aligned with the International Capital Market Association (ICMA)'s Green Bond Principles (GBP).

In line with the objective to develop green asset class in the region, the issuers of ASEAN Green Bonds must have a geographical or economic connection to the ASEAN region. In addition, fossil fuel power generation projects are excluded from ASEAN GBS to mitigate green washing of projects and protect the ASEAN Green Bond label.

To date, there are five ASEAN Green Bonds/Sukuk⁴² with total issuances amounting to US\$390.19 million that have been issued in Malaysia and Singapore. In February 2018, Indonesia issued the world's first sovereign green sukuk with an issuance size of US\$1.25 billion which is also aligned with the ASEAN GBS. It also has been reported that ADB plans to invest USD 155 million through green bonds in Thailand. The proceeds of the first green bonds in the country will be used to fund solar projects. These green bonds usually have lower coupon rates than the standard rates issued by the bank.

⁴²Green sukuk is a sharia-compliant green bond. Generally, while there are no Shariah issues regarding green technologies, green projects should not be related or incidental to non-Shariah compliant businesses or activities, for example the construction of a green building for a casino or brewery.

5.4 Feed-in Tariff and Crowdfunding for Wind Power in Germany

The Ingersheim and Surrounding Energy Cooperative was founded in March 2010 by a group of Ingersheim citizens who intended to build a wind turbine. The cooperative form was chosen because the local community wanted broad public participation in building a source of sustainable, climate-friendly energy supply. The project planning to build a wind turbine started in 2002 and the construction was completed in 2012. The wind turbine is a 2-MW direct drive Enercon E-48 with a lifetime of 18 years.

The Cooperative has around 360 members. Each member purchases at least 20 shares, each worth €25 (€2,500) or its multiples thereof. A total of 22,920 shares (80% of capital) were sold at the start of the project. The paid in-business shares and the capital invested in the project, except for the mandatory shares (the remaining 10%), are distributed back to the members over a term of 15 years.

The Government of Germany provided FiT schemes for the electricity produced as stipulated in the German Renewable Energy Sources Act (EEG)⁴³. The FiT schemes, paid over a period of 20 years, ensures a steady revenue stream and thus guaranteed a return for the project. Dividend distribution is given depending on wind yield therefore remunerative interest rate is expected. The project financing structure is illustrated below:

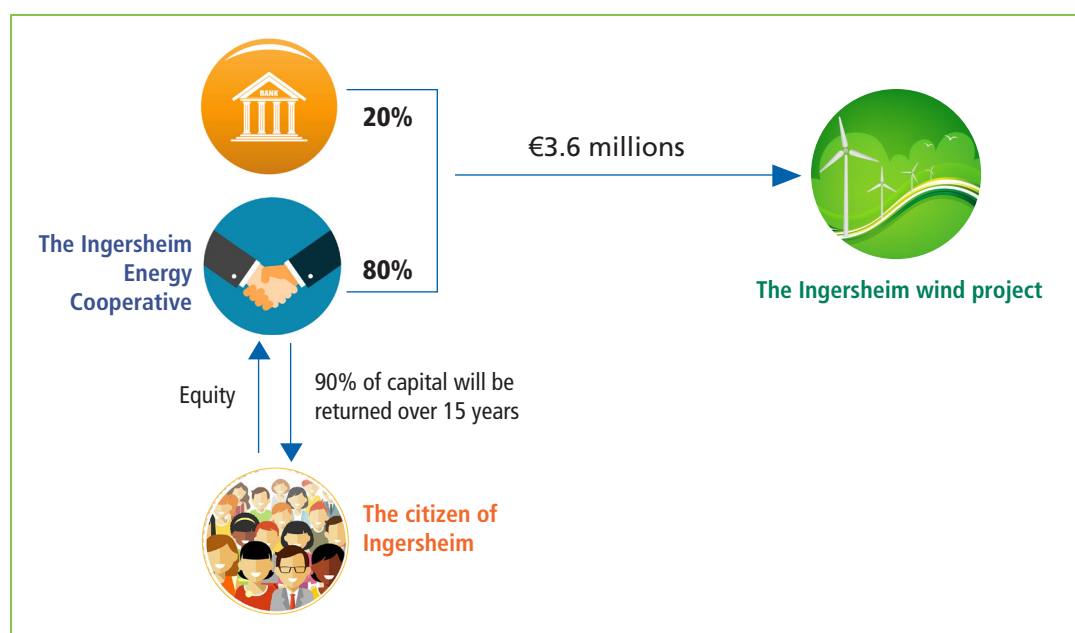


Figure 4: Ingersheim Project Financing Structure

Source: South Pole elaboration; based on Energiegenossenschaft Ingersheim (2013)

The citizens' participation ensures high acceptance of the project and subsequently greatly reduced development risks. The high amount of capital raised by the citizens also decreased the material credit risk as less bank loans were required. Co-ownership also means that each member bears the financial risk. However, in a Cooperative business model, the risk is only limited to the shares they own. A Cooperative is also required to be a member of an association from which it draws benefits, such as consulting and advisory services as well as regular audit. Consequently, the cooperative is well-protected from bankruptcy.

In general, the above concept is also possible in AMS. However, it will depend on the existing legal framework in each AMS and require pro-active community commitment.

⁴³The EEG has transitioned to an auction system in 2014.

6. Conclusions

The ASEAN Member States (AMS) have set a collective target to increase the renewable energy (RE) share in the total energy mix to 23% by 2025. To achieve this target, AMS have developed individual national RE targets and implementation plans reflecting specific country circumstances. Progress in RE deployment and integration into national energy landscapes differs among AMS. Indonesia, Malaysia, the Philippines and Thailand are advancing rapidly (even though they still lag behind mature markets in European countries), while Cambodia, Lao PDR and Myanmar (CLM) are still building the fundamental support framework.

A series of policy, socio-economic and technical challenges have been restricting the RE development in CLM. Key challenges to be addressed in all CLM include high financing costs, limited access to funding, early stage domestic financial markets, limited knowledge on RE financing, limited number of potential off-takers, uncertainty regarding RE market outlook and price, cumbersome permitting process, limited developer markets and sovereign risks. Additionally, RE deployment in Cambodia is hindered by the absence of RE targets (beyond large hydro) and financial incentives, and unclear grid integration and grid absorption capacity. RE investments in Myanmar and Lao PDR face insufficient regulatory framework, substantial currency risks and unfavourable RE pricing conditions.

A collaborative effort from the national governments with the private sectors (project developers, corporates and commercial banks), and supported by development/ financial institutions and international donors, is crucial in ensuring successful financing of RE projects. Policy and financial support mechanisms, such as feed-in-tariffs (FiTs) and government guarantees, have been key factors in encouraging private involvement in RE projects. Concessional loans from development financial institutions and institutional donors further provide access to financing to project developers, as shown by case studies from India, Indonesia, and Vietnam for various technologies.

The limited market size of CLM might be seen as a barrier compared to the case mentioned above if approached individually. However, if Cambodia, Lao PDR, and Myanmar manage to collaborate in developing the support mechanism, these three countries could be combined as a one bigger market thus easing not only financial institutions but also project developers.

Taking the roles of these stakeholders into considerations, the following recommendations to address challenges and help accelerate the RE deployment in CLM AMS have been developed.



Recommendations	Cambodia	Lao PDR	Myanmar
Consider allowing on-site sale of electricity and sales via the grid to enhance the possibility of optimal producer-buyer relationships	✓	✓	✓
Adopt clearer RE targets beyond large hydro	✓	✓	
Assign publicly-owned utilities to provide PPAs in hard currency		✓	✓
Consider net-metering and other incentives for small-scale RE (e.g. feed-in tariffs), to build a strong local project developer market	✓	✓	✓
Integrate RE in Power Development Plan	✓		
Streamline processes for permits and build on-stop-permit facilities	✓	✓	✓
Collaborate with donors and development banks on capacity building efforts	✓	✓	✓

Recommendations for donors to develop capacity on financial support mechanisms and related to key investment risks (in all three CLM states):

- Provide capacity building on RE financing for local and commercial financial institutions; particularly on available currency risk mitigation instruments
- Provide capacity building on political risk mitigation instruments (e.g. from multilateral development banks) for governments, commercial financial institutions and project developers
- Build know-how on grid integration of RE for the government

Recommendations for multilateral, bilateral or national development finance institutions on financial support mechanisms (in all three CLM states):

- Provide credit lines and loan guarantees to commercial banks' lending to RE
- Provide specific guarantees for power purchase agreement (PPA) payments
- Collaborate with donors and governments on capacity building efforts

7. Annexes

Annex I: Input from Focus Group Discussion

A Focus Group Discussion (FGD) on Policy Recommendation on Renewable Energy (RE) Financing Support Mechanisms in Cambodia Lao PDR and Myanmar (CLM) was held on 23-24 August 2018 in Phnom Penh, Cambodia. It consisted of three sessions. During the first session, the participants discussed existing policies and financial barriers of RE project development in CLM. The session included a group work, in which participants were divided into three stakeholder groups i.e. (i) government representatives, (ii) project developers and (iii) financial institutions, to identify and discuss barriers that are hindering RE investments into CLM energy markets. The discussion was followed by a market place session where the different groups were able to discuss and gather insights from other groups and followed by a presentation by each representative of the three on the results of their group work. groups.

After this session, South Pole presented results from the desk-review on RE project development barriers in CLM and compared the desk review results with the group work outcome.

The second session was aimed to provide participants with good practices on RE support mechanisms and financing business model in CLM and other ASEAN Member States (AMS). Representatives from various governments elaborated on how their government develop their RE support mechanism, and project developers shared experiences on how to develop RE project in Cambodia and Malaysia.

The third and last session focused on getting the participant familiarized on the existing- and identifying the gaps on RE support mechanism in CLM countries. During this session, participants were divided into three groups based on their countries of origin. Each group worked on identifying existing support mechanism for RE development and developing recommendations to overcome barriers and accelerate RE investment in CLM countries.

The FGD was concluded with a recap by the facilitators, general feedback from participants, and a closing remark by Mr. Septia Buntara Supendi (Acting Manager for the ASEAN German Energy Programme (AGEP) from the ASEAN Centre for Energy (ACE)).

On the second day, a site visit was arranged to the 1 MWp solar PV rooftop installation at the International School of Phnom Penh (ISPP). The solar PV rooftop investment resulted in electricity cost savings and reduced the school's carbon footprint. With this investment, the ISPP shows its commitment to sustainable development and teaching, and its contribution to a green society and clean environment in Cambodia.

Results

Session 1: Barriers for RE Development in Cambodia, Lao PDR and Myanmar

The objective of session one was to identify key barriers that are holding back the deployment of RE in CLM countries. An overview of country-specific barriers, as identified by the literature, was shared with all participants. The overview was well received, and participants confirmed the relevance of listed instruments and actors.

The input and discussions during the group work revealed that there are common key barriers to RE project development in Cambodia, Lao PDR and Myanmar. High financing costs and limited access to funding were cited as the main challenges in RE development in all countries. Another major barrier is related to the power market, as the national utility is the main or even sole off-taker with power prices negotiated on a case-by-case basis. Furthermore, uncertainty in the RE market outlook and unclear permitting procedures are holding back potential investors despite abundant RE resources and business opportunities. In addition to common barriers across CLM countries, each country also has specific domestic barriers. For example, in Cambodia, RE is seen as a threat for the power market due to perceived stability issues while low electricity tariffs and high currency risks were identified as challenges specific to Lao PDR and Myanmar.

Session 2: Experiences in Renewable Energy Support Mechanism and Project Development

The aim of session two was to provide insights on how the Government develops RE support mechanism. Mr. Sarasy Chiphong provided an overview of the current status of the power sector in Cambodia and elaborated on existing regulations and incentives for RE projects in Cambodia.

Mr. Arjen Luxwolda from Kamworks - RE project developer from Cambodia - shared his experience in developing solar projects in Cambodia. He outlined challenges in financing solar projects in Cambodia and revealed the impact of the Government's new regulation on solar rooftop on project feasibility.

Mr. Tobeng, a project developer from Malaysia presented his experience in developing solar projects in Malaysia. He highlighted the significance of financing support mechanism provided by the Government of Malaysia to RE projects.

Session 3: Renewable Energy Support Mechanism in Cambodia, Lao PDR and Myanmar

Session 3 was aimed to understand the policies and financing support mechanism available in CLM countries, to identify gaps on existing support mechanism and develop recommendations to fast-track RE development.

During the two group works, participants assessed existing support schemes and available funding options for RE development in CLM countries. They also identified challenges and needs to either improve existing schemes or put complementary ones in place. In conjunction with this exercise, the participants developed recommendations on how to overcome existing policy and financial barrier and accelerate RE investments in CLM countries.

For Cambodia, participants identified and confirmed several RE financial schemes and incentives, including the Rural Electrification Fund (REF), the Green Microfinance Programme (also including the 'Good Solar Initiative'), tax exemption for RE projects (for government-owned institutions), and soft loan assistance from international donors.

For Lao PDR, stakeholders identified the Rural Electrification Development Fund (REF), Laos Energy Promotion Fund, the Energy Access Solar Home Systems Fund and the Environment Protection Fund.

In Myanmar, the Village Development Fund, Smart Power Myanmar and the Japan Fund for Poverty Reduction Program were listed as existing financing support mechanisms.

To overcome existing barrier for RE investments in CLM countries, participants put forward recommendations that were equally applicable for all CLM countries and also ideas that were country-specific. Please see the developed recommendations below, grouped according to stakeholders who would lead the implementation of these recommendations:

• **Recommendations for governments (policy support mechanisms):**

- o Consider allowing on-site sale of electricity (in Cambodia and Lao PDR) and sales via the grid (all countries) to enhance the possibility of optimal producer-buyer relationships
- o Adopt clearer RE targets (Cambodia and Lao PDR)
- o Assign publicly-owned utilities to provide PPAs in hard currency (Myanmar and Lao PDR)
- o Consider net-metering and other incentives for small scale RE (e.g. feed-in tariffs,) to build a strong local project developer market (all CLM countries)
- o Integrate RE in power development plan (Cambodia)
- o Streamline processes for permits and build one-stop-permit facilities (all CLM countries)
- o Collaborate with donors and development banks on capacity building efforts (all CLM countries)

• **Recommendations for donors to build capacity on financial support mechanisms and related to key investment risks (in all three countries):**

- o Provide capacity building on RE financing for local, commercial financial institutions; particularly on available currency risk mitigation instruments
- o Provide capacity building on political risk mitigation instruments (e.g. from multilateral development banks) for governments, commercial financial institutions and project developers
- o Build know-how on grid integration of RE for the government

• **Recommendations for multilateral, bilateral or national development finance institutions on financial support mechanisms (in all three countries):**

- o Provide credit lines and loan guarantees to commercial banks' lending to RE
- o Provide specific guarantees for PPA payments
- o Collaborate with donors and governments on capacity building efforts

Please see Annex 6 for group working sheets and results.

case-by-case basis. Furthermore, uncertainty in the RE market outlook and unclear permitting procedures are holding back potential investors despite abundant RE resources and business opportunities. In addition to common barriers across CLM countries, each country also has specific domestic barriers. For example, in Cambodia, RE is seen as a threat for the power market due to perceived stability issues while low electricity tariffs and high currency risks were identified as challenges specific to Lao PDR and Myanmar.

Insights and Conclusions

The FGD brought together different stakeholders in RE finance and development in CLM countries, each equipped with different and valuable experiences and knowledge on the topic. During the FGD, participants got to know each other and learned to view individual issues from different perspectives, complementing everyone's understanding of the current RE development situation. The FGD also allowed participants to grow their professional networks, potentially leading to the realisation of new RE projects in CLM countries in the future.

The FGD showed that RE deployment and integration into national energy landscapes differs among Cambodia, Lao PDR and Myanmar, and that a series of policy, socio-economic and technical challenges are restricting the RE development in CLM countries. Key challenges to be addressed in all CLM countries include high financing costs, limited access to funding, early stage domestic financial markets, limited knowledge on RE financing, limited number of potential off-takers, uncertainty regarding RE market outlook and price, cumbersome permitting process, limited developer markets and sovereign risks. Additionally, RE deployment in Cambodia is hindered by the absence of RE targets (beyond large hydro) and financial incentives, and unclear grid integration and grid absorption capacity. RE investments in Myanmar and Lao PDR face an insufficient regulatory framework, substantial currency risks and unfavourable RE pricing conditions.

A collaborative effort from the national governments along with the private sector (project developers, corporates and commercial banks), supported by development financial institutions and international donors, is crucial in ensuring successful financing of RE projects in CLM countries. Policy and financial instruments such as FiTs and government guarantees are regarded key factors in encouraging private involvement in RE projects. Concessional loans from development financial institutions and institutional donors further provide access to financing to project developers.



8. Bibliography

Abe, M., Moinar, M., & Aung, U. W. (2014). *Myanmar Business Survey 2014: Survey Results*. From UNESCAP: https://www.unescap.org/sites/default/files/MBS_Survey_Results.pdf

ADB. (2018, April). *Asian Development Bank and Myanmar: Fact Sheet*. From Asian Development Bank: <https://www.adb.org/publications/myanmar-fact-sheet>

ADB. (2018, March 8). *ADB project database*. From ADB project database: <https://www.adb.org/projects?terms=energy+efficiency>

ADB. (2017, September 25). *Cambodia: Rural Energy Project (formerly Rural Energy Pilot Project)*. Retrieved March 2018 from <https://www.adb.org/projects/45303-001/main#project-pds>

ADB. (2017). *Lao PDR: Economy*. From Asian Development Bank: <https://www.adb.org/countries/lao-pdr/economy>

ADB. (2017). *ADB's Work in Myanmar*. From ADB: <https://www.adb.org/countries/myanmar/overview>

ADB. (2016, December). *Myanmar: Energy sector assessment, strategy, and roadmap*. From ADB: <https://www.adb.org/sites/default/files/institutional-document/218286/mya-energy-sector-assessment.pdf>

ADB. (2014, September). *DRAFT Myanmar Renewable Energy Policy*. From TECHNOSOL Solar Technologie: http://www.technosol.de/Down/1408MYA-RE_PolicyD.pdf

ADB. (n.d.). *Indonesia: Sarulla Geothermal Power Generation Project*. From Asian Development Bank: <https://www.adb.org/projects/42916-014/main#project-overview>

ASEAN Centre for Energy. (2016). *ASEAN Renewable Energy Policies*. Jakarta: ASEAN Centre for Energy.
ASEAN Centre for Energy. (2015). *ASEAN PLAN OF ACTION FOR ENERGY COOPERATION (APAEC) 2016-2025*. Jakarta, Indonesia.

ASEAN Energy Outlook . (2017). *The 5th ASEAN Energy Outlook 2015 - 2014*. (A. E. Centre, Producer) Retrieved January 15, 2018 from ASEAN Energy Centre: <https://aseanenergy.sharepoint.com/PublicationLibrary/Forms/AllItems.aspx?id=%2FPublicationLibrary%2F2017%2FACE%20Publications%2FAEO5%2FAEO5%20Final-November2017%2Epdf&parent=%2FPublicationLibrary%2F2017%2FACE%20Publications%2FAEO5&p=true&slrid=87d0499e-1038-4000-c468-218bb90d2f5d>

Aung et al. (2015). *Myanmar: All that Matters - Banking & Finance*. Yangon: New Crossroads Asia.

DICA. (2016, October 18). *Myanmar Investment Law (official english translation)*. From Directorate of Investment and Company Administration : https://www.dica.gov.mm/sites/dica.gov.mm/files/document-files/myanmar_investment_law_official_translation_3-1-2017.pdf

Energiegenossenschaft Ingersheim. (2013, July). *Background Information on How the Cooperative Started After a Year of Operation (In German)*. From Energiegenossenschaft Ingersheim: http://www.egingersheim.de/index.php?option=com_phocadownload&view=section&id=1:genossenschaft&Itemid=7

Frankfurt School of Finance & Management. (2018). *Global Trends in Renewable Energy Investment 2018*. Frankfurt am Main: Frankfurt School of Finance & Management.

GAN Integrity. (2018). *Myanmar Corruption Report*. From GAN Business Anti-corruption Portal: <https://www.business-anti-corruption.com/country-profiles/myanmar/>

German Wind Energy Association. (2012, June). *Community Wind Power, local energy for local people*. From German Wind Energy Association: https://www.wind-energie.de/fileadmin/redaktion/dokumente/dokumente-englisch/publications/bwe_broschuere_buergerwindparks_engl_10-2012.pdf

Government of Cambodia. (2009). *The National Green Growth Roadmap*. Phnom Penh: Ministry of Environment.

Government of Lao PDR. (2016, April). *8th Five-year National Socio-economic Development Plan (2016-2020)*. From United Nations in Lao PDR: http://www.la.one.un.org/images/publications/8th_NSEDP_2016-2020.pdf

Government of Lao PDR. (2015, September 30). *Intended Nationally Determined Contribution: Lao PDR*. From United Nations Climate Change: <http://www4.unfccc.int/submissions/INDC/Published%20Documents/Laos/1/Lao%20PDR%20INDC.pdf>

Government of Lao PDR. (2015). *Policy on Sustainable Hydropower Development in Lao PDR*. Vientiane: Government of Lao PDR.

Government of Lao PDR. (2011, October). *Renewable Energy Development Strategy in Lao PDR*. From EEP Mekong: <http://www.eepmekong.org/index.php/resources/country-reports/laos/57-laos-06/file>

Government of Malaysia Economic Planning Unit. (2015, May 21). *Eleventh Malaysia Plan 2016-2010: Anchoring Growth People*. From Talent Corp: https://www.talentcorp.com.my/clients/TalentCorp_2016_7A6571AE-D9D0-4175-B35D-99EC514F2D24/contentms/img/publication/RMKe-11%20Book.pdf

Government of Myanmar. (2014). *National Energy Policy*. From EEP Mekong.

Hubbard, R. (2017, May 9). *Lao PDR: Challenges and opportunities for solar power development*. From DFDL: https://www.dfdl.com/resources/news/lao-pdr-challenges-and-opportunities-for-solar-power-development-in-the-lao-pdr/#_ftn2

Hussein, M. Z. (2013, January 1). *Financing Renewable Energy: Options for Developing Financing Instruments Using Public Funds*. From The World Bank: <http://documents.worldbank.org/curated/en/196071468331818432/pdf/765560WP0Finan00Box374373B00PUBLIC0.pdf>

IEA. (2017). *Southeast Asia Energy Outlook*. Retrieved February 2018 from <https://www.iea.org/publications/freepublications/publication/weo-2017-special-report-southeast-asia-energy-outlook-.html>

IFC. (2017). *Annual Report 2017: Creating Markets*. From IFC: <http://www.ifc.org/wps/wcm/connect/c40f7054-55c5-4606-8612-811edb34f73f/IFC-AR17-Full-Report-Vol-1-v2.pdf?MOD=AJPERES>

IFC. (n.d.). *IFC in Myanmar: Creating Opportunity Where It's Needed Most*. From IFC: <https://www.ifc.org/wps/wcm/connect/3974170043ba9348bab7ba869243d457/IFC+in+Myanmar.pdf?MOD=AJPERES>

Institute of Renewable Energy Promotion Ministry of Energy and Mine. (2016, December). *Renewable Energy Data in Lao PDR*. From IRENA: <https://www.irena.org/-/media/Files/IRENA/Agency/Events/2016/Dec/12/Laos-presentation.pdf?la=en&hash=C3EE41F35C533D50672C4A75B1AA0D9D10C8C66C>

International Financial Law Review. (2009). *International Financial Law Review*. From <http://www.iflr.com/Article/2323064/The-Philippines-Movement-towards-sustainable-energy.html>

IRENA. (2018). *Renewable Energy Market Analysis: Southeast Asia*. Abu Dhabi: IRENA.

KeTTHA. (2010). *National Renewable Energy Policy and Action Plan*. Kuala Lumpur : KeTTHA.

Killeen, P. (n.d.). *Laos Rural Electrification Program Planning*. From Worldwatch Institute: <http://www.worldwatch.org/system/files/Laos%20Atlas%20Case%20Study%20FINAL.pdf>

Kunleang , H. (2007, April). *Capacity and Institutional Strengthening for Rural Electrification and Development-Decentralized Energy Options*. From European Commission: https://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/cap_redeo_rural_electrification_by_re_in_cambodia.pdf

MIGA. (2018, April). *Enabling Renewable Energy Investment in ASEAN through Insurance and Guarantee Scheme*.

Min, K. (2013, October 10). *ADB, Japan to Give \$2.85 m to Develop Power Grid*. From Myanmar Business Today: <https://www.mmbiztoday.com/articles/adb-japan-give-285m-develop-power-grid>

Ministry of Electricity and Energy. (n.d.). *NEP Plan*. From Ministry of Electricity and Energy: <http://www.moee.gov.mm/en/ignite/page/80>

Ministry of Natural Resources and Environmental Conservation. (2017). *Myanmar Climate Change Strategy and Action Plan 2016-2030*. Nay Pyi Taw: The Republic of the Union of Myanmar.

MoEE. (2018). *Current Electricity Supply & Proposed Electricity Supply for Development of Electric Sector*. From Ministry of Electricity and Energy: <http://www.moee.gov.mm/en/ignite/page/80>

Mukawa, T., & Naing, W. (2018, January 26). *2018 Project Finance Report: Myanmar*. From International Financial Law Review: <http://www.iflr.com/Article/3783396/2018-Project-Finance-Report-Myanmar.html>

Myanmar National Energy Management Committee. (2015, December). *Myanmar Energy Master Plan*. From Burma Library: http://www.burmalibrary.org/docs22/2015-12-Myanmar_Energy_Master_Plan.pdf

Nam, K.-Y., Cham, M. R., & Halili, P. R. (2015, October). *Power Sector Development in Myanmar*. From Asian Development Bank: <https://www.adb.org/sites/default/files/publication/175801/ewp-460.pdf>

National Assembly. (1994). *Law of the Investment of the Kingdom of Cambodia*. Phnom Penh: The Kingdom of Cambodia.

(2011). *National Policy on Biofuel Lao PDR*.

OECD. (2017). *OECD Investment Policy Reviews: Lao PDR*. Paris: OECD Publishing.

Oo, T. L. (2017, July 12). *The Role of Renewable Energy in Myanmar's Future Energy Mix*. From Heinrich Boell Stiftung : <https://mm.boell.org/sites/default/files/uploads/2017/07/re12.7.pdf>

Oung, W. C. (2008 , February). *Rural Electrification Fund Cambodia: Providing Grants & Promoting Rural Electrification and Renewable Energy Technology*. From The World Bank: <http://siteresources.worldbank.org/INTENERGY2/Resources/presentation10.pdf>

PACT Myanmar . (n.d.). *Ahlin Yaung: Improving Access to Renewable Energy in Myanmar*. From PACT Myanmar: <https://www.pactworld.org/renewable-energy-myanmar>

Phouthonesy, P. (2015, August). *Energy Policy of Lao PDR 2015*. From the Institute of Energy Economics Japan : <https://eneken.ieej.or.jp/data/6233.pdf>

PT SMI. (2018). From <https://www.ojk.go.id/sustainable-finance/id/Lists/Agenda%20Nasional/Attachments/45/Pemaparan%20PT%20Sarana%20Multi%20Infrastruktur%20.pdf>

Rakhmadi, R., & Sutiyono, G. (2015). *Using Private Finance to Accelerate Geothermal Deployment: Sarulla Geothermal Power Plant, Indonesia*. Climate Policy Initiative.

Review, I. F. (2009). <http://www.iflr.com/Article/2323064/The-Philippines-Movement-towards-sustainable-energy.html>.

Rikvin. (2014). Singapore Tax Incentives.

Robertson, B., Joeline, C., & Dunn, L. (2015, October). *Local Development Funds in Myanmar An Initial Review*. From the Asia Foundation: <https://asiafoundation.org/resources/pdfs/LocalDevelopmentFundsENG.pdf>

Royal Government of Cambodia . (2013). *National Strategic Plan on Green Growth 2013-2030*. Phnom Penh: National Council on Green Growth.

Sarulla Operation Limited. (2017). *Corporate Social Responsibility*. From Sarulla Operation Limited: <http://sarullaoperations.com/>

Swiss Association for International Cooperation. (2010). *Rural Income through Sustainable Energy (RISE)*. Zurich: Swiss Association for International Cooperation.

Taylor, R. (2018, March 7). *The key changes for investors in the new MIC regime*. From Frontier Myanmar: <https://frontiermyanmar.net/en/the-key-changes-for-investors-in-the-new-mic-regime>

The Government of Lao PDR. (1997). *Electricity Law*.

The Sarulla Geothermal Power Project Indonesia. (n.d.). From Power Technology : <https://www.power-technology.com/projects/sarullgeothermalpowe/>

Tin, M. (2017, July 12). *Challenges and Issues of Renewable Projects in Myanmar by Private Developers*. From Heinrich Boell Stiftung: https://mm.boell.org/sites/default/files/uploads/2017/07/challenges_and_issues_of_renewable_energy_projects_utm.pdf

Uawithya, P. (2018, April 30). *Accelerating Rural Electrification in Myanmar*. From The Rockefeller Foundation: <https://www.rockefellerfoundation.org/blog/accelerating-rural-electrification-myanmar/>
UNDP. (2013). *Accelerating Energy Access for All in Myanmar*. United Nations Development Programme, Myanmar.

UNDP. *NAMA for the Renewable Energy Sector of Lao PDR*. Vientiane: UNDP.

Waissbein, O., Glemarec, Y., Bayraktar, H., & Schmidt, T. S. (2013). *Derisking Renewable Energy Investment A Framework to Support Policymakers in Selecting Public Instruments to Promote Renewable Energy Investment in Developing Countries*. New York: United Nations Development Programme.

World Bank. (2015). *Climate Assessment Sustaining Reforms in a Time of Transition*. Yangon: the World Bank.

World Bank. (2014). *Electric power transmission and distribution losses (% of output)*. From the World Bank Data: <https://data.worldbank.org/indicator/EG.ELC.LOSS.ZS>

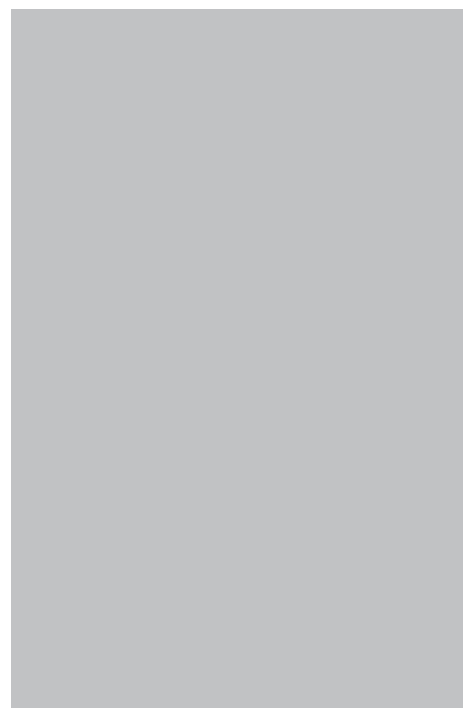
World Bank. (2015). *Implementation Completion and Results Report on an International Development Association Grant In the Amount of SDR 12.6 Million and a Global Environmental Facility Grant in the Amount of US\$1.818 Million to the Lao PDR for the Rural Electrification Proj*. The World Bank.

World Bank. (2012). *Lao PDR Power to the People: Twenty Years of National Electrification*. Washington, DC: the World Bank.

World Bank. (2018b, March 10). *World Bank Data*. From the World Bank: <https://data.worldbank.org/indicator/SP.POP.TOTL?end=2016&locations=MM-LA-TH-VN-ID-KH-PH-MY-SG&start=1990>



The rice husk at Yin Pou Rice Mill, Kork Tunlap, Mongkul Borei, Banteay Mean Chey, Cambodia. Credit: GIZ



ISBN 978-979-8978-53-1



SustainableEnergyforASEAN



www.agep.aseanenergy.org
www.aseanenergy.org



This publication is supported by:



A joint cooperation between:



Implemented by:

