

# Mapping of Energy Efficiency Financing in ASEAN



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## Mapping of Energy Efficiency Financing in ASEAN



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Credit: DoE

## Disclaimer

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# Foreword

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Over the last decades, the Association of Southeast Asian Nation (ASEAN) has experienced one of the world's largest increments in primary energy demand with the growth of 70% since 2000. Energy efficiency (EE) has been identified as one of the most cost-effective ways to address the challenge in ensuring global energy security by reducing user-side energy demand and consumption.

The ASEAN Member States (AMS) have set their collective aspirational target in the ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025 to reduce energy intensity (EI) by 20% in 2020 and 30% in 2025 based on 2005 levels. As reported in the Joint Ministerial Statement of the 36<sup>th</sup> ASEAN Ministers on Energy Meeting (AMEM) held in Singapore in October 2018, ASEAN had achieved a 21.9% reduction in EI compared with 2005 levels in 2016, exceeding the 2020 target.

To accomplish the remaining long-term target of 30% EI reduction in 2025 based on 2005 levels, it is important for ASEAN to highlight the collaborative efforts in creating a conducive environment in attracting investments, most importantly in developing sustainable financing models that suit the needs of each member states.

Supporting the above matter, the ASEAN-German Energy Programme (AGEP) – a jointly implemented project by ASEAN Centre of Energy (ACE) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) – has conducted a study that maps the landscape of energy efficiency in ASEAN, particularly in the relevance of its financing framework.

This study reviews the AMS targets, energy consumption, institutional and policy frameworks, key stakeholders, and various financial support mechanisms available for Energy Efficiency and Conservation (EE&C) to better understand the status, progress, and key success factor of their implementation. As highlighted in one of the findings, some AMS have already been able to successfully develop more advanced frameworks by creating dedicated financing schemes for EE activities. This review is also set as a basis to identify the challenges and prospective recommendations to support the AMS in accelerating their financing strategies.

This study was developed through extensive research and cooperation with the ASEAN Energy Efficiency and Conservation Sub-sector Network. Therefore, we are pleased to present the Mapping of Energy Efficiency Financing in ASEAN. We hope this study could serve as a comprehensive and reliable source of reference that will be helpful for policymakers and other relevant stakeholders in the region, to formulate advance EE policy frameworks and its implementation by developing suitable financial support schemes in their countries. Ultimately, we believe this study will also support AMS in achieving their EE related national target as well as the long-term APAEC target on EI reduction towards a secure, accessible, affordable and sustainable energy future in the region.

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# Executive Summary

The primary energy demand in the Association of Southeast Asian Nations (ASEAN) region grew by 70% since 2000. According to the ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025, ASEAN Member States (AMS) agreed on a regional goal to reduce Energy Intensity (EI) by 20% in 2020 and by 30% in 2025, compared to 2005 level. It is identified that a total investment of around USD 11 billion would be required to achieve this goal.

To promote energy efficiency and conservation (EE&C) implementation in ASEAN, financing is one of the most important factors to consider. This mapping study presents an overview of various financial support mechanisms available for EE&C across all AMS, identifies challenges and provides respective recommendations to accelerate EE&C development in the region.

This report's findings show that EE&C institutional and policy framework at the ASEAN level is developed in which all AMS in the ASEAN region have adopted EE&C policies, programs and roadmaps to achieve energy savings across different sectors. Key stakeholders were identified during the mapping of EE&C financing stakeholders in ASEAN. Government ministries, international development bank/agencies, national development banks, commercial banks, project developers including corporates and energy service companies (ESCOs), as well as utility companies are playing an active role in EE&C financing in the region.

EE projects with high rates of return remain unimplemented because of high investment risks, unavailable information on incentive schemes and mechanisms to project developers, lack of awareness on EE measures and insufficient skilled manpower. Other key challenges identified in this study include low energy prices and subsidies which disincentivise investments in EE&C projects and limited access to finance. In addition, lack of legislative measures to support the effective implementation of EE&C further hindering EE&C development in the region. To address some of the barriers in financing EE&C projects in the region, some AMS such as Singapore, Thailand, Malaysia, Indonesia and Vietnam have been able to develop more advanced frameworks by creating dedicated financing schemes for EE activities (e.g. Thailand provides grants, loans, equity and guarantee dedicated to EE projects).

Innovative financing schemes for EE projects that are highly successful are also presented in this study. The Energy Efficiency Revolving Fund (EERF) in Thailand aims to stimulate EE investments in large scale, energy-intensive industries while building capacities within local banks with regard to financing energy efficiency (and renewable energy) projects by providing soft loans with a flat low interest rate. The Energy Performance Contracting (EPC) Fund in Malaysia provides loans with interest rebate, as well as loan guarantees to eligible EE&C projects to help overcome the capital constraints costs that ESCOs face when securing suitable financing for EE interventions in the building sector.

Several recommendations have been developed to overcome the above-mentioned challenges as follows:

- Remove fossil fuel subsidies and introduce market prices that reflect real economic costs
- Introduce policies, laws, rules and regulations along with schemes on voluntary and mandatory basis such as rating systems and minimum energy performance standards
- Conduct awareness raising for both policy makers and those in the implementation (e.g. commercial banks) and make available related information to all key stakeholders.
- Involve private players in the implementation, financing, reporting and verification of EE&C projects. The private sector could introduce innovative financing instruments provided adequate regulatory frameworks are made available by the governments.

The ASEAN region has already achieved 18% reduction in energy intensity in 2015 and is well-placed to reach the target of 20% as stipulated in the APAEC 2016-2020. Furthermore, to reach the long-term targets of 30% reduction in energy intensity by 2025, there is a need to innovate Energy Efficiency Financing Schemes and mechanisms and develop supporting policies. The implementation of financing mechanisms and schemes often face challenges as highlighted in this study. To overcome AMS' specific and common challenges, an effective collaboration between AMS governments can play a crucial role in developing policies and ensuring its effective implementation.





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# Acronyms and Abbreviations

ABS	Asset-backed securities
ACE	ASEAN Centre for Energy
ACMECS	Ayeyawady-Chao Phraya-Mekong Economic Cooperation Strategy (Lao PDR)
ADB	Asian Development Bank
AETF	Asia Energy Transition Fund
AGEP	ASEAN-German Energy Programme
AIB	Asian Infrastructure Investment Bank
AMS	ASEAN Member States
APAE C	ASEAN Plan of Action for Energy Cooperation
APEC	Asia-Pacific Economic Cooperation
A*STAR	Agency for Science, Technology and Research (Singapore)
ASEAN	Association of Southeast Asian Nations
BAGUS	Brunei Accredited Greening Building Unified Seal
BAU	Business as Usual
BCA	Building and Construction Authority (Singapore)
BREEF	Pilot Building Retrofit Energy Efficiency Financing (Singapore)
BSEEP	Building Sector Energy Efficiency Project (Malaysia)
C2E2	Copenhagen Centre on Energy Efficiency
CCAP	Center for Clean Air Policy
CCCD	Cambodian Climate Change Department
CDIA	Cities Development Initiative Asia
CDM	Clean Development Mechanism
CETREE	Centre for Education and Training in Energy Efficiency and Renewable Energy
CFL	Compact fluorescent lamp
CGIF	Credit Guarantee and Investment Facility
COMM	Capital Markets Malaysia
DANIDA	Danish International Development Agency
DEDE	Department of Alternative Energy Development and Efficiency (Thailand)
DENR	Department of Environmental and Natural Resources (Philippines)
DET	Department of Energy Technique
dfe	Design for Efficiency
DIW	Department of Industrial Works (Thailand)
DOE	Department of Energy (Philippines)
DOTr	Department of Transportation (Philippines)
DSM	Demand-side management
DTI	Department of Trade and Industry (Philippines)
EACG	Energy Audit Conditional Grant (Malaysia)
EASe	Energy Efficiency Improvement Assistance Scheme
EBRD	European Bank for Reconstruction and Development
E2F	Energy Efficiency Fund (Singapore)
E2PO	Energy Efficiency Programme Office (Singapore)
ECA	Energy Conservation Act (Singapore)
EDC	Electricité Du Cambodge
EDPMO	The Energy Department, Prime Minister's Office (Brunei Darussalam)
EDB	Economic Development Board (Singapore)
EDL	Electricité du Laos
EE	Energy Efficiency
EE & C	Energy Efficiency & Conservation
EE & C-SSN	Energy Efficiency & Conservation Sub-Sector Network
EEI	Energy Efficiency Index
ENP	Energy Efficiency National Partnership (Singapore)
EPP	Energy Efficiency Plan 2015 (Thailand)
EPP Mekong	Energy and Environment Partnership Mekong
ERF	Energy Efficiency Revolving Fund
GAT	Electricity Generating Authority of Thailand
EI	Energy Intensity
EIB	European Investment Bank
EID	Energy and Industry Department
EMA	Energy Market Authority (EMA)
ENCON	Energy Conservation and Promotion Fund (Thailand)
EnMS	Energy Management System
EPC	Energy Performance Contracting
EPCF	Energy Performance Contracting Fund
EPPo	Energy Policy and Planning Office (Thailand)
ERIA	Economic Research Institute for ASEAN and East Asia
ESA	Energy Service Agreements
ESCO	Energy Service Company
ESD	Environmentally Sustainable Design
ESI	Energy Savings Insurance
ESPC	Energy Saving Performance Contract
EU I-PDF	European Union Energy Initiative – Partnership Dialogue Facility
FI	Financial institutions
FSA	Financial Services Authority
GCF	Green Climate Fund
GDE	General Directorate of Energy (Vietnam)
GDP	Gross Domestic Product
GEF	Global Environment Facility
GESP	Guaranteed Energy Savings Performance (GESP)
GHG	Greenhouse gas
GIZ	The Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GM-GFA	Green Mark Gross Floor Area (Singapore)
GMIS-DP	Green Mark Incentive Scheme Design Prototype (Singapore)
GMIS-EB	Green Mark Incentive Scheme for Existing Buildings (Singapore)
GMIS-EBP	Green Mark Incentive Scheme for Existing Buildings and Premises (Singapore)
GNI	Gross National Income
GPR	Gross Plot Ratio
GREET	Grant for Energy Efficient Technologies
GTFS	Green Technology Financing Scheme (Malaysia)
HDB	Housing and Development Board (Singapore)
IA	Investment Allowance
IBRD	International Bank for Reconstruction and Development
ICSID	International Centre for Settlement of Investment Disputes
IDA	International Development Association

IDB	Islamic Development Bank
IFC	International Finance Corporation
IFI	International Financial Institution
INDC	Intended Nationally Determined Contributions
IPP	Independent Power Producers
JTC	Jurong Town Corporation (Singapore)
KeTTHA	Ministry of Energy, Green Technology and Water (Malaysia)
LCEE Low	Carbon Transition in Energy Efficiency
LNG	Liquefied natural gas
LTA	Land Transport Authority
MARD	Ministry of Agriculture and Rural Development (Vietnam)
MDV	Malaysia Debt Ventures
MGTW	Ministry of Energy, Green Technology and Water (Malaysia)
MELS	Mandatory Energy Labelling Scheme
MEMR	Ministry of Energy and Mineral Resources (Indonesia)
MEPS	Minimum Energy Performance Standards
MESITA	Malaysian Electricity Supply Industries Trust Account
MESTEC C	Ministry of Energy, Science, Technology, Environment and Climate Change (Malaysia)
MEWR	Ministry of Environment and Water Resources (Singapore)
MFA	Ministry of Foreign Affairs
MGTC	Malaysian Green Technology Cooperation
MIGA	Multilateral Investment Guarantee Agency
MOC	Ministry of Construction (Vietnam)
MOET	Ministry of Education and Training
MOF	Ministry of Finance (Vietnam)
MOI	Ministry of Industry (Myanmar and Thailand)
MOIT	Ministry of Industry and Trade
MONRE	Ministry of Natural Resources and Environment (Vietnam)
MOST	Ministry of Science and Technology (Vietnam)
MOT	Ministry of Transport (Vietnam)
MPI	Ministry of Planning and Investment (Vietnam)
MRV	Monitoring, reporting and verification
MTI	Ministry of Trade and Industry (Singapore)
Mtoe	Million tonnes of oil equivalent
NATIF	National Technology Innovation Fund (Vietnam)
NCCS	National Climate Change Secretariat (Singapore)
NDC	Nationally Determined Contributions
NEA	National Electrification Administration (Philippines)
NEMC	National Energy Management Committee (Myanmar)
NGCP	National Grid Corporation of the Philippines
NPC	National Power Corporation
NEA	National Environment Agency (Singapore)
NEMC	National Energy Management Committee (Myanmar)
NEECP	National Energy Efficiency and Conservation Programme (Philippines)
NPC	National Power Corporation (Philippines)
NRF	National Research Foundation (Singapore)
NTC	National Transmission Corporation (Philippines)
OCBC	Oversea-Chinese Banking Corporation Ltd.
OECD	Organisation for Economic Cooperation and Development
PACE	Property Assessed Clean Energy Programmes
PIEEP	The Philippine Industrial Energy Efficiency Project
PPA	Power Purchasing Agreements
PPP	Public-private partnership
PSALM	Power Sector Assets & Liabilities Management Corporation
PSTLES	Public Sector Taking the Lead in Environmental Sustainability (Singapore)
PT. SMI	Perseoran Terbatas Sarana Multi Infrastructure
RE	Renewable Energy
R&D	Research and Development
SAVE	Sustainability Achieved via Energy Efficiency
SCEM	Singapore Certified Energy Manager
SDCL	AsiaSustainable Development Capital Limited
SEDA	Sustainable Energy Development Authority (Malaysia)
SGBD - B CA	Singapore Green Building Council in collaboration with the Building and Construction Authority
SGD	Singapore Dollar
SME	Small and Medium Enterprises
SME - EE	Small and Medium Enterprises Energy Efficiency
SO	Systems Optimization
SPV	Special Purpose Vehicle
SRI	Sustainable and Responsible Investment
STEED	Science, Technology and Energy Efficiency Department (Vietnam)
T&D	Transmission and Distribution
TFEC	Total Final Energy Consumption
THB	Thailand Baht
TIEB	Thailand Integrated Energy Blueprint
TNB	Tenaga Nasional Berhad (Malaysia)
TWh	Terawatt hours
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
URA	Urban Redevelopment Authority (Singapore)
URCUNEP	Risoe Centre
VAT	Value-added tax
VC	Venture Capital
VDB	Vietnam Development Bank
VEPF	Vietnam Environment Protection Fund
VGF	Viability Gap Fund
VND	Vietnamese Dong
VNEEC	Vietnam Energy and Environment Consultancy
VNEEP	Vietnam National Energy Efficiency Programme
VRF	Variable Refrigerant Flow
WB	World Bank
ZCPS	Zero Capital Partnership Scheme (Singapore)





# 1. Introduction

## 1.1 Background

The Association of Southeast Asian Nations (ASEAN) region is an economic zone of around 630 million people with a regional gross domestic product (GDP) of USD 2.8 trillion (2018) and an annual average growth rate of 5.3% according to the ASEAN annual statistical report. The increased demand for energy is due to the economic drive in the region in addition to rapid industrialisation. ASEAN has collectively become the third fastest growing region in the world. Its accelerated growth has resulted in increased energy demand by a factor of 2.3 over long-term projections to 2040 according to the 5<sup>th</sup> ASEAN Energy Outlook. However, energy demand and supply in individual states vary between ASEAN Member States (AMS). Indonesia, Malaysia and Thailand together account for around 70% of the total energy consumed by all AMS. The specific energy consumption in these states is about ten times higher than Cambodia, Lao PDR, and Myanmar combined.

According to the 5<sup>th</sup> ASEAN Energy Outlook, the total final energy consumption (TFEC) in the region will increase from 427 million tonnes of oil equivalent (Mtoe) in 2015 to 1,046 Mtoe from Business as Usual (BAU) scenario in 2040 (ASEAN Centre for Energy, 2017), and is driven by the demands from the industry, transport, and residential sectors. This increased energy demand is projected to be met by heavy reliance of fossil fuel with coal outstripping natural gas to meet the demand in the electricity sector, and oil representing the main source of fuel for the transport sector. These sectors, however, provide opportunities for potential energy savings and efficiency gains in the region. The 5<sup>th</sup> ASEAN Energy Outlook highlights that energy efficiency (EE) policies that are in place or under consideration today will lead to a saving by 10% of TFEC by 2040, as compared to BAU (ASEAN Centre for Energy, 2018).

The ASEAN Member States agreed on a collective target of a 20% reduction in energy intensity by 2020 and 30% by 2025 with a 2005 baseline as stated under the ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025. They are committed to achieving the energy efficiency and conservation (EE&C) objective through the harmonisation of EE standards and labelling requirements, stronger alignment of building codes with the EE&C criteria, enhancement of private sector participations, including Energy Service Companies (ESCOs), for EE&C promotion, as well as the involvement of financial institutions in EE&C development (ASEAN Centre for Energy, 2015).

This report addresses the need for a consolidated document that presents an overview of the current EE&C financing schemes and mechanisms in the ASEAN region.

## 1.2 Objective and Scope

The objective of this report is to provide a comprehensive overview of the existing EE&C financing mechanisms and schemes, and relevant institutional and policy framework in the AMS. The document identifies major challenges in the financing EE&C projects in the AMS.

## 1.3 Methodology

The content of this report is gathered through three different methodologies:

- A desk review was undertaken to identify EE&C policy framework and map out financing mechanisms and key stakeholders involved in the respective AMS. Programmes and policy reviews were carried out by examining relevant policy documents, schemes and legislations, as well as technological developments and their implementation modalities in the respective AMS.
- The validation of information contained in the first draft of the Mapping Study was conducted by the Energy Efficiency & Conservation Sub-Sector Network (EE&C-SSN) meeting participants during a half-day ASEAN-German Energy Programme (AGEP) EE consultation workshop held in April 2018 in Singapore. The draft Mapping Study was then revised based on the inputs obtained.
- Improvements, revisions and updates of the mapping study were conducted based on the discussions and inputs received by relevant stakeholders, including from the AMS EE&C Focal Points, during a 2-day Focus Group Discussion organised in September 2018 in Bangkok.

## 1.4 Outline of the Report

The report is divided into four chapters and structured as follows:

**Chapter 1** introduces the current state of energy efficiency and its financing scenario in ASEAN.

**Chapter 2** shows an overview of the EE&C institutional and policy frameworks at regional level and existing financing schemes for EE&C together with the stakeholders' landscape in the region (only public and private entities of regional significance).

**Chapter 3** elaborates information on EE&C targets and policy frameworks (schemes, legislations, instruments, mechanisms, rules and regulations) along with key players in each AMS under the following sub-headings.:

- Country overview, energy efficiency status, and targets
- Policy, rules, and regulations
- Financing schemes, mechanisms, and incentives
- Key stakeholders
- Challenges and recommendations

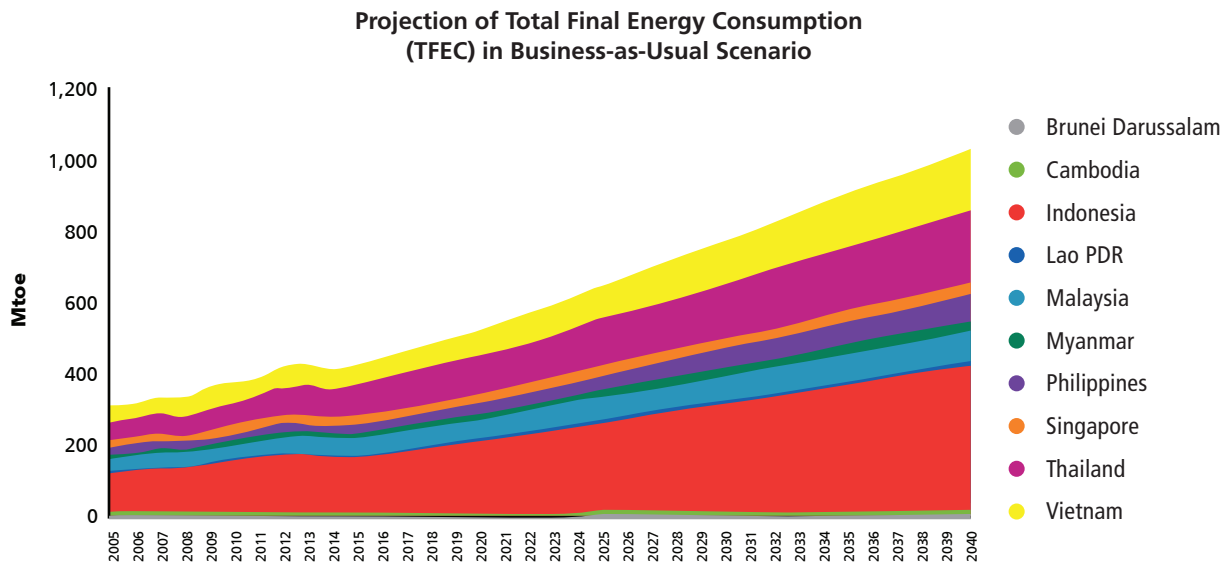
**Chapter 4** summarises the main findings of the report and provides a set of recommendations for the development of the EE&C financing guidelines.



## 2. Review of the Existing EE&C Financing in ASEAN

### 2.1. Overview of Energy Sector in the ASEAN Region

The Total Final Energy Consumption (TFEC) in the ASEAN region is expected to grow 2.4 times (from 2015 to 2040) in a business-as-usual scenario in the absence of enhanced energy efficiency and renewable energy. Energy consumption in individual states varies between the AMS with countries such as Indonesia, Malaysia and Thailand accountable for around 70% of the total energy demand within the ASEAN region as illustrated in Figure 1.



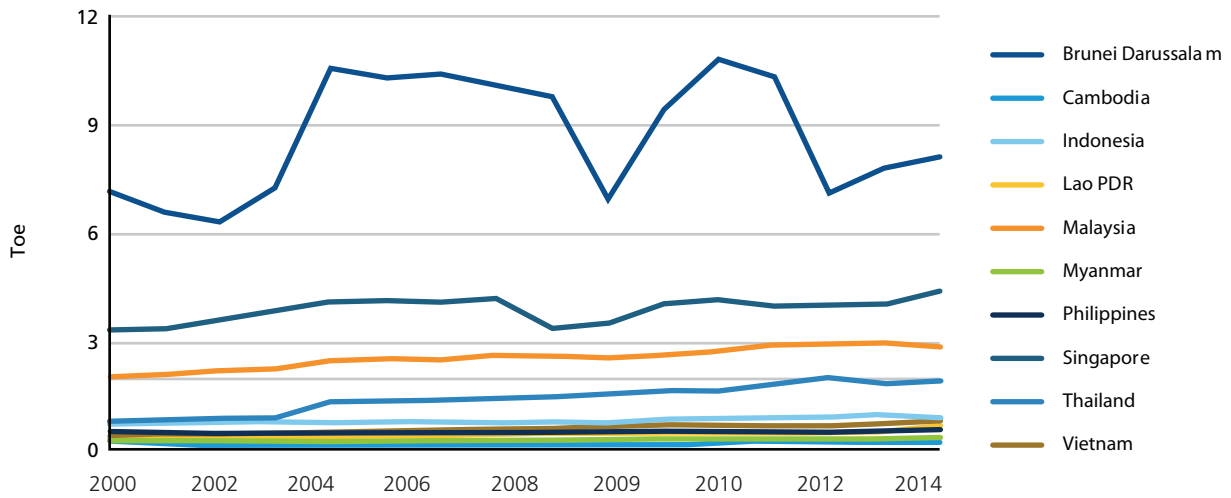
**Figure 1. Projection of TFEC in each AMS**

Source: 5<sup>th</sup> ASEAN Energy Outlook 2017

Energy consumption per capita in the region, however, does not necessarily follow the order of TFEC. Small and relatively wealthier countries such as Brunei Darussalam and Singapore have historically been using more energy per capita than the rest of the AMS as illustrated in Figure 2. The latter can be linked to high energy consumption trends associated with large urban populations<sup>1</sup>, as well as with particularly high per capita Gross National Income (GNI). Singapore, for example, has an advanced service economy and a GNI of US 85,020, while Brunei Darussalam has large oil and gas reserves and a GNI of US 83,010. Both countries are amongst the world's 5 highest GNIs (World Bank, 2018b).

<sup>1</sup> Singapore's population has been entirely urban since 1960, while 75.5% of Brunei Darussalam's became urban by 2016. This share of urban population is the highest amongst the ASEAN countries and is significantly above the world's average of 54%.

**Historical TFEC per Capita in Each AMS**

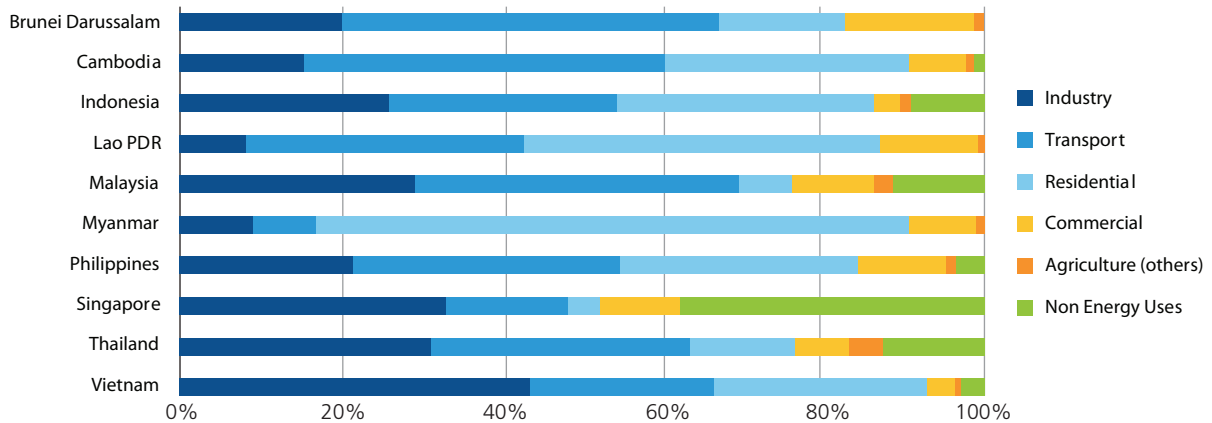


**Figure 2. Historical Energy Use per Capita in each AMS**

Sources: 5<sup>th</sup> ASEAN Energy Outlook 2017

The 5<sup>th</sup> ASEAN Energy Outlook highlights that TFEC in the region will increase from 427 Mtoe in 2015 to 1,046 Mtoe from BAU in 2040. The increase in energy demand is driven by industry, transport and residential sectors, and projections say that the demand will be mainly met by fossil fuels. Figure 3 shows the energy consumption by sector in the region.

**Share of Energy Consumption by Sector in each AMS**



**Figure 3. Energy Consumption by Sector in ASEAN Region**

Source: 5<sup>th</sup> ASEAN Energy Outlook 2017

As the use of energy is a vital component for sustainable development and economic growth, it is imperative that ASEAN countries ensure that energy generation and consumption are managed in the most sustainable way. Towards this goal, ASEAN countries have identified EE&C efforts as a cost-effective strategy to reduce energy consumption. However, several challenges were identified during the process such as the lack of successful Energy Efficiency Financing models which prevents a full exploitation of the EE&C potential in the region. Another problem is lack of an appropriate financial ecosystem for EE&C projects in the region, which has been linked to several institutional and policy challenges. These will be addressed in the following chapter.



## 2.2 EE&C Institutional and Policy Framework at the ASEAN Level

Improving energy efficiency has been identified as the region's top priorities to achieve energy security, accessibility, affordability and sustainability. All countries in the region have adopted EE policies and programmes to achieve energy savings across different sectors. Most AMS have enacted a series of laws, acts or regulations, set up priorities for energy conservation, and assigned functions or created agencies with the mandate to develop strategies and mechanisms to promote EE&C by establishing AMS specific energy saving targets as shown in Table 1.

**Table 1. National Energy Efficiency Targets in the ASEAN Region**

Country	Reference documents	EE targets of ASEAN Member States
<b>ASEAN region</b>	<b>APAEC (2016-2025)</b>	<b>20% Reduction in Energy Intensity (EI) by 2020 and 30% by 2025 with a 2005 baseline</b>
Brunei Darussalam	Energy White Paper 2014	<ul style="list-style-type: none"> <li>Reduce TFEC by 63% and energy intensity by 45% in 2035 (based on 2005 level)</li> </ul>
Cambodia	Cambodia EE Plan	<ul style="list-style-type: none"> <li>Reduce TFEC by 20% in 2035 (BAU)</li> </ul>
Indonesia	National Energy Policy (Government Regulation No. 79/2014)	<ul style="list-style-type: none"> <li>Reduce TFEC in 2025 by 17% in industry, 20% in transportation, 15% in household, 15% in commercial building (BAU)</li> <li>Achieve 1% energy intensity reduction per year until 2025 and energy elasticity of less than 1 in 2025.</li> </ul>
Lao PDR	National EE Policy 2016	<ul style="list-style-type: none"> <li>Reduce TFEC by 10% in 2030 (BAU)</li> </ul>
Malaysia	National EE Action Plan	<ul style="list-style-type: none"> <li>Reduce electricity consumption in TEFC by 8% in 2025 (BAU)</li> </ul>
Myanmar	National EE&C Policy	<ul style="list-style-type: none"> <li>Reduce electricity consumption in TEFC by 20% in 2030 (BAU)</li> </ul>
Philippines	EE Roadmap for the Philippines, 2017-2020	<ul style="list-style-type: none"> <li>Reduce TFEC by 1% per year until 2040 (BAU), equivalent with the reduction of 1/3 of energy demand.</li> <li>Reduce energy intensity by 40% in 2040 (based on 2005 level)</li> </ul>
Singapore	Sustainable Singapore Blueprint 2015	<ul style="list-style-type: none"> <li>Reduce energy intensity by 35% in 2030 (based on 2005 level)</li> </ul>
Thailand	Energy Efficiency Plan (EEP 2015)	<ul style="list-style-type: none"> <li>Reduce energy intensity by 30% in 2036 (based on 2010 level)</li> </ul>
Vietnam	National Target Programme for EE&C	<ul style="list-style-type: none"> <li>Reduce TFEC by 8% in 2020 (BAU)</li> <li>Reduce energy intensity of energy intensive industries by 10% in 2020</li> </ul>

Sources: ERIA (2016), 5<sup>th</sup> ASEAN Energy Outlook 2017



Despite ASEAN's shared priorities, there are significant differences regarding each nation's energy context including resource endowments, consumption patterns, technical capacities, and regional challenges. Table 2 summarises the relevant sectors where EE&C policy frameworks have been developed (marked 'X') in the region, focusing on the industry, commercial & residential, and building sectors.

**Table 2. EE&C Institutional and Policy Frameworks in ASEAN Member States by Sector**

Country	Building sector	Commercial & residential	Industry sector	Transport	Lighting	Other cross-sectoral
Brunei Darussalam		✓	✓	✓		
Cambodia		✓	✓	✓		
Indonesia	✓	✓	✓			
Lao PDR					✓	
Malaysia	✓	✓	✓			
Myanmar						
Philippines	✓	✓	✓	✓		
Singapore	✓	✓	✓	✓	✓	
Thailand	✓	✓	✓	✓	✓	
Vietnam	✓					Power

Sources: ERIA (2016), 5<sup>th</sup> ASEAN Energy Outlook (2018)

## 2.3 Types of EE&C Financing

EE financing can be grouped into two main types namely traditional financing- and emerging (or specialised) instruments. Traditional financing instruments (e.g., loans and leases) are commonly used to pay for EE initiatives as well as many other goods and services. Emerging or specialised instruments are specifically designed to support EE activities and other clean energy installations and to overcome market barriers. For example, on-bill financing products and Property Assessed Clean Energy (PACE) programme that allow a property owner to finance the upfront cost of energy or other eligible improvements on a property and then pay the costs back over time through a voluntary assessment. The unique characteristic of PACE assessments is that it is attached to the property rather than the individual.

Traditional financing instruments are familiar to customers and contractors, given their common use in other contexts, although they typically do not include features offered in emerging or specialised EE financing instruments that are designed to mitigate specific barriers. Several financial institutions that support investment in ASEAN countries rely on instruments such as equity participation, long-term loans, and guarantees as the most popular ways to promote the development of EE&C related projects (World Bank, 2018; ADB, 2018). The International Financial Institutions (IFIs) in the region often leverage financing from other commercial sources in addition to directly offering financial support to EE&C projects. ADB, for example, collaborates with regional organisations and funds (e.g. Asian Development Fund, ASEAN Infrastructure Fund, Credit Guarantee, and Investment Facility) with the aim to bolster sustainable infrastructure. Likewise, the five institutions of the World Bank (WB)<sup>2</sup> provide financing guarantees and technical assistance.

<sup>2</sup> The Multilateral Investment Guarantee Agency (MIGA), The International Bank for Reconstruction and Development (IBRD), The International Development Association (IDA), The International Centre for Settlement of Investment Disputes (ICSID), and The International Finance Corporation (IFC).





ADB has mobilised more than USD 400 million to EE&C projects in the ASEAN region by providing grants and technical assistance to the governments of Indonesia, Philippines, Vietnam, and Thailand. Some of ADB’s key interventions include replacing 100,000 gasoline-burning tricycles in the Philippines for electric ones<sup>3</sup>, supporting green urban infrastructure in Vietnam<sup>4</sup>, and providing technical assistance to mainstream EE measures in Thailand<sup>5</sup>. ADB’s technical assistance to the Government of Myanmar, between 2013-2015, resulted in a comprehensive report which contained EE policies and strategies, a series of key activities to be implemented by the Government, the main sectors to be targeted, and a roadmap for implementation (ADB, 2015b). Other IFIs, such as WB<sup>6</sup> and EIB<sup>7</sup>, have relied on traditional financing instruments to support EE&C projects in the region.

Although policymakers and development banks are already familiar with traditional financing instruments, due to multiple challenges, these instruments cannot always be applied. The challenges include lack of financial and technical capacities, both from the demand and supply side, lack of interest from potential project developers, absence of policy frameworks that encourage investment in EE&C projects, and others (Rugova, 2016). To address such aspects, further innovative financing instruments such as PACE and on-bill repayment are emerging mostly in developed countries (e.g. Europe and North America) with the aim to address some of the investment hurdles.

Table 3 shows examples of both traditional and emerging (specialised) financing instruments while Table 4 provides a description of each of the financing instruments.

**Table 3. Typology of EE&C Financing Instruments**

Traditional Financing Instruments	Specialised (or emerging) Financing Instrument
Objective: to showcase the importance of EE&C measures	Objective: to enable EE&C investments at scale and depth
Debt, including dedicated credit lines (soft loans)	Payment security schemes, e.g. on-bill repayment, On-tax finance, PACE
Grants e.g. Project Development	Crowdfunding
Leasing	Results-based financing (RBF)/Carbon financing
Infrastructure, EE and Revolving funds; Risk-sharing facilities	Asset-backed securities (ABS) & Revenue Bonds
Energy Performance Contracting (EPC), public ESCOs; Energy Service Agreements (ESA)	Green bonds
Traditional guarantees and insurance	New guarantees and insurance, e.g. Energy Savings Insurance (ESI)
Equity e.g. Venture Capital (VC)	

Sources: Burg Capital (2017), Leventis, et al. (2016), Rugova (2016), The World Bank CIF (2013)

<sup>3</sup> ADB, 2017. Philippines: Market Transformation through Introduction of Energy-Efficient Electric Vehicles Project

<sup>4</sup> ADB, 2013. Vietnam: Secondary Green Cities Development Project

<sup>5</sup> ADB, 2009. Thailand: Mainstreaming Energy Efficiency Measures in Thai Municipalities

<sup>6</sup> WB, 2017. Vietnam Energy Efficiency for Industrial Enterprises

<sup>7</sup> EIB, 2009. Vietnam Climate Change FL

**Table 4. Description of EE&C Financing Instruments**

Instruments	Description
Traditional financing instruments	
<p><b>Debt, including dedicated credit lines (soft loans)</b></p>	<p>Lending or debt instruments provide borrowers with upfront funding in exchange for repayment of this capital (known as “principal”) along with interest, based on pre-determined timeframes and interest rate terms.</p> <p>Credit lines for EE measures are extended to end-users at preferential terms in connection with maturity and/or interest rates. Such credit lines are often provided by national or international development banks, such as European Investment Bank (EIB) and European Bank for Reconstruction and Development (EBRD) and are distributed further to designated markets through regional partner retail banks.</p>
<p><b>Grants (for Project Development)</b></p>	<p>Grants are financial awards typically provided to individuals or companies to facilitate or incentivize a determined activity. Grants do not have to be paid back under most conditions and are often provided by governments, companies and foundations.</p> <p>In the EE&amp;C context, grants are often used by governments to encourage the adoption of energy efficient technologies such as insulation, double glazing and others. Grants are often directed to a specific sector of the population that would otherwise not be able to adopt these measures.</p> <p>Grants can also be used under project development facilities, e.g. the Cities Development Initiative Asia (CDIA) to further develop projects and move them towards bankability.</p>
<p><b>Leasing</b></p>	<p>Similar to other lease-financing structures for products such as cars, leasing may be used for EE. Financing is provided for specific equipment whereby the end user rents (leases) that particular equipment from the lessor.</p>
<p><b>Infrastructure, EE and Revolving funds; Risk-sharing facilities</b></p>	<p><b>Real estate and infrastructure fund</b> are well-established structures for investing in real estate and infrastructure projects through funds which are set up for the sole purpose of finding suitable projects that are aligned with the fund’s strategy. In terms of EE, such funds provide for a great vehicle to invest in efficient real estate projects, though the EE component is not specifically defined and reported and, as such, it is often “hidden” in the investment.</p> <p><b>Revolving funds</b> are a mechanism used by organizations (companies, NGOs, municipalities, universities) to fund ongoing EE measures. In such structures, a certain amount of capital is set aside to fund internal efficiency projects. The fund is constantly replenished generated from the savings of already invested projects.</p> <p><b>EE funds</b> – are designated vehicles for EE investments that are typically set up with private or public funding or a combination thereof. The</p>





Instruments	Description
Traditional financing instruments	<p>investment principles are set by the fund and projects are targeted based on a set return. In essence, the fund functions like any other infrastructure fund, whereby a fund manager as well as other investment advisors are appointed to assess investment opportunities. Such funds may place investments in various EE projects that may use energy performance contracting or any other suitable mechanism.</p> <p><b>Risk-sharing facilities</b> – are mechanisms used to enhance the credit aspect of a certain instrument, for example through guarantee funds or first-loss facilities. Such enhancements typically reduce the level of risk for financiers of equity investors by covering a specific part of the risk (e.g. a specified rate of default rate).</p>
<p><b>Energy Performance Contracting (EPC), public ESCOs; Energy Service Agreements (ESA)</b></p>	<p><b>EPC</b> allows ESCOs to undertake the implementation of EE measures on behalf of the end user through an EPC, which often provides a guaranteed level of energy savings to the beneficiary. Furthermore, it allows a sharing of future energy savings between both parties. There are two distinct types of EPC contracts, the “financing Energy Performance Contracts” and “operational Energy Performance Contracts”. The key difference of these contracts lies in the financing arrangement. In operational EPCs, the user is the borrower and the financing agreement is entered between the user and the lending institution based on the EPC. In this case, ESCO’s role is more operational, which mitigates technical-related risks and acts as a savings guarantor. In financing EPCs, the project originates from the ESCOs, then ESCOs arrange the third-party financing, implement the efficiency measures and monitor the project. For large projects, such a centralised role is extremely beneficial as the ESCO serves as the main counterparty role for the financiers as well as the beneficiaries.</p> <p><b>Public ESCOs</b> – are a financing structure that combines the EPC concept with a publicly owned Special Purpose Vehicle (SPV) set up with the purpose of funding and owning EE projects implemented in public buildings. Such a structure is typically set up with public funds and targets projects with deep refurbishment ambitions. Such setups are also designed with public procurement rules in mind.</p> <p><b>ESA financing model</b> – is an emerging structure based on the traditional project finance model for energy projects. A project developer (Sponsor) establishes a SPV for the purpose of arranging, owning, operating, and financing the energy project, in this case energy efficiency projects. ESA is an evolution of EPC seen in ESCO structures, but the revenue aspect mimics the Power Purchasing Agreements (PPA), seen in energy generation projects. In the case of EE, SPV and the end user enter into an ESA based on which the end user pays the SPV for the actual energy saved, either as a fixed dollar amount per kWh saved or a floating amount based on a percentage of the utility bill.</p>

<b>Traditional Guarantees and insurance</b>	<p>Insurance and guarantee products protect investors from a borrower’s failure to repay as a result of pre-specified events. A guarantee can be a minimum assurance that protects a portion of the investment through its lifetime, or a back-end guarantee that covers the entire investment after a pre-determined timeframe.</p>
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<b>Equity (including Venture Capital - VC)</b>	<p>Equity financing is the purchase of a stock or any other security representing an ownership interest. Equity investments may be traded in a private company (not publicly), in which case it is called private equity, or in a public company, then it is called public equity.</p> <p>Venture capital is a special form of equity funding provided directly by investors (venture capitalists) to private companies such as start-up ventures or small companies in exchange of minority stakes. Companies receiving venture capital often have significant potential for expansion but face large financial risks associated with young companies which prevents access to other equities markets.</p> <p>Equity investments provide a critical capital base for a company or project to grow its operations, access other sources of finance, and reduce investment risks faced by other project/company investors, especially debt investors who are repaid before equity investors. In the EE&amp;C context, this instrument could be relevant for companies engaged in the development of innovative technologies.</p>
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Instruments	Description
Emerging financing instruments	

<b>Payment security schemes, e.g. on-bill repayment, On-tax finance, Property Assessed Clean Energy (PACE) Programs</b>	<p><b>On-bill repayment</b> is a mechanism that allows end user to benefit from EE investments without having to incur up-front costs. Investments are made typically by the utility company or a third-party financier, while the repayment is done by charging a repayment fee on the monthly utility bills. This structure leverages the existing relationship between the utility company and the customer, and the default rates are usually very low.</p> <p><b>On-tax finance</b> is a structure introduced in the U.S also known as the Property Assessed Clean Energy (PACE) which allows municipal authorities or private financiers to extend loans to property owners for EE investments. Loans are attached to the property which is being financed and the loan is repaid via local taxes. Similar to the on-bill financing, this structure results in a very low default level as the repayment is linked to taxes.</p>
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Instruments	Description
Emerging financing instruments	
<b>Crowdfunding</b>	<p>Crowdfunding is an emerging instrument that relies on a large number of individuals to provide small amounts of capital to finance a new business venture or project. Projects and ventures are often 'offered' to potential investors through crowdfunding websites and other online platforms as well as social media.</p> <p>Even though most crowdfunding schemes are rewards-based (e.g. investors receive a gift for their investment or a premium version of the product), some offer equity positions, which would be most relevant for EE&amp;C related companies and projects.</p>
<b>Result based / Carbon financing</b>	<p>This is a financing instrument where investors or project owners receive a returning revenue, depending on their results achieved. In case of private result-based finance, investors receive a regular share of business income or royalties until a pre-determined amount is reached, usually 3-5 times the invested money. Such result-based financing offers flexibility to companies as they do not pay back a fixed amount, but rather a percentage of their earnings. In case of public result-based finance or carbon financing, project owners receive revenues depending on results achieved, e.g. GHG emission reductions.</p>
<b>Green Bonds</b>	<p><b>Green bonds</b> are an emerging instrument in which proceeds are designed to be used to fund climate investments i.e. projects that aim to reduce GHG emissions or are geared for other sustainability related purposes. In essence, green bonds are similar to normal corporate bonds but carry a green element, which makes them distinct in how proceeds are used.</p>
<b>New guarantees and insurance e.g. Energy Savings Insurance</b>	<p><b>Energy Savings Insurance</b> <sup>8</sup> is an insurance product that covers projected energy savings for specifically defined and verifiable EE measures as agreed upon in a contract between a SME and technology solution providers. A compensation will be paid to the SME in the event that the promised savings are not realized.</p> <p>A package of complementary measures is also included in the insurance including a standardised contract to reduce transaction costs, third-party verification to ensure the quality of the project and the technology provider, as well as credit lines from development banks and grant support to sustain market demand.</p>

Source: Rugova (2016), Investopedia.com

<sup>8</sup> More information on <https://www.climatefinancelab.org/project/insurance-for-energy-savings/>



Credit: GIZ

Credit: ACE



## 2.4 Financing Schemes and Instruments for EE&C Projects Widely Used in ASEAN

Countries such as Indonesia, Malaysia, Singapore, Thailand and Vietnam have been able to develop more advanced frameworks by creating dedicated schemes to finance EE&C. Thailand, for example, developed the Energy Efficiency Revolving Fund (EERF), which allows the private sector to access dedicated funds that are repaid when projects become operational. Likewise, Malaysia has developed the Energy Performance Contracting Fund (EPCF), which uses government guarantees to make projects more bankable and attractive to investors. Malaysia has also implemented the Sustainability Achieved via Energy Efficiency (SAVE) programme, which uses rebates as a cost-effective mechanism to promote the adoption of efficient technologies within households.

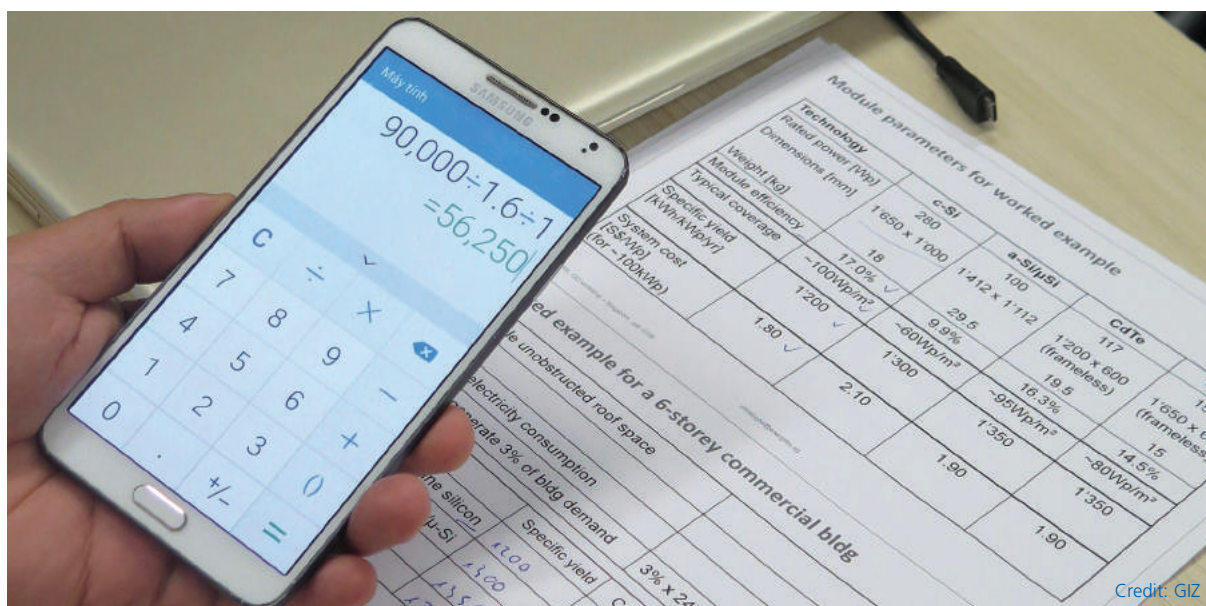
Singapore has various financial schemes to finance EE projects such as the Energy Efficiency Fund (E2F) for the industrial sector and the Green Mark Incentives Schemes (GMIS) for the buildings sector. Indonesia developed various schemes including an Infrastructure Fund and Viability Gap Fund (VGF). In Vietnam, financing schemes from the Vietnam Environment Protection Fund (VEPF), the National Technology Innovation Fund (NATIF), and the Vietnam Development Bank can also be used to finance EE&C projects. Each of the initiatives above is addressed in detail in Section 3 of this document.



Table 5. EE&C Financing Schemes in ASEAN Member States

Country	Dedicated EE grants	Dedicated EE loans	Dedicated EE equity	Dedicated EE Guarantee	Others
Brunei Darussalam					
Cambodia					
Indonesia	✓				
Lao PDR	✓				
Malaysia	✓	✓		✓	EPC, rebates
Myanmar		✓		✓	
Philippines	✓				
Singapore	✓	✓			
Thailand	✓	✓	✓	✓	
Vietnam	✓				

Sources: ERIA (2016), IEA (2018a; 2017) and 5<sup>th</sup> ASEAN Energy Outlook 2017



## 2.5 EE&C Finance Stakeholder Mapping

The stakeholder landscape of EE&C in the ASEAN region is composed by different organisations including intergovernmental bodies, financial institutions, and development agencies as summarised in Table 6. As identified by the Organisation for Economic Cooperation and Development (OECD), IFIs that are relevant for the ASEAN countries are the Asian Development Bank (ADB), the Asian Infrastructure Investment Bank (AIIB), the Islamic Development Bank (IDB), the World Bank Group (WB), the ASEAN Infrastructure Fund, and the Credit Guarantee and Investment Facility (CGIF). Although they do not directly finance EE&C, these donors often build up missing capacities for an effective financial ecosystem. Currently, the Asia Energy Transition Fund (AETF) is the only institution that offers financing for EE&C activities in the ASEAN region.



**Table 6. Types of Stakeholders in EE&C Financing in the ASEAN region**

Type of stakeholder	Roles
<b>Energy ministries</b>	Responsible for policies, regulations, strategies, and plans concerning the energy sector including EE&C.
<b>Finance ministries</b>	Introduce financial incentives or framework for EE&C activities
<b>International development banks/agencies</b>	Provide support in the form of funding (grants, loans, equity and guarantee) or technical assistance for the development of EE&C policies and financing schemes.
<b>National development banks</b>	Provide grants, loans, equity, and guarantee
<b>Commercial banks</b>	Provide commercial loans for individuals and business to cover upfront costs associated with EE&C projects
<b>Corporates</b>	Invest in their own company
<b>ESCOs</b>	Provide energy services, facilitate access to external capital for EE&C project implementation and provide guarantee savings, though usually Energy Performance Contracting (EPC).
<b>Utility companies</b>	Provide energy efficient technologies to the customers and promote EE measures
<b>Donors</b>	Provide support in the form of capacity building, technical assistance, and grants to set up an appropriate financial ecosystem for EE&C activities.
<b>Environment/climate change agencies and ministries</b>	Draft and implement environmental and climate policies targets that may imply a need to increase EE&C investments.



## 3. Mapping of EE&C Financing in ASEAN Member States

EE&C financing schemes and mechanisms were mapped out in each AMS. The mapping of EE&C in every AMS include an overview of the EE&C status, as well as targets, policies, rules, regulations and key stakeholders of relevant sectors. It reviews the existence and success of key financial schemes, mechanisms and incentives to support EE&C projects in each country and identifies barriers and opportunities for future financing of EE&C projects.

### 3.1. Brunei Darussalam

#### 3.1.1. Country Overview, EE status, and Target

The energy consumption per capita in Brunei Darussalam is the highest in ASEAN with approximately 8.07 tons of oil equivalent per capita (2015). Although Brunei's GDP is the lowest in the region, its GDP per capita is the second highest after Singapore. Around 60% of Brunei's GDP is generated by the energy sector, reflecting the huge contribution of this sector to the country's economy (Government of Brunei Darussalam, 2015). The energy sector also dominates the country's export share, with crude oil, liquefied natural gas (LNG), and methanol exports accounting for over 90% of its total exports.

**Table 7. Country Overview, EE Status, and Target in Brunei Darussalam**

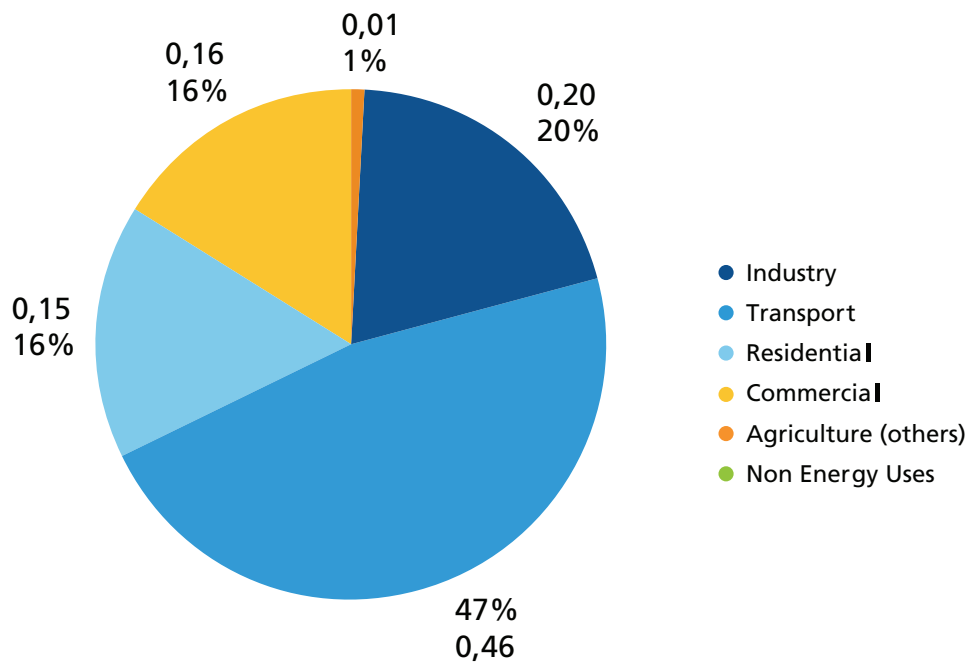
EE&C target	Reduce energy Intensity by 45% (2035) using 2005 as the base year		
Population (2016)	422,000	Population growth (annual, 2010 – 2016)	1.2%
GDP (2016)	USD 11.2 million	GDP growth (annual, 2010 – 2016)	3.3%
Energy use (kg of oil eq. / capita) (2015)	8,070	Electric power consumption (kWh per capita) (2015)	8,948
Access to electricity (2017)	99.9%	Energy intensity level of primary energy (kg of oil eq. / USD 2005 PPP GDP)	134

Source: ASEAN Centre for Energy Database (2018)

Historically, transport sector<sup>9</sup> is the largest energy customer, accounting for approximately 47% of the final energy consumption in 2016, followed by residential sector (16%), commercial and public services sectors (16%), industrial sector (15%), non-energy use (5%), and other sectors (1%) account for the energy consumption in the country. The breakdown of energy consumption by sector is illustrated in Figure 4.

<sup>9</sup> The Land Transport White Paper highlighted that Brunei Darussalam features "extremely high levels of car ownership, use and dependency" and shares of public transport, walking and cycling are extremely low.

**Brunei Darussalam Energy Consumption per Sector (Mtoe and %)**



**Figure 4. Energy Consumption by Sector in Brunei Darussalam in 2015**

Source: ASEAN Centre for Energy Database (2018)

### 3.1.2. Policies, Rules and Regulations

Given the predominant contribution of the energy sector to the country’s GDP, Brunei’s planned mitigation efforts are focused primarily on energy-related policies and actions, mainly in promoting EE&C and renewable energy (RE). Energy White Paper was launched in 2014 to set out a framework for the Government to address challenges and manage the projected risks in the energy sector in order to lead Brunei’s economy into a sustainable future as set out in Brunei Vision 2035. The Energy White Paper provides guidelines for achieving energy targets in the form of key priority initiatives under three strategic goals.

The Strategic Goal 1 is focused on the country’s oil and gas activities, The Strategic Goal 2 is focused on the energy sector, while The Strategic Goal 3 emphasizes local content and workforce. The Strategic Goal 2: Ensure Safe, Secure, Reliable and Efficient Supply and Use of Energy, has laid down an essential basis in improving EE and promoting energy conservation. Under this strategic goal, the Government sets the target to reduce EI by 45% by 2035 with a 2015 baseline. This goal is aimed to be reached through seven key policies and regulatory frameworks, namely (i) electricity tariff reform, (ii) EE&C building guidelines for non-residential sector, (iii) standards and energy labelling for products and appliances, (iv) energy management policy, (v) fuel economy regulation, (vi) financial incentives, and (vii) awareness raising (Government of Brunei Darussalam, 2015).

Transport sector is the largest energy consumer in the country. To address the challenges in this sector, the Government launched the Land Transport White Paper that identifies transport policy framework, strategies, facilities, infrastructure and services required to serve the nation’s long-term land transportation system up to 2035. The key policy framework in Brunei Darussalam is summarised in Table 8.



**Table 8. EE&C Policy Framework in Brunei Darussalam**

Key policies	<ul style="list-style-type: none"> <li>• Energy White Paper 2014, published by the Energy Department of the Prime Minister Office</li> <li>• Brunei Vision 2035, published in 2007 by the Prime Minister Office</li> <li>• EE Strategy (EE Roadmap as part of Nationally Determined Contributions (NDC), 2011), published by the Ministry of Development</li> <li>• Land Transport White Paper, published by the Ministry of Communication</li> </ul>	
	Key policy framework	Sectors
Industrial		<ul style="list-style-type: none"> <li>• Energy management: energy management building, energy monitoring (ISO 50001)</li> </ul>
Commercial and residential		<ul style="list-style-type: none"> <li>• Standard and labelling: MEPS and energy labelling for electrical appliances (residential) – in pipeline</li> </ul>
		<ul style="list-style-type: none"> <li>• Building regulations:                             <ul style="list-style-type: none"> <li>• EE&amp;C guidelines for non-residential buildings (government and commercial buildings), 2015</li> <li>• Brunei Accredited Green Building Unified Seal (BAGUS) as the green building rating system</li> <li>• 4<sup>th</sup> Brunei Darussalam Standard on Building Guidelines and Requirement, 2017</li> <li>• Brunei Darussalam Government Gazette on Building Control Regulation, 2014</li> </ul> </li> </ul>
		<ul style="list-style-type: none"> <li>• Project based EE measures such as street lighting</li> </ul>
Transport		<ul style="list-style-type: none"> <li>• Fuel economy regulations for passenger cars (planned)</li> </ul>
Power		<ul style="list-style-type: none"> <li>• Electricity tariff reform (for residential in 2012), and plan for commercial sector</li> </ul>
Sector wide		<ul style="list-style-type: none"> <li>• Awareness raising: energy awards, energy week and energy club</li> </ul>
	<ul style="list-style-type: none"> <li>• Financial incentives</li> </ul>	

### 3.1.3. Financing Schemes, Mechanism and Incentives

Brunei’s Intended Nationally Determined Contributions (INDC) stated that the Energy and Industry Department (EID) in association with the Ministry of Finance plan to identify suitable financial incentives, such as tax exemptions, tax reductions or rebate schemes, which can be introduced in the country on energy-efficient appliances and products. This financial support is aimed to address the increased capital cost that may incur when more energy efficient equipment is purchased. The EID and the Ministry of Communication are also exploring several options to provide appropriate financial incentives in the transportation sector, in particular for hybrid cars and fuel-efficient vehicles.

### 3.1.4. Stakeholders

The EID is the main government agency that coordinates all efforts for EE&C in the country. The Department envisions a “sustainable energy for Brunei prosperity” with a mission to “drive Brunei economy into sustainable future” (APEC, 2013). Under the Energy Department, there are two entities responsible for EE&C policy planning and implementation, namely the EE&C Unit and National EE&C Committee. Brunei National Energy Research Institute is also a key stakeholder in the field of EE&C that supports the government in designing, analysing and formulating EE related legislations, policies or other practices to enhance economically attractive deployment.

**Table 9. Institutional Framework for EE&C in Brunei Darussalam**

Institutions	Description
Energy and Industry Department (EID)	This department coordinates efforts from all stakeholders and evaluates legislative measures to promote EE&C. Two relevant entities for EE&C policy planning and implementation are: (i) EE&C Unit that implements EE&C action plans, and (ii) National EE&C Committee that oversees the implementation of prioritised EE&C plan of actions as outlined in the EE&C Roadmap.
Department of Electrical Services	This department is the regulator and service provider of electricity in the country.
Ministry of Development	This ministry is responsible for the development of the EE&C building regulation/code as outlined in EE&C's Roadmap with an objective to establish EE&C standards and a regulatory mechanism for buildings. Two relevant entities under the Ministry of Development are: Department of Mechanical and Electrical (Public Works Department) and Authority for Building Control & Construction Industry.
Ministry of Communications (Transportation Section)	This ministry introduces EE&C initiatives for the transport sector, such as promotion of the use of hybrid cars, electric vehicles and fuel-efficient vehicles in the country.
Ministry of Education	This ministry promotes EE&C awareness to inculcate the culture of EE&C at early childhood (school). One example is the establishment of Energy Clubs in schools.
Ministry of Finance	This ministry introduces financial incentives or a framework for energy efficient products and technologies.
Brunei National Energy Research Institute	This institute is a think tank organisation in the field of EE that provides EE-related policy researches, advise and knowledge sharing with an emphasis on economically attractive deployment.
Financial institutions	These institutions provide low interest rates to develop EE&C projects.

The specific sectors and policy measures managed by different agencies of the government are as shown in Table 10.

**Table 10. Management of EE&C Activities by Sector in Brunei Darussalam**

Sector	Measures	Responsible Division
Residential / Commercial	Appliance standards and labelling	EID
	Building regulation	Ministry of Development
Industrial	Energy Management: Energy	EID
	Management Building, Energy	Ministry of
	Monitoring	Communication
Transportation	Fuel Economic regulation	EID
Power	Electricity tariff reform	EID
Sector wide	Financial incentives	Ministry of Education
	Awareness raising	

Source: APEC (2013)



### 3.1.5. Challenges and Recommendations for EE&C Financing

Due to abundant energy resources and cheaper energy prices, there are less financial incentives available to implement EE&C measures in the country (APEC, 2013). Finding the correct, alternative incentives for consumers to engage in EE&C actions are therefore particularly challenging in Brunei Darussalam. Other factors hindering the implementation of EE&C initiatives and the development of dedicated EE&C financing mechanisms in Brunei Darussalam are insufficient legislative measures to support the establishment of effective EE&C institutions, inadequate market mechanisms to incentivize voluntary application of EE&C measures, limited experience with EE&C technologies, and the shortage of qualified EE&C practitioners and experts in the economy as EE&C has only recently been made a priority area in the country. To accelerate the EE&C development in the country, the Government needs to establish legislative measures to support the effective implementation of EE&C. Various schemes such as Minimum Energy Performance Standards (MEPS) could be introduced on voluntary- or mandatory basis. Furthermore, the Government could review existing successful financing schemes in other countries in the ASEAN region and adapt them to the country's national context. Awareness raising programmes for government officials and financial institutions are also necessary to ensure effective and efficient policy implementation. Table 11 shows the multisectoral challenges faced by the country and recommendations to address them.

**Table 11: Challenges and Recommendations for EE&C Financing in Brunei Darussalam**

Challenges	Recommendations
Less financial incentives available to implement EE&C measures due to abundant energy resources and cheaper energy prices.	Revise fossil fuel subsidies and introduce market prices that reflect real economic costs
Inadequate market mechanisms to incentivize voluntary application of EE&C measures.	Review existing successful financing schemes in other countries in the ASEAN region and adapt them to the country's national context
Lack of legislative measures	Establish policies, laws, rules and regulations along with various schemes on voluntary or mandatory basis such as Minimum Energy Performance Standards
Limited experience with EE&C technologies	Conduct awareness-raising and training programmes for policy makers and implementing practitioners.
Shortage of qualified EE&C practitioners	

## 3.2. Cambodia

### 3.2.1. Country Overview, EE Status, and Target

With a population of 15.8 million spread across 176,515 sq. m. Cambodia has been experiencing both a population and an economic growth. Between 2000 and 2016, Cambodia’s GDP more than quadrupled, going from USD 3.654 billion to USD 19.2 billion. Despite this significant growth, about 35% of Cambodia’s population still lacks access to electricity.



Credit: GIZ

Table 12. Country Overview, EE Status, and Target in Cambodia

<b>EE&amp;C target</b>	<ul style="list-style-type: none"> <li>• Reduce TFEC by 20% (2035) compared to BAU projections from 2009</li> <li>• Reduce national CO<sub>2</sub> emissions in 2035 by 3 million tonnes of CO<sub>2</sub> from 2009</li> </ul>		
<b>Population (2016)</b>	15,808,000	Population growth (annual, 2010 – 2016)	1.6%
<b>GDP (2016)</b>	USD 19.2 billion	GDP growth (annual, 2010 – 2016)	9.4%
<b>Energy use (kg of oil eq. / capita) (2015)</b>	266	Electric power consumption (kWh per capita) (2015)	249
<b>Access to electricity (2017)</b>	65%	Energy intensity level of primary energy (kg of oil eq. / USD 2005 PPP GDP)	91

Source: ASEAN Centre for Energy Database (2018)

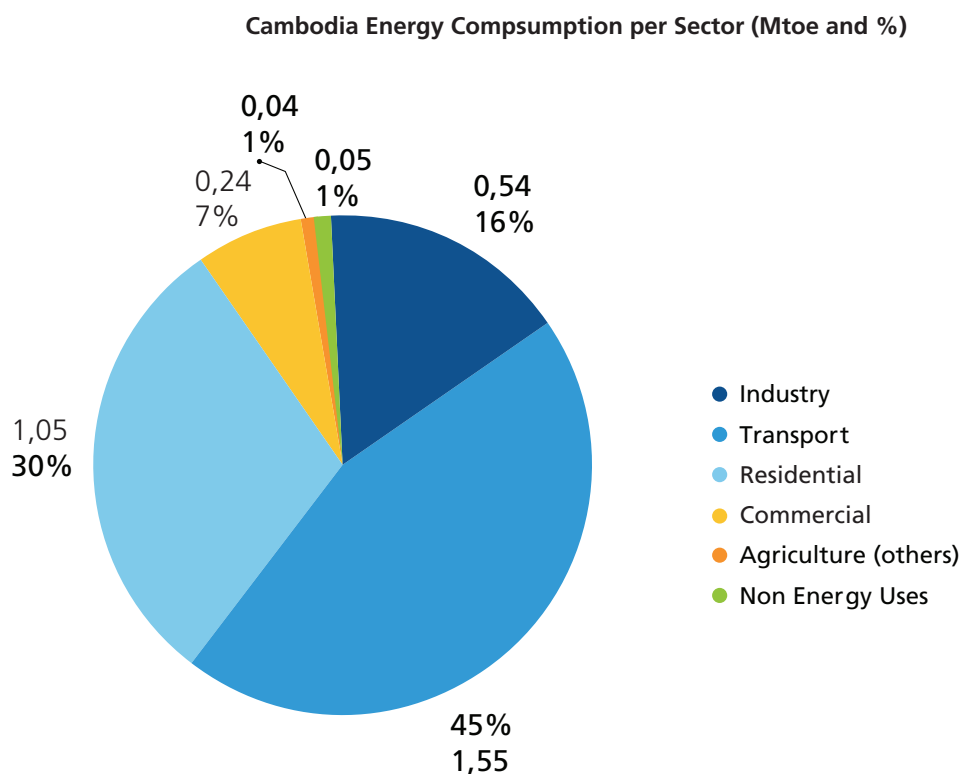






Cambodia's energy mix is mainly composed of oil (39.4%), coal (11.1%) and hydro (3.7%). This high dependency on fossil fuels is exacerbated during dry season, where shortfalls in hydro resources increase the need of importing electricity and resources from neighbouring countries (IRENA, 2018). Electricity demand in the country is expected to rise between 150-200% by 2025, as indicated by IRENA (2018).

Cambodia's energy consumption can be largely traced back to the transport sector (44.7%), followed by the residential (30.3%) and industrial (15.6%) sectors. The use of traditional cook stoves in the residential sector is still a common practice in the country (IRENA, 2018). Even though Cambodia's energy intensity has decreased from 9 MJ/USD 2011 PPP GDP in 2000 to 6 MJ/USD 2011 PPP GDP in 2014, the country continues to be above the regional average (4.3 MJ/USD 2011 PPP GDP). The breakdown of energy consumption by sector in Cambodia is illustrated in Figure 6:



**Figure 5. Energy Consumption by Sector in Cambodia in 2016**

Source: ASEAN Centre for Energy Database (2018)



Cambodia's National EE Policy, Strategy and Action Plan projects energy savings of 20% by 2035. Residential, industrial, and transport are three sectors with the highest energy consumption in the country. The national action plan also forecasts savings of at least 20% in the industrial sector (garments), up to 50% in the household sector (household appliances), up to 80% in the energy sector (rural energy enterprises) and ranging from 30% to 50% in biomass energy (improved cook stoves and kilns) (The Ministry of Industry, Mines and Energy of Cambodia, 2013) Meeting these EE targets is necessary to meet the nationally determined contributions (NDC) commitments of Cambodia.



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### 3.2.2. Policies, Rules and Regulations

In 2008 the Government of Cambodia released a statement requesting all ministries and public institutions to participate in a national programme on electricity saving consumption (The Ministry of Industry, Mines and Energy of Cambodia, 2013); most recommendations were aimed at convincing users to turn off equipment when not being used or under particular circumstances (e.g. once the temperature of a room is below 25 °C, air conditioners are to be switched off). This programme was largely focused on raising awareness on EE&C and operated on a voluntary basis. It was the first official intervention on EE&C matters in the country.

In 2013, the Ministry of Industry, Mines and Energy of Cambodia released the National Policy, Strategy and Action Plan on Energy Efficiency (The Ministry of Industry, Mines and Energy of Cambodia, 2013). The policy was originally envisaged to fit in with the national energy objectives<sup>10</sup>, while identifying energy saving potentials and establishing goals for EE&C. As connectivity remains Cambodia's main energy-related challenge, this policy focuses on increasing access to electricity in an efficient way. For this reason, rural electricity and distribution, industry, end-user products, buildings, and use of biomass resources were identified as priority areas.

The document provides a series of qualitative goals for each of the sectors, focusing on raising awareness, improving capacities and broadly reducing energy consumption within the sectors. Even though the Government does not provide a clear timeline for the implementation of the Roadmap, it estimates that financing all related activities would cost US\$ 8.9 million (The Ministry of Industry, Mines and Energy of Cambodia, 2013). Several initiatives such as the implementation of voluntary standards, the development of new laws and regulations promoting EE&C, further support for the development of ESCOs, and the provision of financial incentives for companies interested in implementing EE&C projects were discussed. However, due to data gaps and lack of technical capacities, the Government recognizes that these are unlikely to be adopted in the short term. The plan also identifies United Nations Industrial Development Organization (UNIDO), ADB, Global Environment Facility (GEF) and other organizations as potential funders for the implementation stages. The EE&C policy framework in Cambodia is summarised in Table 13.

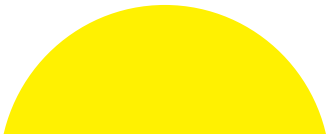
<sup>10</sup> The national energy objectives of Cambodia are to improve the living standard of the population, increase the competitiveness of the Cambodian economy, decrease the dependency on imported fuels and protect the natural environment.



Table 13. EE&C Policy Framework in Cambodia

Key policy framework	<ul style="list-style-type: none"> <li>• National Policy, Strategy and Action Plan on Energy Efficiency in Cambodia by the Ministry of Industry, Mines and Energy (The Ministry of Industry, Mines and Energy of Cambodia, 2013)</li> <li>• Cambodia Climate Change Strategic Plan 2014-2023</li> <li>• National Policy on Green Growth and the National Strategic Plan on Green Growth 2013-2030</li> <li>• National Strategic Development Plan 2014-2018 – for energy saving related measures, description includes the plan implementation for climate change countermeasures and efficient energy consumption.</li> <li>• Energy saving policies report (2013)</li> </ul>	
	Sectors	Policy measures
	Industrial	<ul style="list-style-type: none"> <li>• Standards – improve data collection through established data collection periods as well as definitions of benchmarks and standards, such as ISO 50001</li> <li>• Financial – create financial instruments (e.g. tax incentives, preferential credits, tax reliefs, EE grants, funds) to support the adoption of EE equipment as well as the development of local companies and ESCOs</li> <li>• Regulatory – implement EE&amp;C laws and regulations to restrict energy usage</li> <li>• Capacity building – launch an energy audit support programme as well as training programmes for ESCOs, engineers, technicians and relevant companies engaged in EE&amp;C activities, and the general public; improve knowledge of architecture students through certification courses, specialized lectures and study tours to exemplary buildings</li> <li>• Other – create an Energy Resource Centre to compile and disseminate EE&amp;C materials</li> </ul>
	Buildings	<ul style="list-style-type: none"> <li>• Standards – evaluate building codes in countries with similar climate zones and establish an efficiency building code for Cambodia to include new buildings, government buildings and new public buildings</li> <li>• Financial – make compliance with EE standards a prerequisite for tax reliefs applicable to large developments and luxury hotels</li> <li>• Capacity building – establish an energy manager programme involving staff from buildings with an energy consumption above a predefined threshold; certify energy managers according to ISO 50001 or similar</li> <li>• Other – establish a database for energy consumption of buildings</li> </ul>
Commercial and residential	<ul style="list-style-type: none"> <li>• Standards – implement a compulsory national EE labelling system for household appliances as well as MEPS for public tender documents</li> </ul>	

	Sectors	Policy measures
Key policy framework		<ul style="list-style-type: none"> <li>• Regulatory – promulgate laws and regulations concerning MEPS</li> <li>• Capacity building – introduce EE&amp;C as part of the curricula at the primary and secondary school level and spread information on the importance of EE&amp;C through different media (e.g. TV, internet, radio)</li> <li>• Other – explore opportunities for collaboration with test laboratories in the region as well as the installation of a laboratory in Cambodia to certify appliances</li> </ul>
	Cross sectoral	<ul style="list-style-type: none"> <li>• Capacity building – establish an EE Information Resource Center to gather data and promote EE&amp;C amongst key stakeholders, such as building owners and managers through the provision of online educational and technical materials as well as energy audits.</li> </ul>
	Transport	<ul style="list-style-type: none"> <li>• CO<sub>2</sub> emission reduction targets 2015-2035</li> <li>• Awareness – launch campaigns to improve behavioural change; increase awareness on the use of public transportation</li> <li>• Standards – adhere to international standards; limit imports on non-efficient vehicles and restrict poor-performing vehicles in cities</li> <li>• Standards – enhance fuel quality-control; promote fuel-switching, improve road and traffic management, enhance vehicle and road maintenance</li> <li>• Incentives – provide financial incentives for investments in more efficient vehicles</li> <li>• Capacity building for transportation planning and vehicles maintenance</li> </ul>



### 3.2.3. Financing Schemes, Mechanism and Incentives

There are currently no dedicated national EE&C financing schemes in Cambodia. However, some IFIs such as WB and ADB have been moderately active in the energy sector in the country. According to WB's database of projects, the financial institutions have supported the development of 3 energy sector projects which are GMS Power Trade (Cambodia) Project (2007), Rural Electrification and Transmission Project (2003), and Renewable Energy Development Project (2003). Even though the focus of these projects was not on EE&C, some efficiency elements were included.



ADB on the other hand has supported 17 energy projects in the region (ADB, 2018). ADB has also focused on Transmission and Distribution (T&D) projects, with some additional support being provided for capacity building and RE projects. The project 'Cambodia: Rural Energy Project' has a specific target of promoting the use of up to 90,000 improved cook stoves with higher efficiency in rural areas of Kampong Cham Province (ADB, 2017). The project used funding by the Government of Australia (US 6.1 million) in the form of a grant, which includes all project costs as well as ADB's administrative fees. EE&C is not explicitly targeted by the other projects within the energy sector.

International schemes such as the Green Climate Fund (GCF) and the Energy and Environment Partnership Mekong (EEP Mekong) have been relevant to Cambodia; The EEP Mekong has supported 12 projects in the country, one of them specifically targeting EE&C. The Energy Savings Siem Reap - Promoting and Demonstrating Energy Conservation project (Mekong, 2015) aimed at raising awareness of EE&C, and to demonstrate the feasibility of solar water heaters and compact fluorescent lamps. The duration of the project was 24 months and required a budget of \$US 0.459 million, from which EEP provided 80.93%. The project was led by the Cambodian Climate Change Department (CCCD) and the Cambodian Ministry of Environment, with additional support from partners including the Finnish Ministry of Foreign Affairs (MFA), Nordic Development Fund, Technical University of Denmark, Risoe National Laboratory, UNEP Risoe Centre (URC), Department of Energy Technique (DET), and Royal University of Phnom Penh, Department of Environmental Sciences.

### 3.2.4 Stakeholders

The Electricity Law of Cambodia (2001), which was created to govern and prepare a framework for the electric power supply and services throughout Cambodia, also established the Electricity Authority of Cambodia and defined its responsibilities including those of the Ministry of Industry, Mines and Energy. The state-run Electricité Du Cambodge (EDC) is the main electricity provider in Cambodia. Next to the EDC, private energy providers are active in provincial towns, provincial electricity companies operate in small towns and rural electricity enterprises operate in remoter areas.

The key players of the EE&C in Cambodia are summarised in Table 14:

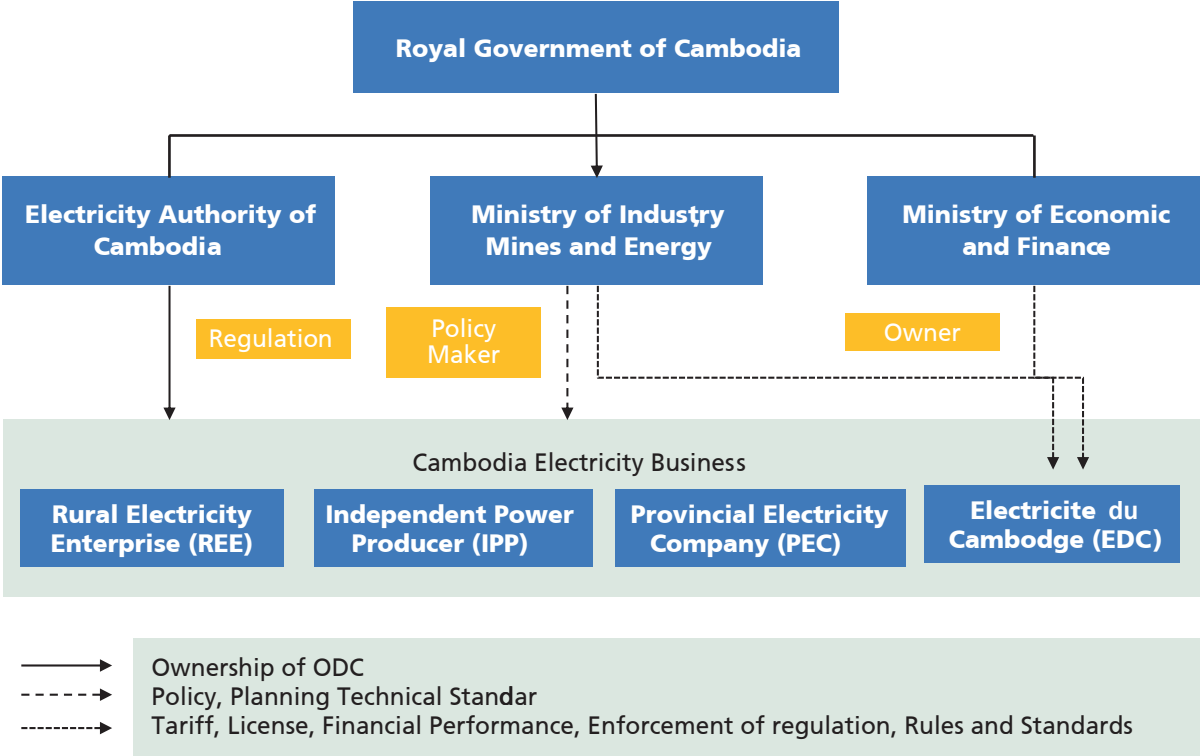
**Table 14. Institutional Framework for EE&C in Cambodia**

Institutions	Description
Ministry of Industry, Mines and Energy	This ministry is responsible for policy formulation, strategic planning, and setting technical standards for the power sector.
Ministry of Land Management, Urban Planning and Construction	This ministry is responsible for governing land use, urban planning, construction projects, and for the resolution of land use conflicts. It is particularly relevant for the development of policies and standards in the building sector, as well as any arising land issues associated with T&D.
Electricity Authority of Cambodia	This agency serves as the national electricity regulator for Cambodia’s electricity businesses. It sets and administers the following: licensing, tariff setting, settling of disputes between producers or suppliers and consumers, and accounting standards in addition to enforcing regulations, and reviewing performance. The Ministry of Industry, Mines and Energy and Ministry of Economics and Finance own this Electricity Authority.
Electricité du Cambodge (EDC)	This state-run agency is responsible for the transmission and distribution of electricity in the country.
Ministry of Economics and Finance	This ministry participates in the development of policy formulation and governing of the sector.

An overview of the electricity sector is provided in Figure 6



Figure 6. Structure of Cambodia's Electricity Sector



Source: WWF (2016)

### 3.2.5 Challenges and Recommendations

The lack of access to electricity for almost half of the country's population remains the biggest energy-related challenge in Cambodia. Like other ASEAN Member states with similar economy conditions, Cambodia faces challenges associated with rising economies such as an increased demand for electricity across all its sectors; household sector that is heavily dependent on biomass, the lack of a mature EE&C framework as well as effective monitoring, reporting and verification (MRV) mechanisms on are needed to develop policies. However, energy prices in the country are amongst the highest in the region, mainly due to the high costs of energy imports. The latter highlights an increased necessity for developing EE&C measures, particularly in the housing sector. The European Union Energy Initiative - Partnership Dialogue Facility (EUEI-PDF) has supported the development of a National Energy Efficiency Policy, Strategy and Action Plan for Cambodia in 2012/13. During the development of the Action plan it was noted that energy prices are high in Cambodia due to outdated infrastructure and high reliance on imported fossil fuels. The consultation was updated during several scoping missions in 2015 and 2017. It concluded that there is large potential of EE measures to address the increasing energy demand, but the responsible governmental institution, the Ministry of Mines, needed to strengthen its capacities on the analysis of the EE data to effectively deploy the strategy. This leads to the conclusion that among the barriers to EE financing in Cambodia is uncertainty regarding the implementation of policies due to limited capacity of the ministry to effectively implement policies (EUEI, 2017<sup>11</sup>). The Ministry of Mines and Energy concluded in 2016 that Cambodia needed to develop new RE and enhance its EE regulation and activities to reduce energy intensity for long-term energy security<sup>12</sup>.

<sup>11</sup> For further info, please visit: <http://www.euei-pdf.org/en/seads/capacity-building/capacity-development-for-independent-evaluation-of-energy-efficiency>

<sup>12</sup> For further info, please visit: <https://www.irena.org/-/media/Files/IRENA/Agency/Events/2016/Dec/12/Cambodia-presentation.pdf?la=en&sh=DF4C3396F9F276C8FB3CF712876AE83B9F1E3109>

Lack of financial mechanisms, awareness, training, regulation and incentives in Cambodia limits the development of EE and RE sectors. As part of the national strategy on EE&C, the Government of Cambodia also recognized that the absence of high-quality data was a major challenge for the implementation of policies, particularly standards and labelling schemes.

In order to address this lack of technical capacities, the Government of Cambodia should explore the development of further programmes aimed at building institutional capacities and generating reliable data to develop effective baselines for standards and labelling schemes in the housing and industrial sectors. Further financial resources could be pursued from international initiatives such as CGF, EEP Mekong, as well as from IFIs.

Table 15 summarises the challenges in EE&C financing in Cambodia and the recommendations on how to overcome the barriers.

**Table 15: Challenges and Recommendations for EE&C Financing in Cambodia**

Challenges	Recommendations
Limited regulations, financial mechanisms and incentives limit the development of EE sector	Develop energy efficiency regulations and activities for long term investment security .
Absence of high-quality data is a major challenge in implementing policies particularly standards and labelling schemes	Explore the development of further programmes aimed at building institutional capacities and generating reliable data to develop effective baselines for standards and labelling schemes in the housing and industrial sectors.
Uncertainty regarding the implementation of policies due to lack of capacity of the ministry to effectively implement policies	Strengthen government capacities (e.g. Ministry of Mines) on the analysis of energy efficiency data to effectively deploy energy efficiency strategy and action plans.





### 3.3. Indonesia

#### 3.3.1. Country Overview, EE Status and Target

Indonesia's economy is the largest in Southeast Asia with a GDP of USD 931.2 billion in 2016 with a steady growth averaging at 4% - 5% annually. As a large middle-income country with a growing economy, a critical component of Indonesia's future strength will be its ability to harness and manage sustainable sources of energy. Indonesia's Ministry of Energy and Mineral Resources (MEMR), which is responsible for managing the energy sector in the country, estimated that the domestic demand for energy will rise by around 7% per year, with electricity demand alone expected to nearly triple between 2010 and 2030 if the Indonesian economy continues to grow at its current rate (ADB, 2016).

Table 16. Country Overview, EE Status, and Target in Indonesia

EE&C target	<ul style="list-style-type: none"> <li>• Reduce TFEC by 20% (2035) compared to BAU projection</li> <li>• Reduce national CO<sub>2</sub> emissions in 2035 by 3 million tonnes of CO<sub>2</sub></li> </ul>		
Population (2016)	259,816,000	Population growth (annual, 2010 – 2016)	1.2%
GDP (2016)	USD 931.2 billion	GDP growth (annual, 2010 – 2016)	4.6%
Energy use (kg of oil eq. / capita) (2015)	857	Electric power consumption (kWh per capita) (2015)	786
Access to electricity (2017)	95.35%	Energy intensity level of primary energy (kg of oil eq. / USD 2005 PPP GDP)	93

Source: ASEAN Centre for Energy Database (2018)





The breakdown of energy consumption by sector in Indonesia is illustrated in Figure 8 below. Most of it is used in residential buildings (32%), transport (28%) and industry (26%).

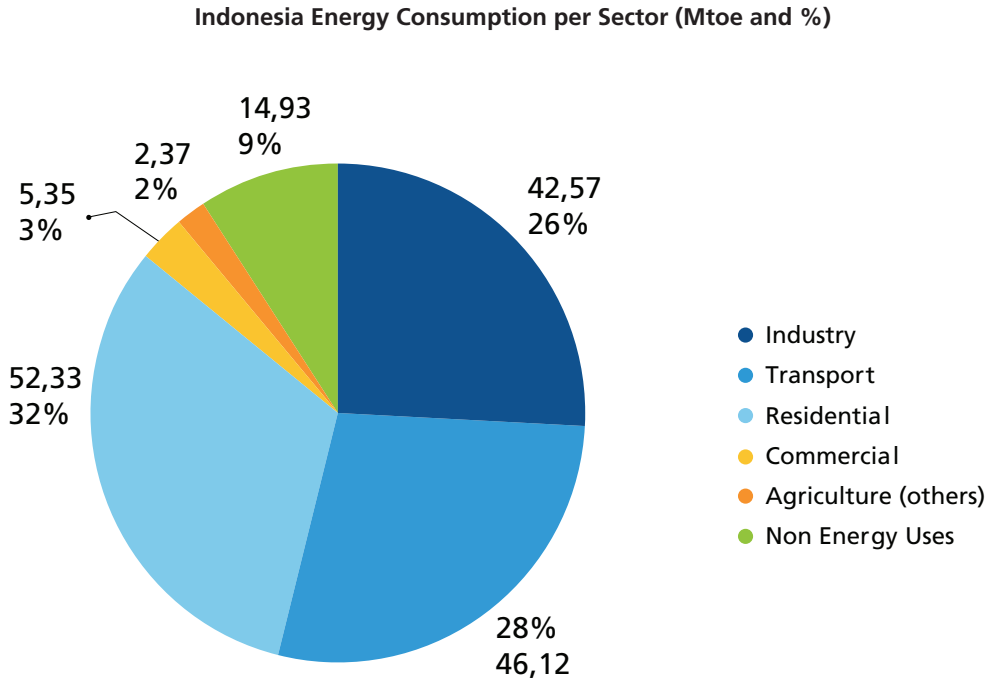


Figure 7. Energy Consumption by Sector in Indonesia in 2015

Source: ASEAN Centre for Energy Database (2018)

The transport and industrial sectors are identified as the most high-priority sectors for EE&C measures in Indonesia, mainly due to their expected growth in energy demand, which is expected to nearly double by 2035 compared to 2010 (C2E2, 2015).

### 3.3.2. Policies, Rules and Regulations

Indonesia’s policy on EE&C started back in the 1980s, and gradually strengthened through the development of various plans and policies. In 1995, the country introduced a Master Plan for National Energy Conservation providing a framework for EE&C actions and regulations to set forth. In the last 10 years, MEMR has issued various regulations on energy saving, electricity use, water saving, standard and labelling, electricity tariffs, including the National Energy Policy (C2E2, 2015). Table 14 summarises the key policy framework for EE&C in Indonesia. The activities of EE&C include capacity building, creating public awareness, implementing standards and labelling, reducing GHG emissions, implementing ISO 50001, developing partnerships, developing energy investments, and reducing energy intensity (C2E2, 2015).



Table 17. EE&C Policy Framework in Indonesia

<p><b>Key policies</b></p>	<p>Key policy documents</p> <ul style="list-style-type: none"> <li>• National Energy Conservation Master Plan (1995, revised in 2005)</li> <li>• National Energy Policy (Govt. Regulation 79/2014)</li> <li>• Govt. Regulation on Energy Conservation (PP 70/2009)</li> <li>• Energy Law (Law No. 30/2007)</li> <li>• National Action Plans on GHG Emissions Reduction (Presidential Regulation No. 61/2011)</li> <li>• Ministry of Energy and Mineral Resources Regulations:             <ul style="list-style-type: none"> <li>• No. 13/2012 on Electricity Saving</li> <li>• No. 14/2012 on Energy Management</li> <li>• No. 18/2014 on Labelling for Ballasted Lamp</li> <li>• No. 7/2015 on MEPS and Labelling for AC</li> <li>• No. 41/2015 on National Standard Competency for Energy Manager on Building and Industry</li> </ul> </li> <li>• Presidential Instruction:             <ul style="list-style-type: none"> <li>• No.13/2011 on Energy and Water Saving</li> <li>• No. 10/2005 on Mandatory Energy Conservation in Govt. Office Building</li> <li>• Building Law (Law No. 28/2002)</li> </ul> </li> <li>• National EE Standard for Buildings (2011)</li> <li>• Provincial Govt. of Jakarta Regulation No. 38/2012 on Green Building</li> <li>• Indonesia ESCO Regulation (signed by MEMR on 29 May 2016, reviewed February 2018 and will soon be published), that would set standards and guidelines, and allow for registration of ESCOs but does not provide direct incentives</li> <li>• Central Bank of Indonesia Regulation No. 14/15/2012 on Asset Quality Rating for Commercial Banks</li> <li>• Financial Authority Regulation No. 51 of 2017 (OJK 51 /POJK.03/2017)</li> </ul>													
<p><b>Key policy framework</b></p>	<table border="1"> <thead> <tr> <th>Sectors</th> <th>Policy measures</th> </tr> </thead> <tbody> <tr> <td>Building</td> <td> <ul style="list-style-type: none"> <li>• Building code</li> </ul> </td> </tr> <tr> <td>Industrial</td> <td> <ul style="list-style-type: none"> <li>• Implementation of ISO 50001: energy management system</li> <li>• Mandatory implementation of energy management for companies with 6,000 toe/year</li> <li>• Standard and labelling</li> <li>• Financial support: grant</li> </ul> </td> </tr> <tr> <td>Residential and commercial</td> <td> <ul style="list-style-type: none"> <li>• Standard and labelling: MEPS and labelling, implemented for CFLs 2014 and cooling appliances 2015 (labels) as well as buildings (standards)</li> </ul> </td> </tr> <tr> <td>Transport</td> <td> <ul style="list-style-type: none"> <li>• Low emission carbon project: eco car green tax system</li> </ul> </td> </tr> <tr> <td>Multi - sector</td> <td> <ul style="list-style-type: none"> <li>• Tax incentives</li> </ul> </td> </tr> </tbody> </table>	Sectors	Policy measures	Building	<ul style="list-style-type: none"> <li>• Building code</li> </ul>	Industrial	<ul style="list-style-type: none"> <li>• Implementation of ISO 50001: energy management system</li> <li>• Mandatory implementation of energy management for companies with 6,000 toe/year</li> <li>• Standard and labelling</li> <li>• Financial support: grant</li> </ul>	Residential and commercial	<ul style="list-style-type: none"> <li>• Standard and labelling: MEPS and labelling, implemented for CFLs 2014 and cooling appliances 2015 (labels) as well as buildings (standards)</li> </ul>	Transport	<ul style="list-style-type: none"> <li>• Low emission carbon project: eco car green tax system</li> </ul>	Multi - sector	<ul style="list-style-type: none"> <li>• Tax incentives</li> </ul>	
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**3.3.3. Financing Schemes, Mechanism, and Incentives**

The EE financing scheme is granted to energy conservation projects of small and medium-scale that meet its technical criteria. Incentives can be provided through different regulatory options. Based on the Government Regulation No. 70/2009, there are at least 2 groups that could receive incentives for achieving successful energy conservation targets, which are:

- Entities with annual energy use larger than or equal to 6,000 tonnes of oil equivalent per year that successfully implement energy conservation for a given period. The success of the project can be measured by: i) the amount of reduction of specific energy consumption and ii) the elasticity of energy consumption<sup>13</sup> (Article 12)
- The manufacturers of energy-saving equipment that have managed to conserve energy during a certain period. The criteria to be met : i) projects should be able to produce energy-saving equipment more than the predetermined benchmark and ii) projects should be able to set labels on appliances in accordance with applicable standards (Article 19)

In this context, the Ministry of Finance has provided various forms of incentives to influence economic actors in implementing sustainable energy savings programmes, namely by providing tax incentives and establishing different facilities on components/spare parts and raw materials for EE appliances.

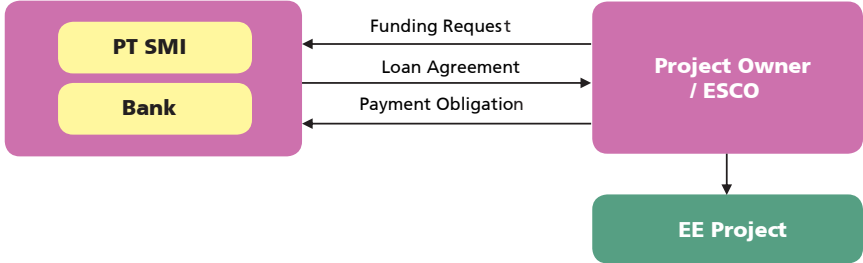
The Financial Services Authority (Otoritas Jasa Keuangan – OJK) identified three financing schemes available in the country, namely: (i) Infrastructure Fund through PT. Sarana Multi Infrastruktur (PT.SMI), (ii) Viability Gap Fund (Dana Dukungan Kelayakan) and (iii) other innovative financing schemes. The Fiscal Policy Agency at the Ministry of Finance of Indonesia has carried out studies on the EE revolving fund, but are not yet fully developed.<sup>14</sup>

**3.3.3.1. Infrastructure Fund through PT Sarana Multi Infrastruktur (PT. SMI)**

The Indonesian government established PT. SMI to accelerate the development of national infrastructure and attract private funds domestically and internationally. PT. SMI provides financing to infrastructure projects through various financing schemes including loan, equity, and mezzanine financing, which can be used to finance EE&C activities.<sup>15</sup>

**3.3.3.1.1. Subordinated Loan Facility**

Together with the bank, PT. SMI provide loans through a subordinated loan facility scheme. Under this scheme, the bank will provide the larger share of the loan. The financing mechanism for subordinated loan facility is illustrated in the following figure:



**Figure 8. PT. SMI Subordinated Loan Facility Scheme**

Source: Financial Services Authority (2015)

<sup>13</sup> Elasticity of energy consumption is defined as the ratio of the change in energy consumption rate to the change in entity's production output rate.

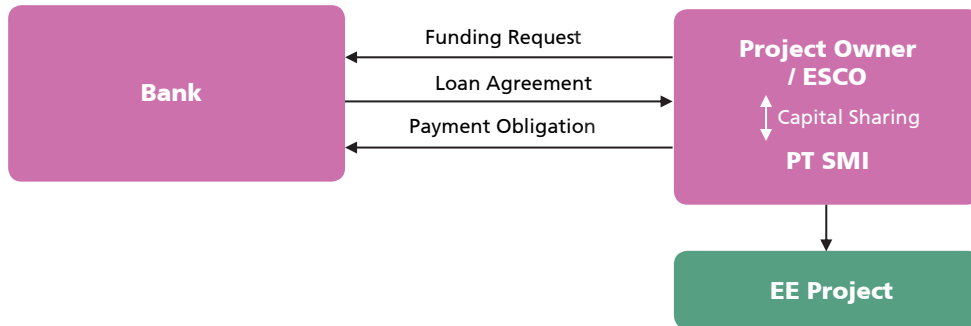
<sup>14</sup> The planned scheme of Indonesian EE revolving fund is as follows: the Ministry of Finance places IDR 500 trillion (USD 36.7 million) following the regular mechanism of the state budget to the Indonesia Investment Agency (Pusat Investasi Pemerintah or PIP), which will become the source of funds for the loan to be disbursed through the bank at an interest rate of 2-3% per year. Further, the banks will lend the fund to the EE projects at a maximum interest rate of 7-9% per year. The procedure of applying for EE revolving fund has also been proposed in the study.

<sup>15</sup> For further information on PT SMI's financing schemes, please visit <https://www.ptsmi.co.id/our-business/products-and-services/three-business-pillars/financing-investment/>.



### 3.3.3.1.2. Equity Investment Scheme

The project owner or ESCO may also collaborate with PT. SMI to obtain the working capital, while the subsequent capital deficiency can be obtained from the loan to the bank as illustrated in the following figure:



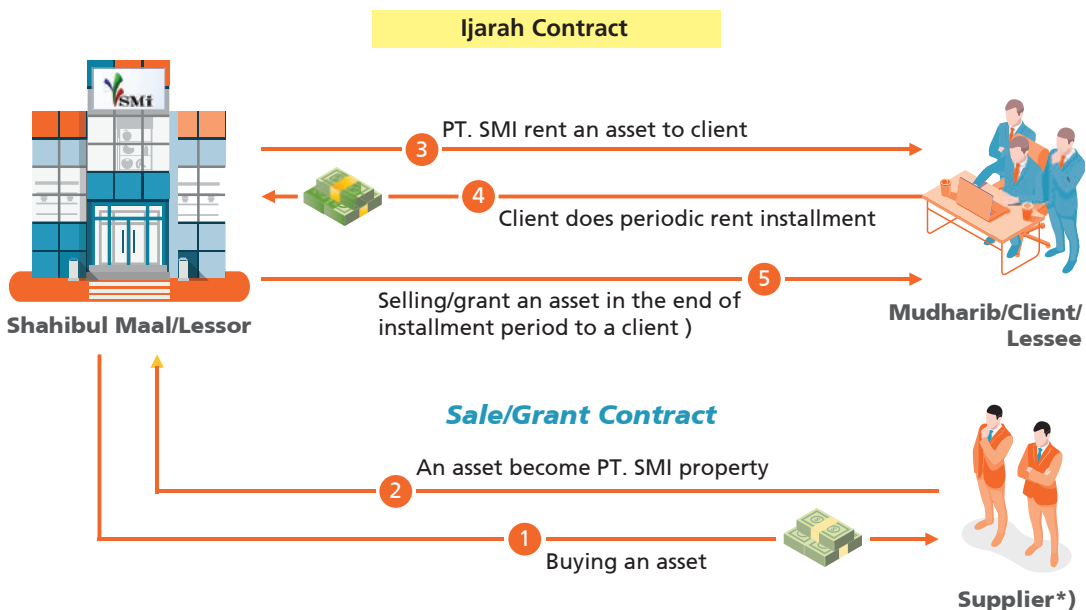
**Figure 9. PT. SMI Equity Investment Scheme in Indonesia**

Source: Financial Services Authority (2015)

PT SMI provides many options for financing and investing based on the Sharia principles, e.g., Ijarah Muntahiya Bittamlik (financial lease), Murabahah (instalment sale), and Musyarakah Mutanaqisah (diminishing partnership) as explained in the following section<sup>16</sup>.

### 3.3.3.1.3. Ijarah Muntahiya Bittamlik (Financial Lease)

Ijarah Muntahiya Bittamlik is a financing facility with a rental scheme on a leased object between PT SMI and client within a specified period that will end with ownership of the asset in the hands of the client, as illustrated in the following figure:



**Figure 10. PT. SMI's Ijarah Muntahiya Bittamlik Financing Scheme**

Source: PT. SMI (2018)

<sup>16</sup> Procedure for applying for these Shariah financing schemes is available at PT. SMI website <https://www.ptsmi.co.id/our-business/products-and-services/sharia-unit/financing-and-investment/>

### 3.3.3.1.4. Murabahah (Instalment Sale)

Murabahah is a sharia-based term financing in which one party purchases an asset for cash and then sells it to a second party for deferred payments, by adding some profit there on, as illustrated in the following figure:

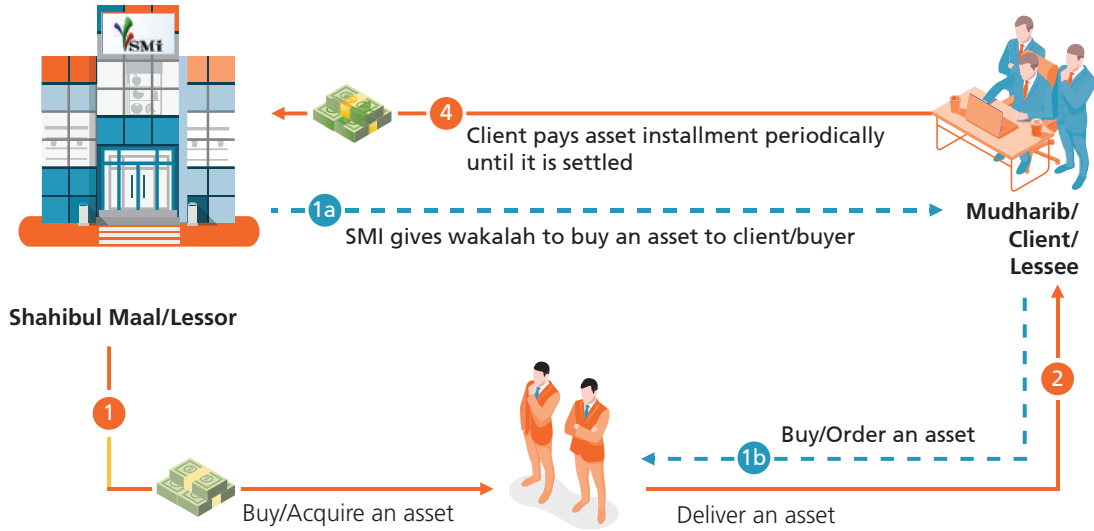


Figure 11. PT. SMI's Murabahah Financing Scheme

Source: PT. SMI (2018)

### 3.3.3.1.5. Musharakah Mutanaqisah (Diminishing Partnership)

Musharaka Mutanaqisah is a financing facility for ownership of asset through a cooperation on a rental business, whereby PT SMI's portion will decline gradually as a result of takeover by the client, as illustrated in the following figure:

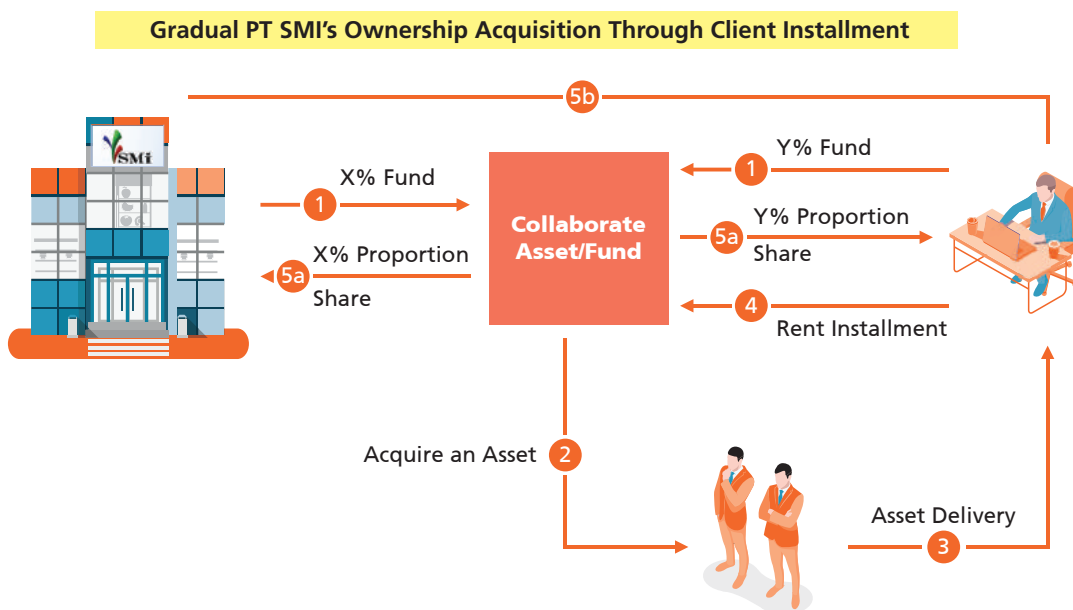


Figure 12. PT. SMI's Musyarakah Muntanaqisah Financing Scheme

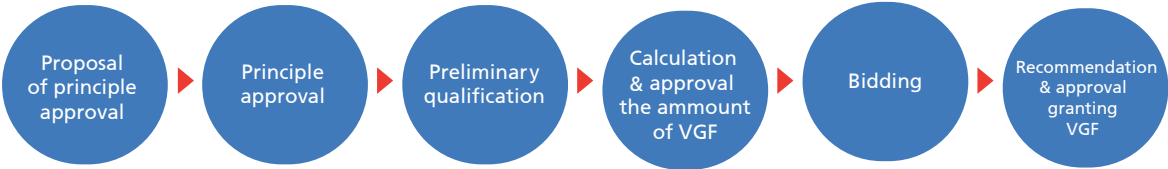
Source: PT. SMI (2018)



**3.3.3.2. Viability Gap Fund (*Dana Dukungan Kelayakan*)**

Viability Gap Fund or VGF is a government support in the form of contribution of some of the construction cost, given in cash to a PPP project that already economically viable but has not had a financial feasibility. VGF can be given when there is no other alternative to make the PPP project financially feasible. Local Government can contribute to the provision of this support after obtaining the approval of Local Parliament.

Viability Gap Fund (VGF) is funds provided by the Government to support infrastructure projects in a public-private partnership (PPP) scheme to make the projects, that were initially economically viable but does not have financial feasibility, to become economically and financially viable. VGF can only be given if there is no other alternative to make a project financially feasible (as a last resort). The amount of VGF that can be granted is a certain portion (not dominating) of the construction cost of the project, which includes construction-, equipment-, installation-, and interest cost during the construction period. It can also cover other costs related to construction, with the exception of costs related to land acquisition and tax incentives (Setiawan, et al., 2015). The mechanism of providing VGF is illustrated in Figure 14.



**Figure 13. Grant Mechanism of Viability Gap Fund**

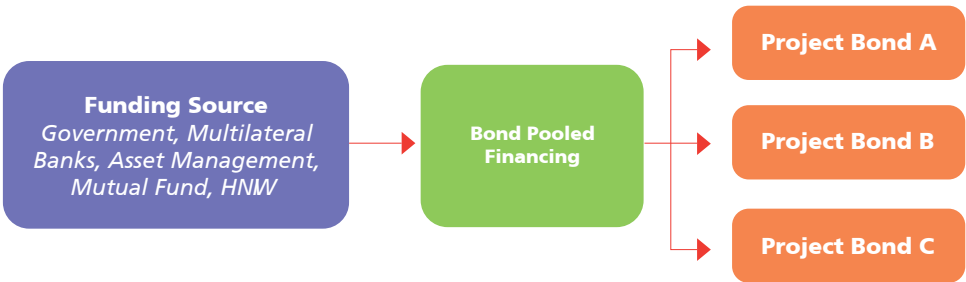
Source: Setiawan & Surachman (2015), Saragih (2013; 2015)

**3.3.3.3. Other Innovative Financing Scheme**

Given the importance and rapid development of EE efficiency projects, various innovative financing schemes have been developed to attract broader consumers. Other schemes currently being prepared in Indonesia are bond pooled financing, utility on-bond financing, loan purchase programme, and linked deposit programme.

**3.3.3.3.1. Bond Pooled Financing**

Project of various investors were pooled under a financing fund. This scheme allows an investor to invest in a portfolio of joint projects with other investors. The bond transaction cost is spread out among the borrowers to pay for a financial adviser, bond counselor, underwriter and trustee. Sources of funds can come from governments, multilateral banks, assets management, mutual funds, or high-net-worth individual. In this scheme, usually a small group of borrowers can pool their financing needs together and issue a single bond.



**Figure 14. Bond Pooled Financing Scheme**

Source: Financial Services Authority (2015)

### 3.3.3.3.2. Utility On-Bill Financing

Utility on-bill financing allows consumers (mainly in residential and commercial sectors) to invest in EE projects and pay the cost of the investment through a surcharge in the electricity bill. The results of the energy savings can cover the additional costs. A third party, such as a bank, finances the debt, and the equity is obtained from tax funds and grants from the governments. A state-owned electricity company (*Perusahaan Listrik Negara*, PLN) is responsible for the financing and acts as a collecting agent, lender and service provider.

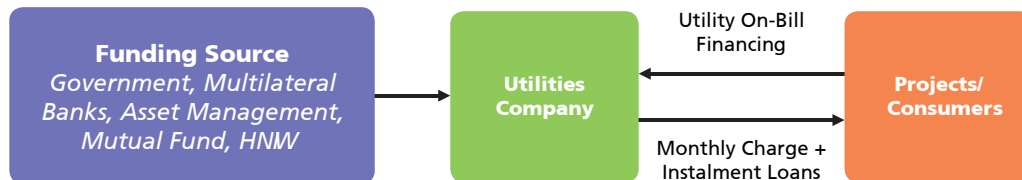


Figure 15. Utility On-Bill Financing Scheme

Source: Financial Services Authority (2015)

### 3.3.3.3.3. Loan Purchase Programme

With the loan purchase programme, the government guarantees that the purchase of credits issued by the bank/lender finances EE projects under certain preconditions. This scheme allows banks to minimise their credit risk. It is very attractive for borrowers since they can obtain financing at a lower interest rate.

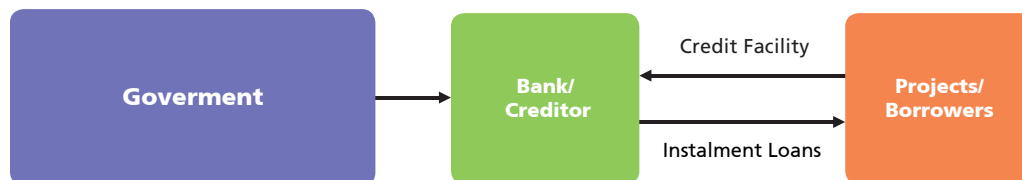


Figure 16. Loan Purchase Programme

Source: Financial Services Authority (2015)

### 3.3.3.3.4. Linked Deposit Programme

The Linked Deposit Programme is guaranteed by the Government and their funds have low interest rate. The project owner/borrower shall pay the interest to the bank, while the bank also pays the interest to the Government.

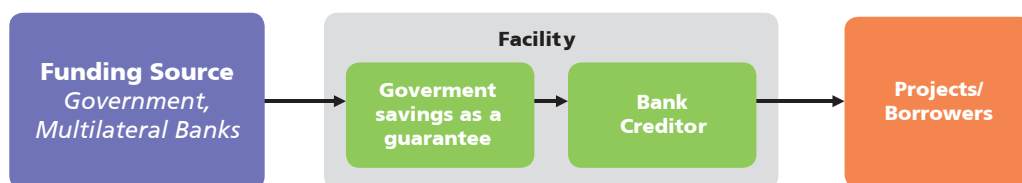


Figure 17. Linked Deposit Programme

Source: Financial Services Authority (2015)





### 3.3.4. Stakeholders

Key players on EE&C activities in Indonesia are summarised in Table 18 below.

**Table 18. Institutional Framework for EE&C in Indonesia**

Institutions	Description
Ministry of Energy and Mineral Resources (MEMR)	This ministry is responsible for dealing energy-related issues, including EE&C. The Directorate of Energy Conservation of MEMR is technically the national focal point for energy conservation.
Ministry of Finance	This ministry is responsible for the formulation of financial incentives for EE&C activities such as EE revolving fund, tax incentives, etc.
Financial Services Authority (Otoritas Jasa Keuangan – OJK)	This agency performs regulatory and supervisory duties over financial services activities in the banking-, capital market-, insurance-, and pension funds sector, including in financing institutions and other financial services institutions related to EE&C activities.
PLN (state electricity company)	This state-owned utility company is a service provider of electricity in the country.
Other ministries: Ministry of Environment, Ministry of Public Work	These ministries implement the mandates for EE&C conservation that fall under their responsibility, in close collaboration with MEMR.
EE&C Associations, i.e. APKENINDO	These associations are responsible in catalysing activities and promoting the establishment of strategic alliances between ESCOs, energy end users, financing institutions, energy efficient equipment manufacturers and distributors, and support institutions.
Government Investment Agency (PIP)	This agency acts as a channelling agent for the revolving fund and loans to be disbursed through banks/financial institutions. The PIP also collects and analyses monitoring reports from the bank.
Commercial Banks	These institutions are responsible for performing financial assessments/ risk management evaluations for funding proposals prepared by EE project developers, and providing loans and equity if projects are bankable.
ESCOs	ESCOs are responsible for providing technical assistance to project proponents and banks, and to provide energy services at specific prices (including EE measures)

### 3.3.5. Challenges and Recommendations

In general, the main issue of EE financing in Indonesia is not a lack of available funds. The challenge is that the available funds cannot be assessed by facility owners from the local banks on commercially attractive terms (APKENINDO, 2011; Dreessen, 2016). This causes the “disconnect” in current bank lending practices versus the need of facility owners (and project developers) in funding EE&C projects. Table 19 presents more detailed challenges for EE&C financing in Indonesia and how to address them.

**Table 19: Challenges and Recommendations for EE&C Financing in Indonesia**

Challenges	Recommendations
Low energy prices due to government subsidy	Revise fossil fuel subsidies and introduce market prices that reflect real economic costs
Facility managers have limited awareness on EE&C benefits causing limited interest in funding EE&C projects	Conduct targeted awareness raising- and stakeholder knowledge exchange activities. Dedicated trainings should be oriented towards their roles in EE financing and focus areas.
Knowledge gap between banks and industries. The latter is not aware of the financing aspects of its EE project	
Commercial banks are generally unwilling to provide project financing to public services enterprises	Create government-led EE financing programmes and consider collaborations between commercial banks and public service enterprises
Financial institutions have limited confidence in the ESCO market	Present ESCO project cases to banks and engage in discussions on existing concerns of financial institutions; learn from existing financing mechanisms. An example is the ESCO Revolving Fund in Malaysia
Contracting and procurement rules are often very restrictive	Liberalise contracting and procurement rules to improve investments in EE&C
Obtaining loans or funds for EE is a cumbersome process	Streamline approval process and establish standard documentations
Responsibilities for capital and operating budgets in public agencies are often dispersed, making it difficult to deploy funds from the capital budget	Create clear energy efficiency responsibilities and budget lines within ministries/agencies
The concept of energy performance contracting is relatively new in Indonesia	Implement finance pilots for energy performance contracting and provide guarantees to accelerate the market



### 3.4. Lao PDR

#### 3.4.1. Country Overview, EE Status and Target

Lao PDR is one of the countries with a smaller population in the ASEAN region. The country has 6.89 million inhabitants, which is significantly below the region’s average of 63.86 million. Lao PDR’s GDP is the smallest in the region, despite having risen from USD 1.73 billion in 2000 to USD 17.09 billion in 2017. Still, this rapid economic growth is coming together with an increased consumption of electricity. It is estimated that by 2025, Lao’s electricity demand will grow about 200% across most sectors, with an important share being intended for exports (IRENA, 2018).

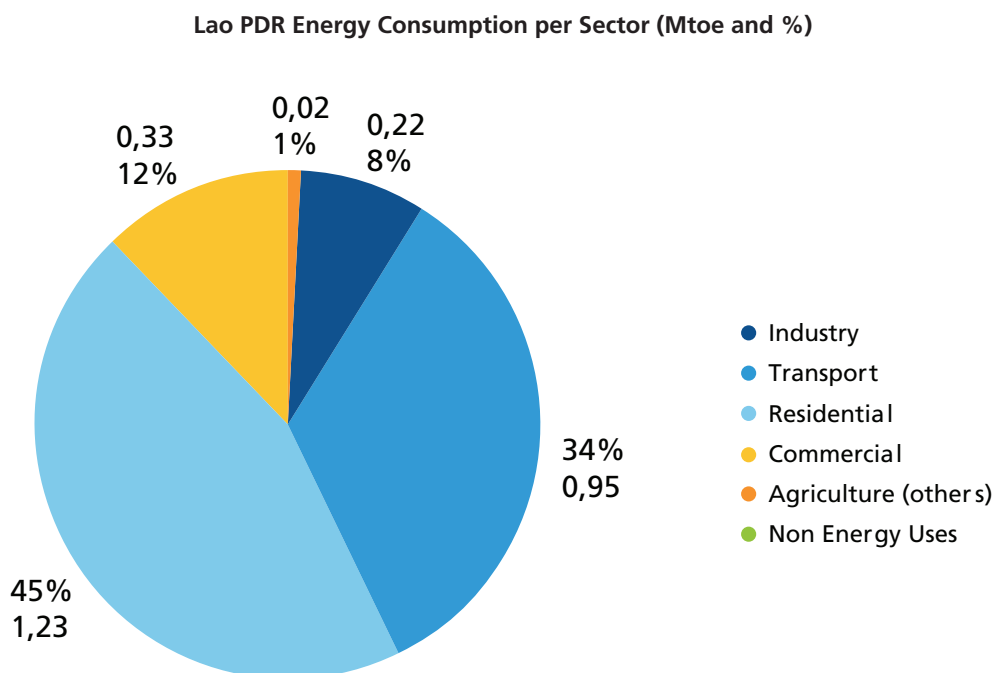
**Table 20 Country Overview, EE Status, and Target Lao PDR**

EE&C target	<ul style="list-style-type: none"> <li>Reduce TFEC by 10% in 2030 compared to BAU, as stated in the Energy Efficiency and Conservation Plan (under development)</li> </ul>		
Population (2016)	6,890,000	Population growth (annual, 2010 – 2016)	1.6 %
GDP (2016)	USD 15.9 billion	GDP growth (annual, 2010 – 2016)	15.4 %
Energy use (kg of oil equivalent / capita) (2015)	662	Electric power consumption (kWh per capita) (2015)	538
Access to electricity (2015)	92.05%	Energy intensity level of primary energy (MJ/USD 2011 PPP GDP)	139

Source: ASEAN Centre for Energy Database (2018)

The role that Lao PDR plays as an electricity exporter nation is expected to become more relevant. From the period between 2000-2015 Lao PDR’s total electricity exports increased substantially from 2.8 TWh to 11.5 TWh (71% of total electricity production), with an important share going to Thailand (IRENA, 2018). Within this period, Lao PDR and Thailand expanded their electricity trade through the establishment of the Nam Theun Hydropower station and signed an agreement for Lao PDR to export 100 MW of electricity to Malaysia via Thailand’s transmission lines. The recent development of large hydropower projects has resulted in an overall decrease in Lao PDR’s energy intensity, which went from 5 MJ/USD 2011 PPP GDP in 2000, to just 2 MJ/USD 2011 PPP GDP below the region’s and world’s average.

The total final energy consumption (TFEC) in Lao PDR increased at an average growth rate of 5% between 2000 and 2015. Residential sector dominated the TFEC with 45% share, followed by transportation (34%) and industrial sector (8%). The breakdown of energy consumption by sector in Lao PDR is illustrated in the following figure:



**Figure 18. Energy Consumption by Sector in Lao PDR in 2015**

Source: ASEAN Centre for Energy Database (2018)

Even though Lao PDR has one of the region’s largest shares of hydropower potential (about 26 gigawatts), an important part of these resources remains untapped (IRENA, 2018). Instead, the country relies heavily on traditional biomass resources (about 96% of the population primarily relies on the traditional use of biomass), as well as on diesel and gasoline imports (ADB, 2015). The latter highlights the importance of promoting EE&C in the use of transport fuel, as well as in the residential sector.

### 3.4.2. Policies Rules and Regulations

Lao PDR is at an early stage of development and implementation of an EE&C strategy. So far, the country has managed to issue EE guidelines for residential, building, and industrial sectors. The National Socio-Economic Development Plan (2006-2010) published in October 2006 stated the policy to promote clean and highly energy efficient technologies and industrial development in industrial and construction sectors among others. The lack of technical and economic capacities has been identified as one of the main barriers preventing the development of EE&C policies, particularly those related to the implementation and enforcement of labels and standards (ASEAN Centre for Energy, 2018). In 2012, the Ministry of Energy and Mines released an overview of EE&C in the country and highlighted challenges preventing further uptake of EE&C projects. Some of the key highlights were an identified lack of specific laws and regulations as well as a strategy for EE&C promotion (Ministry of Energy and Mines, 2012). Even though the Government anticipated the development of a master plan for EE&C by the end of 2017, this has not been released.

Various donor-assisted programmes have helped to build EE&C capacities and to introduce EE measures in the buildings and household sectors, including highly practical means for improving efficiency in government buildings and the adoption of International Electro-Technical Commission standards for selected electrical products (ADB, 2015). The Government has indicated a preliminary energy saving target of 10% by 2025.



Table 21. EE&C Policy Framework in Lao PDR

Key policy framework	Key policy documents:	
	<ul style="list-style-type: none"> <li>National EE Policy 2016</li> <li>Energy Efficiency and Conservation Plan (under development)</li> <li>Prime Minister decree for EE&amp;C (under development)</li> </ul>	
	Sectors	Policy measures
	Industrial	<ul style="list-style-type: none"> <li>Energy-saving diagnosis has been implemented for beer production and cement plants (supported by Japan and other donors)</li> </ul>
	Commercial and residential	<ul style="list-style-type: none"> <li>Promotion energy-saving of lighting equipment</li> <li>Implementation of energy-saving measures in the buildings of public institutions (supported by World Bank)</li> <li>Implementation of energy-saving activities in hotels through experts' dispatch (supported by the Energy Conservation Centre, Japan)</li> </ul>
	Transport	<ul style="list-style-type: none"> <li>Stopped used cars imports. Since February 2012, the Government encourages increased public transport usage (supported by JICA, Japan)</li> <li>Strategy and action plans for EV are currently under development.</li> </ul>
Cross-sectoral	<ul style="list-style-type: none"> <li>Develop standard and labelling for air-conditioning.</li> <li>Develop MEPS</li> <li>Develop energy management system</li> </ul>	

### 3.4.3. Financing Schemes, Mechanism and Incentives

There are no dedicated EE&C financing schemes in Lao PDR as of now. However, the Investment Law (2004) includes some incentives that are applicable for EE&C investments including corporate tax holidays of up to 7 years, exemption from import duties and taxes on raw materials and capital equipment, exemption from export duty, 10% personal income tax for expatriate employees and additional tax holidays and reduced tax rates for large projects, with special concessions to be negotiated (ADB, 2015).

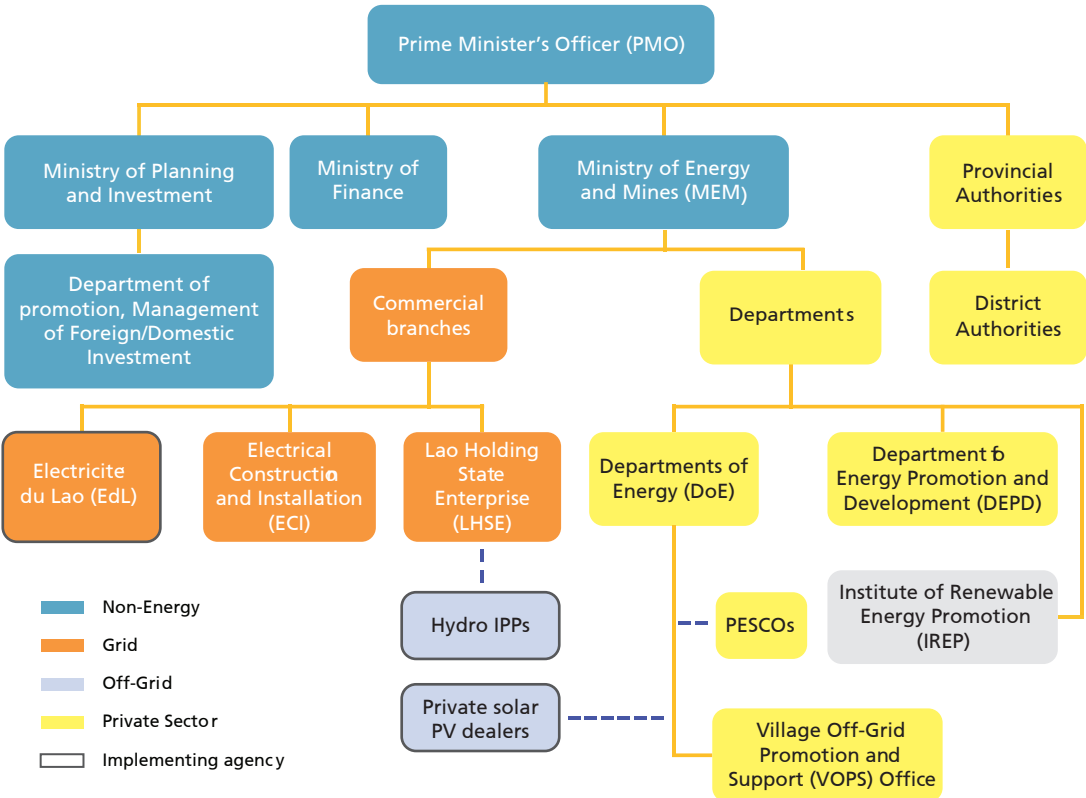
Some other programmes like the ASEAN-Japan: Promotion of EE&C, and the Mekong Economic Cooperation strategy, and the Ayeyawady-Chao Phraya–Mekong Economic Cooperation Strategy (ACMECS) have been implemented to raise awareness of the importance of reducing energy consumption, through a series of activities including workshops, seminars, energy audits, training and others. Moreover, countries like China have been involved the promotion of energy development in the region. Even though this has not been exclusively related to EE&C, China offered USD 11.5 billion in loans and credits to a series of countries including Lao PDR in 2016 (ASEAN Centre for Energy, 2018). Another example of China's involvement in the energy sector in Lao PDR is the agreement between the Chinese public company Karnchang and Lao PDR's government for the development of the Xayburi hydroelectric project, which is underpinned by a power purchase agreement with the Electricity Generating Authority of Thailand.

Additional interventions by financial institutions have taken place in the country, with the 'Demand Side Management and Energy Efficiency' project funded by the World Bank/GEF and implemented by Electricité du Laos (EDL) being the most relevant. During phase I of the project (2007-2010) the WB provided funding

for the auditing of 50 government buildings and identification of EE&C improvements. After implementing a pilot programme with 4 buildings, it was identified that low-cost EE&C measures could deliver energy savings of about 4-8% (ADB, 2015). Phase II of the project focused on the residential sector and provided funding for the replacement of 400,000 light bulbs for with high quality compact fluorescent alternatives. This phase also involved the replacing of air conditioner units in government buildings, as well as activities to raise awareness on the importance of EE&C. Estimates from the International Institute for Energy Conservation indicate that about 1 GWh per year will be saved though the programme.

### 3.4.4. Stakeholders

The Ministry of Energy and Mines is the main agency responsible for the energy sector of the Lao PDR. The Department of Energy Policy and Planning draws up national policies and regulations while the Department of Energy Business negotiates agreements and other legal documents with hydropower investors and contractors. Department of Energy Management is responsible for drafting laws, guidelines, safety standards and regulations, as well as overseeing and ensuring both public and private entities to follow all the rules and regulations<sup>17</sup>. The Ministry of Energy and Mines oversees three state enterprises: EDL, the Lao Holding State Enterprise and the Electrical Construction and Installation Company. The Institute of Renewable Energy Promotion is the main agency responsible for developing and promoting the use of RE, as well as EE&C and new alternative energy. (ADB, 2015). Other agencies in energy policy and administration in Lao PDR include Energy and Mines Research Institute and the recently-established Institute of Energy and Environment.



IPPs = Independent power producers, Lao PDR = Lao People's Democratic Republic, PESCOs = Provincial electricity supply companies, PV = photovoltaic.

Figure 19. Institutional Framework for Energy Sector in Lao PDR

Source: ADB (2015)

<sup>17</sup> For more info on energy policy and administration in Lao PDR, visit <https://laos.opendevlopmentmekong.net/topics/energy-policy-and-administration>





### 3.4.5. Challenges and Recommendations

Lao PDR is at a very early stage of development of an EE&C framework. As the country is experiencing a rapid economic growth, accompanied by an increased demand for energy, it is crucial that EE&C incentives and capacities are developed timely. As the country still has a weak capital market when compared to other countries in the region (e.g. Indonesia, Singapore, Thailand), there are several political and commercial risks that will prevent EE&C interventions in the country unless these are addressed timely and through proper policies and financing schemes and measures. The development of the National EE Policy (2016) was a step in the right direction however it is imperative that the Government develops an EE strategy as well as additional institutional, policy and regulatory frameworks.

Many challenges on EE&C financing in Lao PDR are mainly due to limited capacity in developing EE&C projects. Stakeholders such as the Government, financial institutions and project developers have very limited understanding and awareness regarding EE&C initiatives. In addition, ESCO services do not yet exist in the country, which further exacerbates the difficulty in developing EE&C projects. It is therefore crucial for the Government to conduct capacity building and awareness raising programmes for the stakeholders to expand their knowledge on EE&C initiatives.

Another important challenge in the region is the existence of very low energy prices and low electricity tariffs. As there is no data on Lao PDR's energy consumption by sector, the assessment of achieving 10% energy savings target becomes challenging. This lack of data limits the type of financial mechanisms that could be applied and highlights the importance of a first round of interventions focusing on building technical capacities. It is important for the government of Lao PDR to obtain better data regarding the energy sector, particularly on the possession of electric appliances as well as on the status of EE&C (Sasaki, 2015). The latter would provide a firmer baseline for charting the EE&C saving potentials. Competition in accessing finance for EE&C projects is also a major challenge in EE&C development since public donors and development banks, as well as existing funds from the Government are prioritising infrastructures and small-scale RE projects. Currently, a decree on the Energy Development Fund is under development with the World Bank providing some support.

As Lao PDR still has a heavy reliance on public donors and development banks, it is important that it engages these organizations effectively to obtain financial support for EE&C initiatives, particularly for the development of policies and/or strategies around EE&C. An additional opportunity for Lao PDR is associated to its role as Southeast Asia's only net exporter of energy on an intraregional basis. As this role is expected to become more relevant in the short future, Lao PDR's government could aim to explore EE&C opportunities within the electricity transmission sector.

Table 22 outlines the challenges and recommendations for EE&C financing in Lao PDR.



**Table 22: Challenges and Recommendations for EE&C Financing in Lao PDR**

Challenges	Recommendations
Weak capital market leads to several political and commercial risk preventing energy efficiency interventions in the country	Establish proper policies and financing schemes for energy efficiency
The Government is prioritising infrastructure and small-scale RE projects over EE&C projects.	Engage international donors and development banks to obtain financial support for energy efficiency initiatives
ESCO services are still non-existent	<p>Create policy and regulatory framework and build general awareness on ESCO models for companies and financial institutions</p> <p>Create ESCO financing support mechanisms such as dedicated ESCO credit lines for commercial banks, or specific funds providing direct finance to ESCOs</p>
Limited capacity in developing EE&C projects	Conduct capacity building and awareness raising programmes for the stakeholders to expand their knowledge on EE&C initiatives.
Very low energy prices and low electricity prices	Revise fossil fuel subsidies and introduce market prices that reflect real economic costs
Limited data availability for energy consumption	Introduce energy consumption reporting requirements for facilities and strengthen data exchange and communication with electricity utility



Credit: GIZ



## 3.5. Malaysia

### 3.5.1. Country Overview, EE status and Target

Malaysia is a mid-size economy within the ASEAN region. With a population of 31 million and a GDP of USD 299.6 billion, Malaysia has an electricity consumption of about 4,681 kWh per capita as well as an energy intensity of 127 kg of oil equivalent/USD 2005 PPP GDP. Malaysia's electricity grid is largely dependent on fossil fuels; coal and gas generate about 88% of the country's electricity.

Table 23. Country Overview, EE Status, and Target in Malaysia

<b>EE&amp;C target</b>	<ul style="list-style-type: none"> <li>Reduce, within a decade, the electricity consumption by 8% (from 2016 to 2025) compared to BAU.</li> </ul>		
<b>Population (2016)</b>	30,988,000	Population growth (annual, 2010 – 2016)	1.6 %
<b>GDP (2016)</b>	USD 299.6 billion	GDP growth (annual, 2010 – 2016)	3 %
<b>Energy use (kg of oil equivalent / capita) (2015)</b>	2,829	Electric power consumption (kWh per capita) (2015)	4,681
<b>Access to electricity (2017)</b>	95%	Energy intensity level of primary energy (kg of oil eq. / USD 2005 PPP GDP)	127

Source: ASEAN Centre for Energy Database (2018)

Historically, Malaysia's ratio of energy intensity has always been over 1.0, indicating an inefficient use of energy. In 1990 Malaysia's energy intensity level of primary energy was 4 MJ/USD 2011 PPP GDP and has not decreased since then. This inefficient use of energy, plus an increased demand of energy supply has drawn the Government's attention to EE&C and resulted in the development of the Malaysia Energy Efficiency Action Plan (2014). This plan sets a series of actions and initiatives to bolster EE&C in the country, mainly in the industrial, commercial and residential sectors. The transport (40.9%) and industry (29.44%) sectors represent the largest end use sectors. The breakdown of energy consumption by sector in Malaysia is illustrated in Figure 20.

Malaysia PDR Energy Consumption per Sector (Mtoe and %)

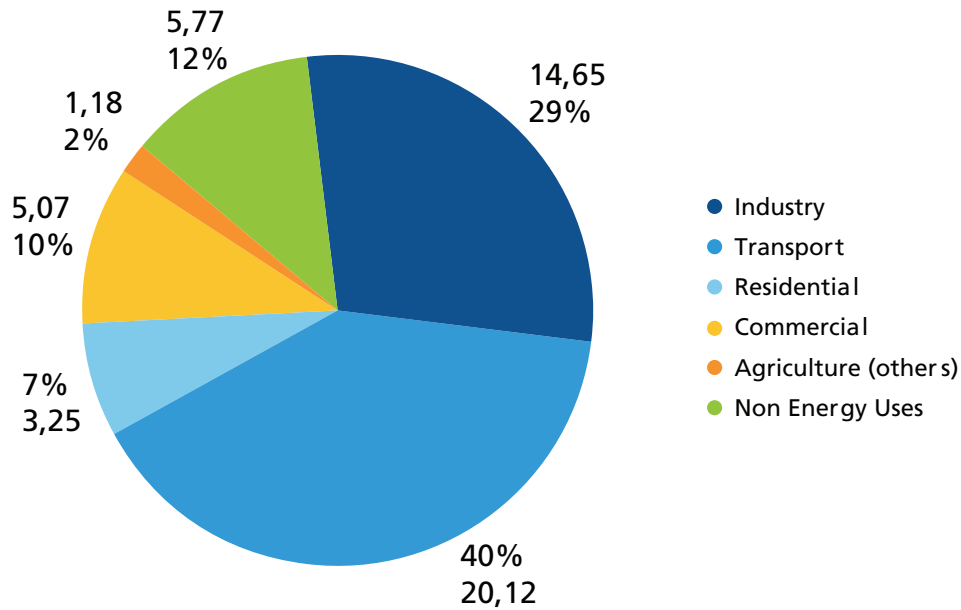


Figure 20. Energy Consumption by Sector in Malaysia in 2015

Source: ASEAN Centre for Energy Database (2018)

### 3.5.2. Policies Rules and Regulations

EE&C has been part of Malaysia’s policies since the 1970s, when the National Petroleum Policy included elements to increase efficiency within the sector. Further EE&C elements have been included as part of the National Energy Policy (1979), the National RE Policy Action plan (2010) and the National EE Action Plan (2014). In 2015, Malaysian Government released the 11th Malaysia Plan 2016-2020, which aims to promote wellbeing and development in the country. As part of this plan, the Government highlights its intention to promote the adoption of EE technologies across the transport, buildings, products and services sectors. Additionally, it sets the target of having at least 20% of green procurement by 2020. In this same document, the Government of Malaysia highlights the necessity of establishing suitable financing mechanisms to promote green growth, such as carbon taxes, green bonds and others.

Malaysia’s EE Action Plan outlines actions and initiatives needed to effectively implement EE&C programmes and achieve the national target of reduced electricity consumption (Ministry of Energy, Green Technologies and Water, 2014). The Government of Malaysia identified that implementing the EE action plan would require an annual average governmental allocation of about RM 1,040 million (US 265 million), as well as a leverage of RM 9,518 million (US 2,432) from the private sector. The total RM 10,557 (US 2,698) would cover administrative costs as well as the implementation of EE&C initiatives such as rating and labelling of appliances, Minimum Energy Performance Standard (MEPS), energy audits, EE building design and others as shown in table 19. Even though transport was not initially included in the National EE Action Plan, in 2014 the Malaysian government reformed its automotive plan, setting a new objective for Malaysia to become a regional hub of energy efficient vehicles, and promoting the assembly and manufacture of hybrid and electric vehicles through a mix of fiscal incentives, duty exemptions and capacity building measures. A comprehensive Roadmap for the development of infrastructure in the production of electric vehicles started being prepared in 2017 by the Ministry of Energy, Green Technology and Water (its new name is now the Ministry of Energy, Science, Technology, Environment and Climate Change, MESTECC).



Table 24. EE&C Policy Framework in Malaysia

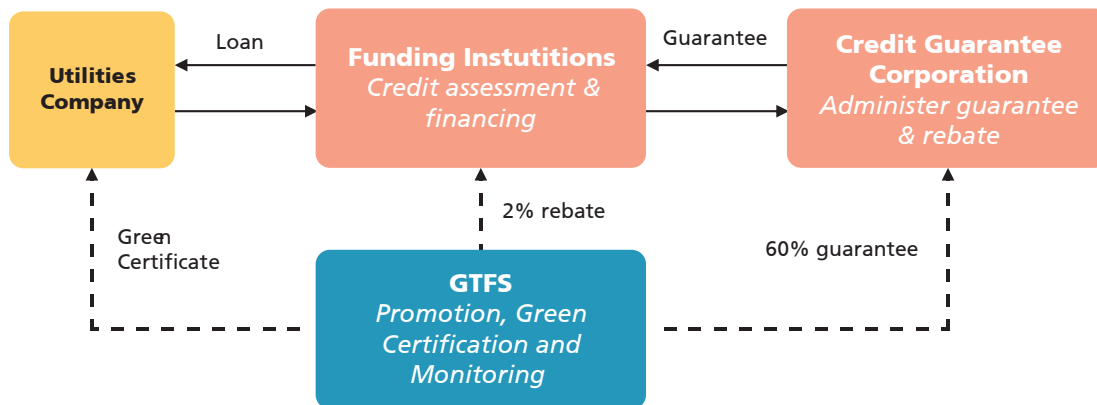
Key policy framework	<ul style="list-style-type: none"> <li>• National Energy Policy (1979)</li> <li>• National Energy Efficiency Action Plan (2014)</li> <li>• Five-fuel Policy (2001)</li> <li>• National Renewable Energy Policy Action plan (2010)</li> <li>• 11<sup>th</sup> Malaysia Plan 2016-2020</li> </ul>	
	Sectors	Policy measures
	Building	<ul style="list-style-type: none"> <li>• Standards - adoption of green buildings criteria and strengthening of green certification</li> </ul>
	Commercial and residential	<ul style="list-style-type: none"> <li>• Labelling - expansion of the eco-labelling scheme to include household products, electronic and electric appliances</li> </ul>
	Industry	<ul style="list-style-type: none"> <li>• Standards - introduction of internationally aligned green rating</li> </ul>
	Transport	<ul style="list-style-type: none"> <li>• Standards - adoption of fuel standards to promote environmentally-friendly fuels</li> </ul>
	Cross sectoral	<ul style="list-style-type: none"> <li>• Public awareness - development of a task force including key stakeholders from different sectors to promote public awareness programmes on the sustainable use of energy resources</li> <li>• ESCOs - increasing the competencies of ESCOs in buildings, industries, households and government buildings</li> <li>• Tax incentives (exemption)</li> </ul>

### 3.5.3. Financing Schemes, Mechanism, and incentives

Although the Government of Malaysia has introduced EE&C elements in its policies since the 1970s, EE&C activities specific to industry and buildings sectors have only been promoted since the early 2000s. In the period of 2000-2010, the Malaysian government and other international stakeholders including UNDP and DANIDA funded several initiatives aiming to build capacities and promote EE&C in the industry and building sectors. In 2010, the Government introduced the Green Technology Financing Scheme (GTFS), which has been one of the main financing instruments in the country. Other initiatives and programmes including tax incentives and funds have been implemented in the country. The following section describes the main EE&C programmes in Malaysia as well as their financing schemes.

### 3.5.3.1. Green Technology Financing Scheme (GTFS)

The GTFS was launched in 2010 and is administered by the Malaysian Green Technology Corporation (GreenTech Malaysia)<sup>18</sup>. 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 government guarantee of 60% on financing provided by financial institutions. This scheme is applicable for producers and users of green technologies, who can apply for up to USD 25 million and USD 2.5 million respectively. The financing scheme of GTFS is illustrated in Figure 21.



**Figure 21. Malaysia's GTFS Structure**

Source: (Mustafa, 2017)

The GTFS was aimed to fund green technology-related ventures by providing easier access to financing at lower financing costs compared to private banks/commercial financing for the energy, waste and water, building and transport sectors. Projects to be supported by the GTFS must be located in Malaysia and cannot be refinanced. In order to facilitate access to finance, the GTFS has a series of public guidelines for each sector, as well as technical handbooks for project developers. Even though EE&C is not a sector in itself, it is included as part of the eligibility criteria of all four targeted sectors.

The GTFS is currently engaging 52 banks and financial institutions, of which MDV, OCBC, UOB Bank, Maybank Berhad and Small-Medium Enterprise (SME) Bank are the most active ones, having financed more than 100 projects altogether (GTFS, 2018). The Scheme was initially set to last until 2015 but due to its positive results it was extended to 2017 and later a new version of GTFS, the GTFS 2.0, was announced in 2018 and set to last until 2022. However, after the change of government in May 2018, the allocation of GTFS 2.0 for fiscal year 2018 was cancelled. Furthermore, the Government has reduced the earmarked amount for the GTFS 2.0, from RM 5.0 billion to RM 2.0 billion. In addition, the 2% rebate which was originally provided throughout financing tenure, will now only be provided for the first five years.

GreenTech Malaysia reported that by the end of 2017, the GTFS has supported more than 319 projects out of 620 applications with a total cost of around USD 1.7 billion. The majority of loans have been approved in the RE sector (81%), followed by the waste and water (17%), buildings (1%) and transport sectors (1%). Only about 5% of all loan approvals were directly targeting EE&C, with most interventions taking place in the energy sector (61%), followed by buildings (21%), waste and water (13%) and the transport sector (5%). It is estimated that financed projects have resulted in the reduction of more than 3.78mtCO<sub>2</sub>eq/year and generated more than 4,909 jobs (GreenTech Malaysia, 2018).

<sup>18</sup> GreenTech Malaysia is an organisation under the purview of the Ministry of Energy, Green Technology and Water, Malaysia responsible for catalysing green technology deployment as a strategic engine for socio-economic growth in Malaysia in line with the National Green Technology Policy 2009.

### 3.5.3.2. Energy Performance Contracting (EPC) in Government Buildings

In 2013, Malaysian government approved an EPC scheme to overcome capital costs and other financial barriers associated with EE&C implementation measures in government buildings. Under this scheme, ESCOs would cover the initial costs of investment associated with the EE&C improvements, while the Government would pay the investment cost from the resulting energy savings. The EPC scheme follows the structure of a traditional ESCO, as shown in the following figure:

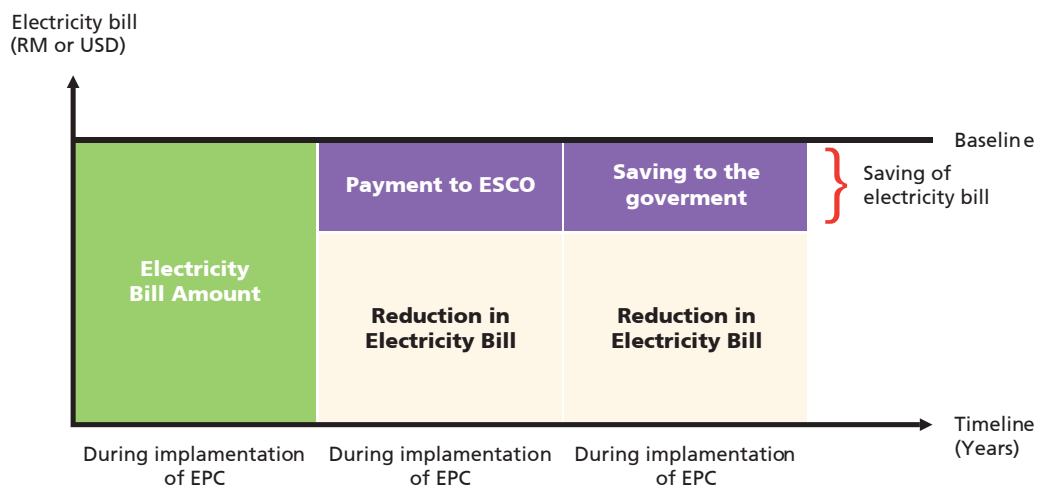


Figure 22. Structure of Malaysia's EPS

Source: (Suruhanjaya Tenaga)

### 3.5.3.3. Energy Performance Contracting Fund (EPC Fund)

Having identified that the ESCO market is still in a very early stage, the Malaysian government decided to implement a fund to provide financing for applicable EPC projects. The overall objective of the EPC fund is to overcome the constraints that ESCOs face when aiming to secure suitable financing for the cost of capital investments associated with EE interventions in the building sector. The Fund will be led by Malaysia Debt Ventures Berhad (MDV) who will provide around USD 51 million and further supported by the Building Sector Energy Efficiency Project (BSEEP) to provide a credit guarantee fund of about USD 3 million. The established fund will pay for credit guarantees from Credit Guarantee Corporations for up to 80% on the unsecured portion up to the maturity date of the term loan facility up to USD 0.7 million cover. Table 32 shows the envisioned structure for the EPC Fund.

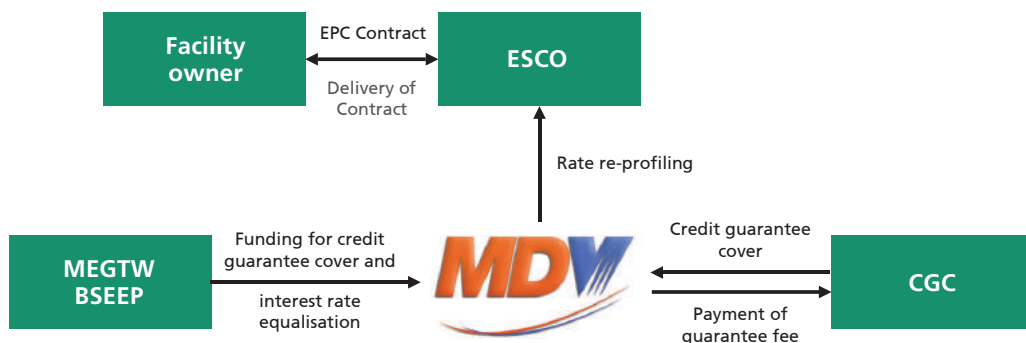


Figure 23. Structure of Malaysia's EPC Fund

Source: Ministry of Energy, Green Technology & Water (2014)

Financial resources will be used by ESCOs to finance EE projects, with monetary savings being shared amongst the facility owner and MDV. Once the financing facility is paid, MDV's portion will be paid to the ESCO. In order to access finance from the EPC Fund, ESCOs have to meet a series of criteria including minimum staff, audits, MRV plans, and other<sup>19</sup>. The EPC Fund following incentives:

- Available via Term, Revolving and Trade Lines
- Financing for up to 85% of project costs
- Target financing size of USD 0.2-3.8 million
- Target tenure 3-5 years with a maximum of 7 years
- 7% financing rate per annum
- Assignment of energy savings payments and a debenture as main security

The EPC Fund is expected to fund about 50 projects, which would contribute to an estimated electricity savings of 1,050 GWh equivalent to USD 102.2 million and 728.7 ktCO<sub>2</sub> after 5 years of implementation.

#### **3.5.3.4. Sustainability Achieved via Energy Efficiency (SAVE) Programme**

Launched in 2011, Sustainability Achieved via Energy Efficiency (SAVE) programme aims to provide cash rebates for the purchase of energy efficient refrigerators, air-conditioners, and chillers that would reduce energy consumption in households. The programme offered about USD 11.5 million for rebates as well as for its related promotional campaign activities aimed at raising awareness of EE&C ((Suruhanjaya Tenaga) and (Ministry of Energy, Green Technology & Water (MEGTW), 2014)). SAVE's budget covered the purchase of about 100,000 refrigerators, 65,000 air conditioners and 72,000 Refrigeration-Ton (RT) capacity of energy efficient chillers. Besides bolstering the market creation for EE appliances, the EE technologies adoption resulted in energy savings of US 8.8 million.

#### **3.5.3.5. Centre for Education and Training in Energy Efficiency and Renewable Energy (CETREE)**

Centre for Education and Training in Energy Efficiency and Renewable Energy (CETREE) was originally established in 2000 from a partnership between the Malaysian government and the Danish International Development Agency (DANIDA). DANIDA provided financial resources for CETREE between the period of 2000-2004. Afterwards, the Malaysian government has funded CETREE. CETREE has developed multiple courses on EE and RE for elementary and secondary schools, as well as assisted universities incorporating these subjects in their programmes. CETREE works together with local universities and other key stakeholders to organise capacity building events across the country.

#### **3.5.3.6. Malaysian Electricity Supply Industries Trust Account (MESITA)**

Malaysian Electricity Supply Industries Trust Account (MESITA) was launched in 1997 to support projects in the areas of rural electrification, R&D and RE, capacity building for the industrial sector, EE and others. The trust fund has a special committee, which is integrated by representatives from Malaysia's Economic Planning Unit, Ministry of Energy, Energy Commission, Ministry of Finance, Ministry of Rural Development, Tenaga Nasional Berhad (TNB) and six electricity generating companies<sup>20</sup>. The fund obtains its contributions from power generating companies, who voluntarily contribute 1% of their total annual audited turnover from electricity sales to the Peninsular Grid or the transmission network. Benefits from financed projects include the implementation of EE related courses, seminars, workshops and other capacity building activities, as well as the installation of highly efficient appliances and equipment. The fund can also support projects aiming to encourage EE by setting targets on reducing energy consumption.

<sup>19</sup> For further information, please visit: <http://www.mdv.com.my/en/energy-performance-contracting-fund/>

<sup>20</sup> TNB Generation Sdn. Bhd. and Independent Power Producers (IPPs) in Peninsular Malaysia are comprised of Genting Sanyen Power Sdn. Bhd., Port Dickson Power Bhd., Powertek Bhd., Segari Energy Venture Sdn. and YTL Power Generation Sdn. Bhd.







### 3.5.3.7. Energy Audit Conditional Grant (EACG)

The Energy Audit Conditional Grant (EACG) was launched in 2015 by the MEGTW as part of the Eleventh Malaysia Plan 2016-2020. The project started in 2016 and will be operational for three years. EACG aims to reduce energy consumption and GHG emissions from the industrial sector by providing financial support to undertake energy auditing and implement energy saving measures. The project focuses on commercial and industrial buildings with large consumption electricity consumption patterns (e.g. consumption of more than 3 million kWh for 6 consecutive months). MEGTW designated two independent implementing agencies for the commercial building and the industrial sectors; MGTC manages and monitors projects in the industrial sector, while the Sustainable Energy Development Authority (SEDA) is in charge of the building sector. The EACG provides assistance through grants, as well as through capacity building activities on EE&C. ESCOs are in charge of conducting the relevant audits and of making sure that energy saving measures achieve at least a 5% of energy savings per year compared to baseline.

### 3.5.3.8. Green Finance Programme and Green Sukuk (Sharia)

In 2016 the WB joined a technical working group supporting the Malaysia Green Finance Programme integrated by Bank Negara Malaysia and the Securities Commission with the objective of developing green markets and encouraging investments in green infrastructure in Malaysia and subsequently in the ASEAN region.

In 2017, this collaboration resulted in the issuance of the first green Sukuk in the ASEAN region, as an innovative channel to address financial gaps for green infrastructure. The fund was issued by Securities Commission Malaysia under the Sustainable and Responsible Investment (SRI) framework developed by the working group of the Green Finance Programme. The SRI Sukuk framework is expected to work as an effective fundraising channel in parallel with other incentives such as investment tax allowances, and income tax exemptions for green technologies. Under this Framework, SRI sukuk can be issued to finance eligible projects including renewable energy, energy efficiency, natural resources, community and economic development as well as waqf.

In 2017, the world's first green sukuk was issued under the SC's SRI Sukuk Framework to finance a solar project. To date, there are five issuances of green SRI sukuku with total issuances amounting to MYR 2.4 billion.

To encourage more issuances of green sukuk in the Malaysian capital market, several incentives are provided, including tax deduction on the issuance costs of SRI sukuk from the year of assessment (YA) 2016 up to YA 2020. In addition, the SC also established MYR6.0 million Green SRI Sukuk Grant Scheme, administered by Capital Markets Malaysia (CMM), the promotional arm of the SC, to support external review costs incurred by green SRI sukuk issuers. The grant scheme is also tax exempted for applications received from 1 January 2018 to 31 December 2020.

### 3.5.3.9. Fiscal Incentives

The Malaysian government has introduced a series of tax incentives to promote EE&C projects within the industry and transport sectors. These were first introduced in 2001 in the form of waiver of import duty and sales tax on EE equipment, as part of the Government financial budget and have been enhanced since then.

Some of the key fiscal incentives are listed below:

- Tax exemption on energy saving equipment, environment friendly buildings, hybrid cars and electric vehicles
- Investment tax allowance (e.g. for ESCOs)
- Initially accelerated capital allowance
- Import duty and sales exemption

### 3.5.4. Stakeholders

The key players on EE&C in Malaysia is summarised in Table 25 below

**Table 25. Institutional Framework for EE&C in Malaysia**

Institutions	Description
Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC)	This ministry formulates and implements EE policy in coordination with other key stakeholders.
Energy Commission	This commission regulates the electricity and gas supply industry at the reticulation stage. It also advises the MEGTW on EE, tariffs and other as relevant
Malaysian Green Technology Corporation (GreenTech Malaysia)	This corporation, under the purview of MEGTW, is in charge of catalysing the deployment of green technology in line with national green policies.
Energy Unit of Economic Planning Unit	This unit identifies the need for resources and allocates these for the implementation of EE programmes.
Ministry of International Trade and Industry	This ministry is responsible for international trade, industry, investment, productivity and others including automotive. It plans, legislates and implements international trade and industrial policies in line with the National Economic Policy.
Securities Commission Malaysia	This ministry is responsible for regulating and developing capital markets, including those related to energy.
Ministry of Finance	This ministry formulates economic policy and prepares the federal budget



### 3.5.5. Challenges and Recommendations

Even though Malaysia started developing its EE&C framework in early 2000s, the country still faces institutional rather than technological barriers associated with EE&C. Some of the main challenges associated with the development of EE&C projects in the country include low energy prices resulting from high energy subsidies (both on the price of natural gas and through rebates in bills for low-income households) the need of relevant skills to develop and monitor programmes, lack of access to finance as well as lack of collaboration between key stakeholders (UNEP, 2015).

Despite having financing schemes already in place, accessing finance for EE&C projects in Malaysia has been proven to be difficult due to disproportion of funding between EE&C and RE projects. Banks are more interested in funding RE projects due to their clear path of revenue and benefits. EE&C projects have also relatively smaller size which leads to a high transaction cost, further preventing banks to provide funding. In addition, government policies have been prioritising RE projects with the provision of supporting schemes such as feed-in tariff and net-metering. It is therefore crucial for the Government to expand and establish funding dedicated to EE&C projects.

Another key challenge in accessing finance in EE&C projects is lack of capacity in financial institutions. Many banks are reluctant to provide financing to EE&C projects due to their lack of technical capability and awareness about EE&C technologies. Knowledge building in EE&C technologies is important to enhance their skills in evaluating EE&C projects to address this issue. Lack of transparency in service contracts between financial institutions and project developers, as well as unclear approval procedures also hinders EE&C development. To address this issue, the Government needs to establish standard documentations (e.g. standardised procurement procedures).

Table 26 gives an overview of challenges currently faced by the country and recommendations on how to address them.

**Table 26: Challenges and Recommendations for EE&C Financing in Malaysia**

Challenges	Recommendations
Disproportion of funding between EE&C and RE projects; banks are more interested in funding RE projects	Expand and establish funding dedicated to EE&C projects
Lack of capacity in financial institutions in assessing EE&C projects	Put in place knowledge building programmes for financial institutions
Lack of collaboration between key stakeholders	Foster collaboration through EE financing working groups and dedicated platforms across stakeholder types
Lack of transparency in service contracts between financial institutions and unclear approval procedures	Establish standard documentations (e.g. standardised procurement documentations)



The recent development of Malaysia's EE national action plan and the inclusion of EE&C elements on the 11th Plan offers interesting opportunities for the transport sector, particularly as the Government is planning to release a clear scheme on how it will achieve its target of 100,000 EVs on the road by 2020 and 125,000 charging stations nationwide (Government of Malaysia Economic Planning Unit, 2015), (Malaysian Ministry of International Trade and Industry, 2014). The latter could offer a reliable framework for investors looking to promote the uptake of these technologies as well as for consumers. Regarding the building sector, the Government could implement further high-impact programmes targeted at high-energy consuming equipment (e.g. chillers) as well as on-bill financing schemes for EE-retrofits at the long term (Hor, y otros, 2018).

According to WB's data (2015), Malaysia has managed to achieve a small reduction of its energy intensity of 0.278 MJ/USD 2011 PPP GDP between 2000 and 2014. Further reductions on Malaysia's EI are expected in the following years, particularly as result of several EE&C schemes launched after 2010 (e.g. GTF5, EPC, SAVE, EACG) and other initiatives, such as Green Sukuks currently under development. However, for these reductions to materialize, it is necessary for the Government to develop an effective regulatory framework to enforce EE measures particularly in the industry and transport sectors.



## 3.6. Myanmar

### 3.6.1. Country Overview, EE status and Target

Myanmar experienced a significant economic rise between 2000-2017, going from a GDP of USD 8.9 billion to USD 69.3 billion. The country experienced similar increments for indicators such as energy consumption and CO2 emissions per capita. According to the World Bank (2017), Myanmar holds a population of 53.4 million. Myanmar has an extremely low electricity consumption per capita, only about 217 kWh in 2014, which is well below the region's average of 700 kWh per capita. Despite the increments in energy consumption, about 67% of the country's population lacks access to electricity, representing Myanmar's main energy related challenge.

**Table 27. Country Overview, EE Status, and Target in Myanmar**

<b>EE&amp;C target</b>			
		<ul style="list-style-type: none"> <li>Reduce TFEC by 5% by 2020, and by 8% by 2030, as compared with the 2005 level</li> <li>Improve EE by 20% in all sectors by 2030 (based on 2012 level)</li> <li>Reduce consumption by 5%–8% in the commercial and residential sector by 2020 through labelling systems and another demand-side management</li> </ul>	
<b>Population (2016)</b>	54,511,000	Population growth (annual, 2010 – 2016)	0.88%
<b>GDP (2016)</b>	USD 68.64 billion	GDP growth (annual, 2010 – 2016)	8.9 %
<b>Energy use (kg of oil equivalent / capita) (2015)</b>	330	Electric power consumption (kWh per capita) (2015)	1,137
<b>Access to electricity (2017)</b>	33%	Energy intensity level of primary energy (kg of oil eq. / USD 2005 PPP GDP)	36

Sources: ASEAN Centre for Energy Database (2018)

Myanmar's electricity grid has the largest share of renewable sources within the ASEAN countries. The country's energy production is largely based on hydro (58.9%) and natural gas (39%), with a minor contribution from coal (1.8%) and oil (0.3%). The recent increment of hydro in Myanmar's energy production from 11 MW in 2011 to 682.1 MW in 2014 has resulted in an important decrease of the country's energy intensity, which dropped from 14 MJ/USD 2011 PPP GDP in 1990, to 3 MJ/USD 2011 PPP GDP in 2014 (World Bank, 2014 & MOME, 2018). The residential sector represents Myanmar's largest energy end use sector (56.74%), followed by transport (19.92%) and industrial (12.25%) sectors. The residential sector represents Myanmar's largest energy end use sector (74%), followed by industrial (9%) and transport (8%) sectors. The breakdown of energy consumption by sector in Myanmar is illustrated in Figure 24.

Myanmar Energy Consumption per Sector (Mtoe and %)

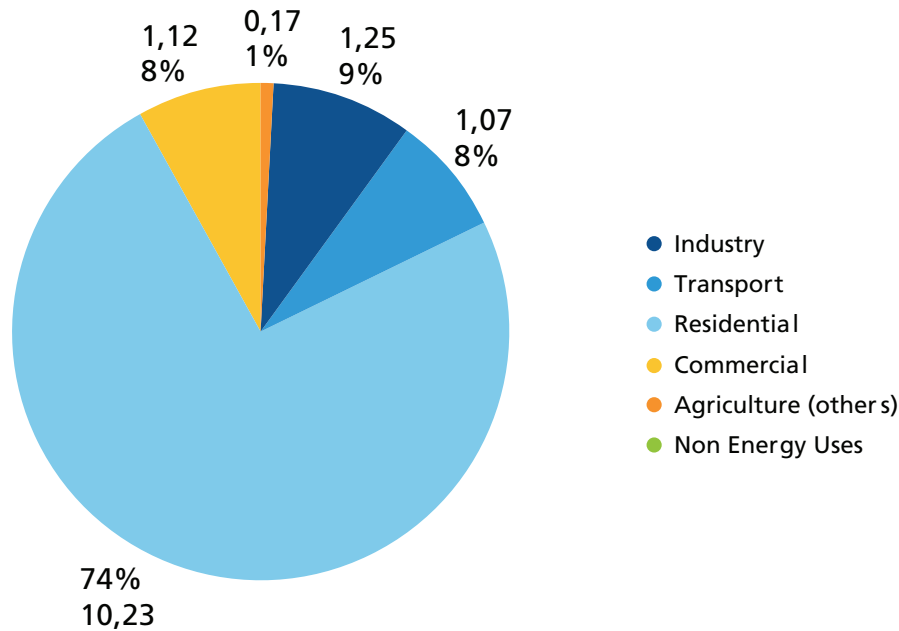


Figure 24. Energy Consumption by Sector in Myanmar in 2015

Sources: ASEAN Centre for Energy Database (2018)

### 3.6.2. Policies, Rules and Regulations

The political and economic reforms introduced by the Government since 2011 have been transformational and some tentative steps have been taken to improve EE. However, the necessary legal regulatory and overall policy framework are still being drawn up. In 2014 the Government of Myanmar released the National Energy Policy, which highlighted the importance of EE&C for the country’s long-term energy goals, and recognized the financial gap to finance projects, particularly in the industrial sector. The Government also recognized the necessity to establish a new Directorate for Energy Efficiency Improvement and Conservation Programme.

In 2015, the Government of Myanmar developed a long-term energy master plan, including EE&C elements with support from ADB. As part of this collaboration, the Government released the National Energy Efficiency and Conservation Policy, Strategy and Roadmap (2016). As part of this roadmap, the Government identified Myanmar’s energy consumption patterns and future demand, as well as the potential to reduce energy consumption by 25% by addressing EE&C issues mainly in the industrial (8.84%), commercial (4.97%) and residential sectors (9.70%); an additional potential of 1.7% was identified in other sectors. Additionally, this document presents a series of EE related measures (Table 23) as well as a 4-year implementation roadmap to be financed by the Government of Myanmar and additional development partners.



Table 28. EE&C Policy Framework in Myanmar

Key policy documents	<ul style="list-style-type: none"> <li>• National Energy Efficiency and Conservation Policy, Strategy and Roadmap (2015) issued by Ministry of Industry (MOI), Asian Development Bank (ADB), and the National Energy Management Committee (NEMC)</li> <li>• National Electrification Plan issued by the Government of Myanmar and the WB (2015)</li> <li>• National Energy Policy issued by NEMC (2014)</li> <li>• Myanmar Energy Master Plan issued by NEMC (National Energy Management Committee, 2015)</li> </ul>	
	Sectors	Policy measures
Key policy frameworks	Building	<ul style="list-style-type: none"> <li>• Standards - adoption of energy efficiency building code in new buildings and refurbishment of existing buildings</li> <li>• Capacity building - development of EE guidelines for commercial buildings, as well as trainings for architects and engineers on EE</li> <li>• Financial incentives - provision of incentives to implement EE measures and to manufacture EE equipment</li> <li>• Other - promotion of RE technologies such as PV and water heating systems in hotels and buildings</li> </ul>
	Commercial and residential	<ul style="list-style-type: none"> <li>• Labelling (voluntary) - introduction of EE performance standards and labelling for appliances, as well as testing and certifying facilities for appliances</li> <li>• Financial incentives - introduction of incentives for EE equipment</li> <li>• Capacity building - implementation of training programmes and awareness campaigns on EE</li> <li>• Other - promote the adoption of efficient biomass cook stoves as well as efficient LPG cook stoves</li> </ul>
	Industry	<ul style="list-style-type: none"> <li>• Standards - establishment of energy data collection procedures, energy audit programmes and good energy management practices</li> <li>• Financial incentives - provision of financial incentives for the implementation of EE measures</li> <li>• Capacity building - increase awareness of EE&amp;C through trainings, certification programmes, energy guidelines and others</li> </ul>
	Cross sectoral	<ul style="list-style-type: none"> <li>• ESCOs - increasing the competencies of ESCOs in buildings, industries, households and government buildings</li> <li>• Tax incentives (exemption)</li> </ul>



### 3.6.3. Financing Schemes, Mechanism, and Incentives

Financing of EE&C programmes in Myanmar is still at a very early stage. Implementing the National Energy Efficiency and Conservation Policy, Strategy and Roadmap will imply cost for both the Government of Myanmar, as well development partners. Developing financial incentives for EE&C in all sectors is identified as a key activity, which would require funding from development partners. National Energy Efficiency and Conservation Fund covers financial incentives as given below:

1. Tax incentives for investment in EE technologies and import of energy efficient appliances
2. Subsidies for procurement of EE technologies, energy audits
3. Leasing system for solar home systems
4. Revolving fund for community-based energy projects.

The above-mentioned incentives are expected to be in place 2 years after the beginning of the implementation of the roadmap and will cover industry, commercial and residential sectors.

Energy Efficiency and Conservation Law is currently being drafted and is planned to be enacted in 2019. This law will provide for the establishment of EE&C Fund which will be used to provide support for EE&C projects and improvement measures.

### 3.6.4. Stakeholders

Besides Myanmar's government institutions, there have been multiple international financial institutions and cooperation agencies involved in the development of capacities for EE&C as well as in the provision of financial resources including ADB, JICA, and WB among others.



Credit: GIZ



Table 29. Institutional Framework for EE&C in Myanmar

Institutions	Description
Ministry of Electricity and Energy	This is the ministry responsible for energy policy and coordination
Ministry of Industry (EE)	The Energy Efficiency and Conservation Division under the Directorate of Industrial Collaboration is responsible for EE&C activities for all sectors in Myanmar. The Central Research and Development Department of the Ministry formerly was responsible for EE measures in the industrial sector.
Ministry of Construction	This ministry is responsible for EE&C in building construction
Myanmar's Engineering Society	This society works with various government groups and international and local non-government organisations to raise awareness of EE&C
Ministry of Natural Resources and Environmental Conservation	This ministry is responsible for issues on fuelwood, climate change, environmental safeguard requirements

### 3.6.5. Challenges and Recommendations

Myanmar's main energy-related challenge is low electrification rate (41.82%). For this reason, much of the Government's attention has focused on developing energy infrastructure to provide further access to electricity. It was until 2014 when the Government released its National Energy Policy, that the importance of financing EE&C related projects was recognized.

Despite that ADB (2015) has identified important energy saving potential in the industry, commercial, residential and public sectors, these face a series of regulatory, financial and institutional challenges. Some of the key regulatory challenges include a lack of clear policies and regulations, as well as mandatory mechanisms to encourage the adoption of energy efficient technologies. However, the Government is developing the Energy Efficiency and Conservation Law and is expected to be published by 2019. The absence of inadequate technical capacities is another key challenge; ESCOs have limited presence in the region and offer a limited range of services due to the absence of legal and financial infrastructure to support performance contracts. Furthermore, the number of local private investors is very limited, if any. The source of funding for EE&C programmes has derived from international donors and development agencies such as ADB and JICA. They provide support through the central bank. The absence of local private investors in Myanmar effectively restricts implementation of financial instruments measures.

The Government of Myanmar (2014) has identified a big financial gap in the industrial sector, particularly for medium and large-scale projects due to lack of effective policies and plans targeting this sector. Additionally, the industrial sector often faces low energy costs per unit of output, which encourages investments in business expansion as opposed to energy conservation. Implementing energy audits and supporting further interventions from ESCOs would improve the current conditions in the sector.



As the residential sector in Myanmar is responsible for about 23% of the total energy consumption it is key that the Government develops effective mechanisms to achieve an effective transition from biomass as the main source of energy. Even though energy efficient technologies such as cook stoves, lights, or refrigerators represent a key area of opportunity to decrease energy consumption and improve household's quality of life, most of the products that are available in the market are imported from China and India due to their non-availability and lack labelling on energy performance. An effective labelling system, with suitable financial incentives (e.g. tax exemptions, rebates) could be an effective way to bolster the adoption of energy efficient technologies.

Table 30 outlines the challenges and recommendations for EE&C financing in Myanmar.

**Table 30: Challenges and Recommendations for EE&C Financing in Myanmar**

Challenges	Recommendations
Limited policies and mechanisms, as well as mandatory mechanisms to encourage adoption of energy efficient technologies	Implement energy audits and intervention supports for ESCOs to improve condition in industrial sector
Limited legal and financial infrastructure to support energy performance contracting which leads to limited ESCOs' presence and services offered	Develop effective labelling system with suitable financial incentives to bolster the adoption of energy efficient technologies
Very limited number of local private investors, effectively restricting implementation of financial instruments	Set in place financial mechanisms suitable for a smaller group of actors, such as size-adapted direct EE loan programmes. Mechanisms can be adapted at a later stage when EE financing demand from the private sector has increased.
Low energy prices which discourages investments in energy conservations	Revise fossil fuel subsidies and introduce market prices that reflect real economic costs



## 3.7. The Philippines

### 3.7.1. Country Overview, EE status and Target

With a population of 102.5 million, the Philippines is the second largest populated country in ASEAN after Indonesia (261.11 million). The Philippines has experienced a significant growth of its GDP between 2000 and 2016, increasing from USD 81.026 to USD 311.4 billion respectively. The population increased from 77.9 million in 2000 to 102.5 million in 2016. These growing trends have been accompanied by a 29% increased consumption of electricity per capita during the same period.

The Philippines' electricity grid is largely dependent on fossil fuels. Coal (44.5%), oil (7.1%) and gas (22.9%) are responsible for about 75% the country's energy production. Renewable energy sources in the form of hydro (10.5%) geothermal (13.4%) and solar power (0.2%) produce about 25% of the country's electricity. Despite this large dependency on fossil fuels, energy intensity has decreased from 5 MJ/USD 2011 PPP GDP in 2000 to just 3 MJ/USD 2011 PPP GDP in 2014.

**Table 31. Country Overview, EE Status, and Target in The Philippines**

<b>EE&amp;C target</b>	<ul style="list-style-type: none"> <li>• Reduce energy intensity by 3% by 2040 from 2005 level</li> <li>• Decrease total final energy consumption by 24% by 2040 through targeted EE&amp;C savings in the transport, industry, residential, commercial and agriculture sectors.</li> </ul>		
<b>Population (2016)</b>	102,447,000 million	Population growth (annual, 2010 – 2016)	1.6%
<b>GDP (2016)</b>	USD 311.4 billion	GDP growth (annual, 2010 – 2016)	7.7%
<b>Energy use (kg of oil equivalent / capita) (2015)</b>	528	Electric power consumption (kWh per capita) (2015)	687
<b>Access to electricity (2017)</b>	90.7 %	Energy intensity level of primary energy (kg of oil eq. / USD 2005 PPP GDP)	86

Sources: ASEAN Centre for Energy Database (2018)

The largest energy end use sectors in the Philippines are transport (33.4%), residential sector (29.6%) and industry (21.4%) which together account for more than 80% of the country's energy consumption. Other relevant sectors include commercial and public services (10.7%) and non-energy use (3.7%) sectors. The full breakdown of energy consumption by sector in the Philippines is illustrated in Figure 25:



Credit: GIZ

Philippines Energy Consumption per Sector (Mtoe and %)

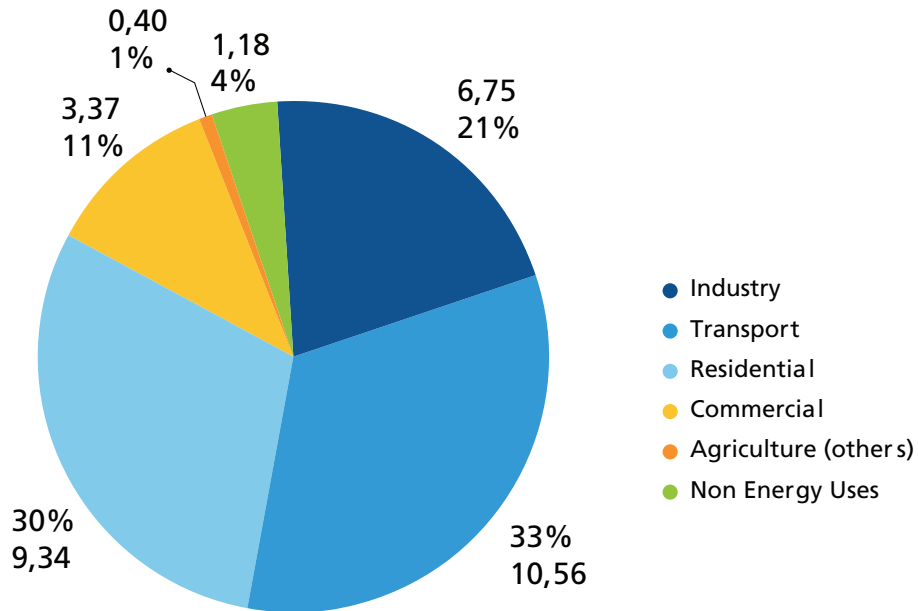


Figure 25. Energy Consumption by Sector in the Philippines in 2015

Source: ASEAN Centre for Energy Database (2018)





### 3.7.2. Policies, Rules and Regulations

The Philippines started developing programmes to promote EE&C in the country in 2004, and more recently released the second version of its EE&C conservation roadmap 2017-40<sup>21</sup> (Department of Energy, 2017). The document elaborates on how to ensure energy security, while concurrently achieve optimal energy pricing and sustainable energy systems. For this, the Government of Philippines set cross-sectoral as well as sector-specific EE&C targets for the transport, industry, residential and commercial sectors which together account for annual energy savings of 24% by 2040 with a 2005 baseline.

Besides sectoral targets, the roadmap includes a series of short to long-term objectives for each sector, to be achieved through the implementation of policy instruments including regulatory, financial, and capacity building ones, as summarized in Table 32:

**Table 32. EE&C Policy Framework in the Philippines**

Key policy documents	<ul style="list-style-type: none"> <li>The Energy Efficiency and Conservation Roadmap 2017-40</li> <li>The National RE Programme</li> <li>Energy Efficiency and Conservation Act (2017)</li> <li>Philippines Development Plan 2017 – 2022</li> <li>Republic Act 7638</li> </ul>	
	<b>Sectors</b>	<b>Policy measures</b>
Key policy framework	Transport	<ul style="list-style-type: none"> <li>Standards – development of fuel efficiency ratings</li> <li>Capacity building – implementation of driver education programmes and larger scale fleet management</li> <li>Financial incentives – implementation of fiscal measures (e.g. vehicle registration, congestion taxes)</li> <li>Other – development of initiatives and programmes to target key energy subsectors within road transport and non-road transport (e.g. marine and air transport) and promotion of the adoption of electric vehicles as well as other EE non-engine components (e.g. tires, cooling system, lightning)</li> </ul>
	Industry	<ul style="list-style-type: none"> <li>Standards – introduction of MEPs for electric motors and similar devices, and further inclusion of other devices such as fans, chillers, boilers, Ventilation and Air Conditioning systems and others in line with international trends and available technologies</li> <li>Financial incentives – explore the implication of different tariff schemes for the development of demand side projects</li> <li>Capacity building – introduction of energy reporting and support for ESCOs</li> <li>Other – development of specific programmes for energy intensive industries (e.g. sugar, cement) as well as revision of the national investment rules to further promote EE</li> </ul>

<sup>21</sup> The Department of Energy completed a first version of the Energy Efficiency and Conservation Roadmap in 2014, to be effective from 2014-30. The roadmap was revised in 2016 and was released in 2017 having a new effective period from 2017-2040.

Key policy framework	Sectors	Policy measures
	Residential	<ul style="list-style-type: none"> <li>Standards – continuation of the MEPS scheme and future inclusion of EE measures in the national building code</li> <li>Financial incentives – explore the viability of on-bill financing models</li> <li>Capacity building – support the passing of the Enercon Bill which promotes the enforcement measures for Measurement, Reporting and Verification (MRV), as well as increase engagement with electric utilities and fuel providers to increase data capacities</li> <li>Other – development of EE&amp;C programmes to support the adoption of insulation, lighting and retrofit technologies, as well as specific programmes for low-income households</li> </ul>
	Commercial buildings	<ul style="list-style-type: none"> <li>Standards - inclusion of EE measures in the national building code</li> <li>Financial incentives – development of EE incentive funds including the participation of private financiers</li> <li>Capacity building – organisation of workshops and seminars as well as building a series of benchmarking and ratings for building information and reporting</li> </ul>
	Cross sectoral	<ul style="list-style-type: none"> <li>Standards – establishment of further enforcement regimes and development of a national strategy for the power supply sector</li> <li>Capacity building – improvement of coordination within local government units to promote the adoption and enforcement of EE&amp;C measures and other educational and informational campaigns</li> <li>Other – establishment of EE database, data collection regime and MRV framework</li> </ul>

### 3.7.3. Existing EE&C Programmes and their Financing Schemes in the Philippines

The Philippines has not yet institutionalised the rules for EE&C or mechanism to encourage EE&C practice through financial incentives. The recent approval of the last revision of the Energy Efficiency and Conservation Act of 2018 and the Recoverable System Loss Act by the Senate are key milestones for a further development of EE&C mandatory programmes. Some of the current EE&C programmes are voluntary based:

#### 3.7.3.1. The Philippine Industrial Energy Efficiency Project (PIEEP)

The Philippine Industrial Energy Efficiency Project (PIEEP) is a 5-year project which is created through a collaboration between the Department of Energy, the Department of Trade and Industry, UNIDO and the Global Environment Facility. It aims to promote a sustainable energy management system and achieve EE best practices in industrial sector to obtain energy savings. PIEEP's targets include savings of 1,143,149 GJ in energy and 359,877 kWh of electricity consumption. These targets are to be achieved through the introduction of energy management system (EnMS) standards (compliant with ISO 50001), systems optimization (SO) for steam, compressed air, and pumps, and financial opportunities for energy efficiency investments. The financial dimension of the project is focused on enhancing technical capacities amongst financing institutions. The co-financing sources include Land Bank of the Philippines and the Bank of the Philippines Islands, with both offering USD 10 million each in the form of standby loan project window on EE project.







### 3.7.3.2. National Energy Efficiency and Conservation Programme (NEECP)

The National Energy Efficiency and Conservation Programme (NEECP) started in 2004 with the objective to improve the utilisation of all energy users through EE&C programmes and achieve an average annual energy savings of 23 million barrels of fuel oil equivalent. The Department of Energy (DOE) leads the programme and focuses on fuel efficiency and electricity efficiency. The programme includes a series of actions from capacity building to the promotion of energy labelling, EE&C standards, and the adoption of alternative fuels.

### 3.7.3.3. Green Choice Philippines Scheme

Established in 2000, the Green Choice Philippines is a voluntary eco-labelling programme, which helps identify products, or services that reduce environmental impact based on aspects such as raw materials extraction, recycling, and disposal methods. It is guided by the principles and procedures of ISO 14024.

### 3.7.4. Stakeholders

The power sector in the Philippines was privatised after the Electric Power Industry Reform Act of 2001. Today, there are multiple stakeholders involved in policy making, as well as in the production and distribution of energy as summarized in the following table:

**Table 33. EE&C Policy Framework in the Philippines**

Institutions	Description
Department of Energy (DOE)	This department is responsible for all activities related to energy including exploration, development, utilization, distribution and conservation. It is also in charge of designing, developing and implementing plans, programmes, projects and other activities related to the energy sector.
Energy Utilization Management Bureau	This bureau is part of DOE and is responsible for formulating and implementing policies, regulations, programmes and plans on several energy matters including the efficient use of energy resources
EE&C Division	As part of the Energy Utilization Management Bureau, this division is responsible for the development and evaluation of the EE&C programme as well as the promotion and advocacy of relevant technologies
Alternative Fuels and Energy Technology Division	As part of the Energy Utilization Management Bureau, this division is responsible for the development, management and evaluation of programmes related to alternative fuels and energy technologies
Energy Regulatory Commission (ERC)	This commission is responsible for the promulgation, approval and enforcement of rules, regulations, guidelines and policies associated with the electric power industry

Institutions	Description
National Grid Corporation of the Philippines (NGCP)	This private corporation is in charge of operating, maintaining, and developing the country's state-owned power grid, which is an interconnected system that transmits gigawatts of power at thousands of volts from where it is made to where it is needed
National Transmission Corporation (NTC)	This corporation is responsible for protecting national government's interests by ensuring its compliance with the terms and conditions of the Concession Agreement and the policies of DOE, as well as administering the Feed-in-Tariff Allowance Fund for renewable energy generators and others.
National Power Corporation (NPC)	This corporation is responsible for providing reliable power generation and power delivery systems to ensure total electrification of its missionary areas, as well as encouraging private sector participation
Power Sector Assets & Liabilities Management Corporation (PSALM)	This corporation is responsible for activities associated to privatization of NPC and NTC's assets, liability management and administrative tasks related to the ERC
National Electrification Administration (NEA)	This administration is responsible for rural electrification.
Department of Environmental and Natural Resources (DENR)	This department formulates and implements policies, guidelines, rules and regulations related to environmental management and pollution prevention and control. DENR supervises the government's policies, plans and programmes pertaining to the management, conservation, development, use and replenishment of the country's natural resources and biological diversity.
Department of Trade and Industry (DTI)	This department is responsible for enabling an innovative, competitive and inclusive business sector and economy in the country. It acts as a catalyst for private sector activity both domestic and foreign
Department of Transportation (DOTr)	This department is responsible for the planning, programming, coordinating, administrating and other activities related to the transport and communication systems. It is responsible for ensuring that the transport sector is efficient, globally competitive and in line with international standards



### 3.7.5. Challenges and Recommendations

EE&C development in the Philippines is mainly facing barriers related to the lack of awareness and capacity in implementing EE&C measures. Table 34 provides an overview of challenges and how to address them in EE&C development in the Philippines.

**Table 34: Challenges and Recommendations for EE&C Financing in the Philippines**

Challenges	Recommendations
Limited awareness across all sectors concerning the needs and benefits of implementing EE saving measures	Establish effective and comprehensive training programmes for all involved stakeholders to expand their knowledge on EE&C initiatives
Limited capacity of EE service providers	
Support from bilateral and multilateral agencies is mostly in form capacity building	Capacity building programme from bilateral and multilateral agencies is to be complemented with financial support (e.g. guarantee or soft loans) for EE initiatives
Limited capacity in the local government units in EE&C implementation	Build capacity within local commercial banks and establish credit lines or guarantees to kick-start the involvement of commercial banks in energy efficiency
Local bank branches are currently less open to provide financing for EE projects	



### 3.8. Singapore

#### 3.8.1. Country Overview, EE status and Target

Singapore has an area of 660 square kilometres and a population of 5.6 million, making it a densely populated nation. Singapore plays an important role in global energy markets as it is a major global energy trading hub and the world’s third largest oil refining centre (IEA, 2017). Singapore is also one of the key financial services centres in Asia and is likely to play an important role in financing energy sector development in ASEAN. Energy is a strategic resource for Singapore, since the country relies on imported fuel to meet its energy demand. Given Singapore’s limited potential RE resources, EE is a key strategy in achieving energy security. In this regard, the country has set up an objective of reducing emissions intensity by 36% by 2030 from its 2005 level.

Table 35. Country Overview, EE Status, and Target in Singapore

<b>EE&amp;C target</b>	<ul style="list-style-type: none"> <li>• Reduce emissions intensity by 36% (from 2005 level) by 2030</li> <li>• Improve EE is a key mitigation measure</li> <li>• Stabilise GHG emissions with the aim of peaking around 2030</li> </ul>		
<b>Population (2016)</b>	5,640,000	Population growth (annual, 2010 – 2016)	1.8%
<b>GDP (2016)</b>	USD 297 billion	GDP growth (annual, 2010 – 2016))	3.9%
<b>Energy use (kg of oil equivalent / capita) (2015)</b>	4,370	Electric power consumption (kWh per capita) (2015)	8,642
<b>Access to electricity (2017)</b>	100 %	Energy intensity level of primary energy (kg of oil eq. / USD 2005 PPP GDP)	61

Sources: ASEAN Centre for Energy Database (2018)

Given the volatile global energy prices and uncertainties in energy supply, EE has been an important measure in managing Singapore’s dependence on energy imports, enhancing its energy security and in reducing business costs and emissions. While energy demand is expected to grow in the future due to economic growth and an increase in population, part of this growing energy demand can be met by using energy more efficiently instead of increasing energy production.

The Energy Market Authority (EMA), a statutory board under the Ministry of Trade and Industry, is responsible for ensuring reliable and secure energy supply, promoting effective competition in the energy market and developing a dynamic energy sector in Singapore. Together with other government agencies like the National Environment Agency (NEA) and the Economic Development Board (EDB), EMA jointly promote and facilitate the adoption of EE measures in Singapore. The industrial sector accounts for the largest share of Singapore’s energy consumption (33%), followed by transport sector (15%), commercial and public-sector services (10%) and households (4%). The breakdown of energy consumption by sector in Singapore is illustrated in Figure 26.



Singapore Energy Consumption per Sector (Mtoe and %)

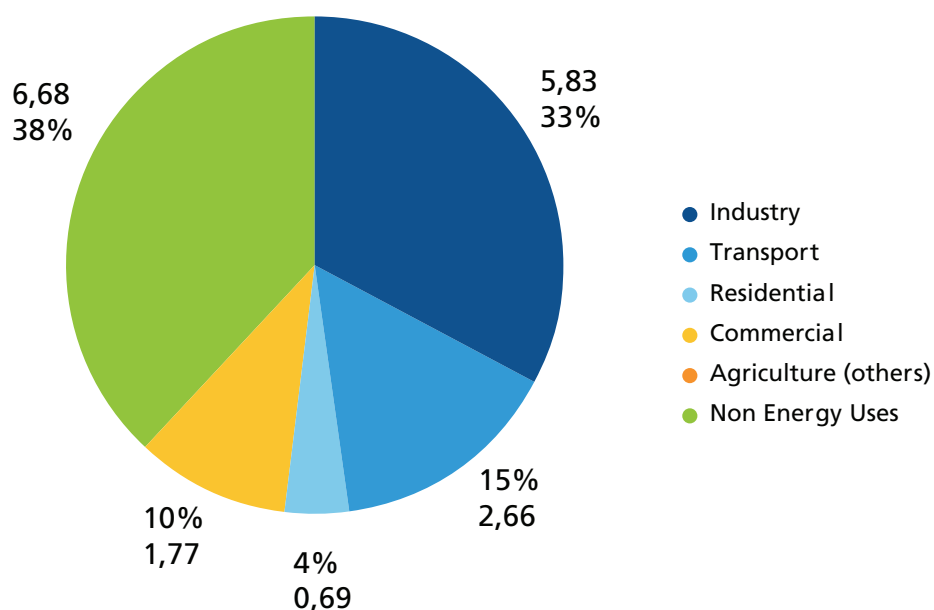


Figure 26. Energy Consumption by Sector in Singapore in 2015

Sources: ASEAN Centre for Energy Database (2018)

### 3.8.2. Policies, Rules and Regulations

Launched by the Inter-Ministerial Committee on Sustainable Development, the Sustainable Singapore Blueprint (2009-2030) serves as the umbrella framework for EE initiatives in Singapore and has set a target of 20% and 35% energy intensity reduction by 2020 and 2030 respectively. The Energy Conservation Act (ECA) was introduced in 2013 and amended in March 2017 to mandate energy management requirements for energy-intensive users (companies consuming 54 TJ or more of energy per year). The main requirements of Energy Conservation Act include the appointment of energy managers, reporting of greenhouse gas emissions and energy use, and submission of energy efficiency improvement plans (Energy Studies Institute, 2017).

Table 36. EE&C Policy Framework in Singapore

Key policy framework	<ul style="list-style-type: none"> <li>• Energy Conservation Act (2013), amended in 2017</li> <li>• Sustainable Singapore Blueprint<sup>22</sup></li> <li>• The National Climate Change Strategy 2012<sup>23</sup></li> <li>• Climate Action Plan 2018</li> <li>• Singapore’s NDC<sup>24</sup></li> </ul>	
	Sectors	Policy measures
	Building	<ul style="list-style-type: none"> <li>• Code on Envelope Thermal Performance for Buildings</li> <li>• Building Control (Environmental Sustainability) Regulations 2008</li> <li>• Building Control (Environmental Sustainability Measures for Existing Buildings) Regulations 2013</li> <li>• BCA Green Mark Rating for new and existing building</li> </ul>

<sup>22</sup> For more information on Sustainable Singapore Blueprint, please visit <https://www.mewr.gov.sg/ssb>

<sup>23</sup> The National Climate Change Strategy can be accessed under <https://www.nccs.gov.sg/docs/default-source/publications/national-climate-change-strategy.pdf>

<sup>24</sup> Singapore’s Second Biennial Update Report and Third National Communication to UNFCCC can be accessed here, <https://www.nccs.gov.sg/resources/publications/plans-reports/change-strategy.pdf>

Key policy framework	Sectors	Policy measures
	Household appliances	<ul style="list-style-type: none"> <li>Mandatory Energy Labelling Scheme (MELS)</li> <li>Minimum Energy Performance Standards (MEPS)</li> </ul>
	Industry	<ul style="list-style-type: none"> <li>Mandatory Energy Management Requirements</li> </ul>
	Transport	<ul style="list-style-type: none"> <li>Fuel Economy Label</li> <li>Higher emission standard for vehicle</li> </ul>

### 3.8.3. Financing Schemes, Mechanism and Incentives

As explained in the previous section, industry, households and public-sector buildings are key sectors in EE initiatives in Singapore. As such, EE initiatives and their financing schemes in the country are mainly focused on these sectors with grant, loan and tax incentive serving as the main financing instruments as summarised in the following table:

**Table 37. Summary of Singapore’s EE financing Schemes and Incentives**

Incentives/Program	Components	Instrument	Sectors
Incentives	Incentives		
Energy Efficiency Fund (E2F)	<ul style="list-style-type: none"> <li>Resource Efficient Design of New Facilities or Major Expansion</li> <li>Energy Assessments of Existing Facilities</li> <li>Adoption of Energy Efficient Technologies</li> </ul>	Grant	Industry
Productivity Grant (Energy Efficiency)	<ul style="list-style-type: none"> <li>Adoption of Energy Efficient Equipment or Technologies</li> </ul>	Grant	Industry
Finance Programme for Energy Efficiency Projects (SDCL Asia)	<ul style="list-style-type: none"> <li>Third party financing of upfront capital to implement energy efficiency projects</li> </ul>	Loan	Industry, manufacturing and building
Green Mark Incentive Scheme	<ul style="list-style-type: none"> <li>SGD 100 million Green Mark Incentive Scheme for Existing Buildings (GMIS-EB)</li> </ul>	Grants (cash incentives)	Building
	<ul style="list-style-type: none"> <li>Green Mark Gross Floor Area (GM-GFA) Incentive Scheme</li> </ul>	Grants	
	<ul style="list-style-type: none"> <li>SGD 5 million Green Mark Incentive Scheme - Design Prototype (GMIS-DP)</li> </ul>	Grants (cash incentives)	
	<ul style="list-style-type: none"> <li>SGD 50 million Green Mark Incentive Scheme for Existing Buildings and Premises (GMIS-EBP)</li> </ul>	Loan	
	<ul style="list-style-type: none"> <li>Building Retrofit Energy Efficiency Financing (BREEF) scheme</li> </ul>		
<b>Tax incentive schemes</b>			
Investment Allowance (IA)	<ul style="list-style-type: none"> <li>Provides additional 30% allowance against taxable income on top of normal capital allowance for EE investment</li> </ul>	Tax incentive	Industry

Source: (Green Future Solutions, 2015), (NEA, 2017), (BCA GMIS, 2017), (NCCS, 2017)

### 3.8.3.1. Incentives for EE in Singapore

#### 3.8.3.1.1. Energy Efficiency Fund (E2F)

Energy Efficiency Fund (E2F) was set-up in April 2017 and is administered by the National Environment Agency (NEA) to support industrial companies to design resource-efficient facilities and conduct energy assessments to identify EE measures, and adopt energy efficient technologies. It consolidates all existing NEA-administered industrial EE incentive schemes with streamlined procedures for grant application process to minimise paper work.<sup>25</sup> The key features of this fund are presented in Table 38.

**Table 38. Key Features of Singapore's Energy Efficiency Fund (E2F)**

Supportable components	Description	Eligibility companies	Grant quantum	Qualifying costs
Resource-Efficient Design of New Facilities or Major Expansion <sup>26</sup>	Encourages investors in new facilities to integrate resource efficiency improvements into manufacturing development plans early in the design stage	<ul style="list-style-type: none"> <li>Owners/operators of industrial facilities must be registered in Singapore</li> <li>Facilities should be located in Singapore</li> </ul>	<ul style="list-style-type: none"> <li>Co-funds up to 50% of design workshop cost</li> <li>Capped at SGD 600,000/ project</li> </ul>	<ul style="list-style-type: none"> <li>Consultancy fee</li> <li>Transportation and accommodation for consultants</li> <li>Venue and other logistical costs for design workshop</li> </ul>
Energy Assessments of Existing Facilities <sup>27</sup>	Encourages companies in the industry sector to carry out energy assessments for their existing facilities to identify potential areas for EE improvement	<ul style="list-style-type: none"> <li>Owners/operators of industrial facilities must be registered in Singapore</li> <li>Facilities should be located in Singapore</li> <li>Must have conducted a preliminary energy assessment</li> </ul>	<ul style="list-style-type: none"> <li>Co-funds up to 50% of energy audit cost</li> <li>Capped at SGD 200,000 over a 5-year period for any single facility</li> </ul>	<ul style="list-style-type: none"> <li>Salaries</li> <li>Use of instrumentation and evaluation tools</li> <li>Expendables</li> <li>Overheads</li> </ul>
Adoption of Energy Efficient Technologies <sup>28</sup>	Encourages manufacturing companies, including SMEs, to invest in energy efficient technologies	<ul style="list-style-type: none"> <li>Owners/operators of manufacturing facilities registered in Singapore with an annual sales turnover of ≤ SGD 500 mil</li> <li>Facilities should be located in Singapore</li> <li>A partner of EENP programme. sited in Singapore</li> <li>A partner of EENP programme.</li> </ul>	<ul style="list-style-type: none"> <li>Co-funds up to 30%</li> <li>No cap</li> </ul>	<ul style="list-style-type: none"> <li>Manpower</li> <li>Equipment and materials</li> <li>Professional services</li> </ul>

Sources: NEA (2016, 2017a, 2017b)

<sup>25</sup> The previous schemes include Design for Efficiency (DfE) Scheme, Energy Efficiency Improvement Assistance Scheme (EASE), Grant for Energy Efficient Technologies (GREET) and National Small and Medium Sized Enterprise Energy Efficiency (SME EE) initiative.

<sup>26</sup> Previously known as Design for Efficiency (DfE) Scheme.

<sup>27</sup> Previously known as Energy Efficiency Improvement Assistance Scheme (EASE)

<sup>28</sup> Previously known as Grant for Energy Efficient Technologies (GREET)



### 3.8.3.1.2. Productivity Grant (Energy Efficiency)

The Productivity Grant (Energy Efficiency) is co-administered by the National Environment Agency (NEA) and the Economic Development Board (EDB) and aims to encourage owners and operators of industrial facilities to invest in energy efficient equipment or technologies. The grant covers a typical funding of up to 30% of the qualifying costs, which include manpower cost, equipment and materials, and professional services. Some of the selection criteria for the project include the use of energy efficient equipment with a proven track record of energy savings in an industrial facility, measurable and verifiable energy savings, and minimum estimated project cost of SGD 200,000 for enterprises with an annual energy consumption of more than 5 GWh. (Energy Efficient Singapore, 2018)

An energy management system is required from the applicant at the time of application, with details in the following table:

**Table 39. Energy Management System Requirements for the Productivity Grant**

Component	Description
Energy policy	The energy policy should state the organisation's commitment to achieve improvements in its energy performance
Energy objectives and energy targets	The energy objective is a specified achievement to improve the organisation's energy performance as set in the energy policy, whereas the energy target is a detailed and quantifiable energy performance requirement which arises from the energy objective
Energy efficiency improvement plan	The organisation should establish an energy efficiency improvement plan to achieve the objectives and targets
Roles and responsibility	The organisation should designate an appointed energy manager, who needs to be certified by the Singapore Certified Energy Manager (SCEM) or is currently undergoing the SCEM training programme
Monitoring, measurement and analysis	The key characteristics for the monitoring, measurement and analysis process include: significant energy uses in the organisation, energy performance indicators, effectiveness of EE improvement plans in achieving objectives and targets, and actual versus expected energy consumption.

Sources: (Energy Efficient Singapore, 2018)

### 3.8.3.1.3. Financing Programme for EE Projects - Sustainable Development Capital Limited (SDCL) Asia

To help companies find additional sources of financing for EE activities, the Singapore Economic Development Board (EDB) is piloting the EE Financing Programme where a third-party financier provides companies with upfront capital to implement EE projects, and the energy savings are shared between the various stakeholders. Through an approved fund of up to SGD 200 million, SDCL Asia provide up to 100% of the capital costs to finance EE technologies installation, system and equipment without any upfront costs outlay by the host company with a guaranteed return through energy cost savings (performance guaranteed agreements) with suppliers (SDCL, 2014), (SDCL, 2017).



The investment criteria of SDCL Asia is presented in the following table: with details in the following table:

**Table 40. Investment Criteria of SDCL Singapore EE Finance Programme**

<b>Structure</b>	Finances up to 100% of project costs It can cover equipment, labour and installation, annual operating cost, regular measurement and verification costs, and all three levels of energy assessment cost
<b>Project investment size</b>	SGD 0.5 – 40 million Lower project size is considered on a case-by-case basis
<b>Payback period</b>	< 7 years (projects with simple payback beyond 7 years can be considered on a case-by-case basis).
<b>Sector</b>	Industrial and manufacturing sector
<b>Typical project type</b>	Cooling, compressors, lighting, motors/drivers, heating
<b>Eligibility criteria</b>	Company: Singapore-registered owner or operator of an industrial facility in the manufacturing sector in Singapore Project: (i) involves installation and use of energy efficient equipment or technologies with a proven track record of energy savings in an industrial facility, and (ii) measurable and verifiable energy savings results

Source: SDCL (2014) and NEA (2017c)

#### 3.8.3.1.4. Green Building Related Incentive Schemes

To help companies find additional sources of financing for EE activities, the Singapore Economic Development Board (EDB) is piloting the EE Financing Programme where a third-party financier provides companies with upfront capital to implement EE projects, and the energy savings are shared between the various stakeholders. Through an approved fund of up to SGD 200 million, SDCL Asia provide up to 100% of the capital costs to finance EE technologies installation, system and equipment without any upfront costs outlay by the host company with a guaranteed return through energy cost savings (performance guaranteed agreements) with suppliers (SDCL, 2014), (SDCL, 2017). The investment criteria of SDCL Asia is presented in the following table: with details in the following table:



Credit: ASEC

Table 41. Types of Green Building-Related Incentives in Singapore

Scheme	Purposes	Type of Scheme	
Green Mark Incentive Scheme for Existing Buildings (GMIS-EB)	Encourages developers and/or building owners to adopt energy efficient retrofitting design, technologies and practices in their existing building.	Grant - a cash incentive for upgrading and retrofitting	Co-funds up to 50% (capped at SGD 3 million) of the costs of supply and installation of energy efficient equipment and professional services
		Grant - Health check (an energy audit for air-conditioning plants)	Co-funds 50% of energy audit costs <sup>29</sup>
Green Mark Gross Floor Area (GM-GFA)	Encourages the private sector to develop buildings that attain higher tier Green Mark ratings	Grant (additional floor area over and above the Master Plan Gross Plot Ratio (GPR) control)	<ul style="list-style-type: none"> <li>Platinum: up to 2% additional GFA beyond Master Plan GPR (capped at 5,000 sqm)</li> <li>GoldPLUS: up to 1% additional GFA beyond Master Plan GPR (capped at 2,500 sqm)</li> </ul>
Green Mark Incentive Scheme - Design Prototype (GMIS-DP)	Encourages developers and building owners to strive for greater EE in buildings by placing more emphasis at the design stage	Grant - Engagement of Environmentally Sustainable Design (ESD) consultants to conduct collaborative design workshops and assist in simulation studies	Co-funds up to 70% of the qualifying costs (capped at SGD 600,000.00)
Green Mark Incentive Scheme for Existing Buildings and Premises (GMIS-EBP)	Encourages building owners and tenants to undertake and adopt EE improvements within their buildings and premises	Grant - a cash incentive	Co-funding rate and cap amount vary for building owners and tenants depending on the Green Mark rating and the respective qualifying criteria achieved: <ul style="list-style-type: none"> <li>Building owners: 35%, 40%, and 50%</li> <li>Tenants: 40% and 50%</li> </ul>
Pilot Building Retrofit Energy Efficiency Financing (BREEF)	Encourages building owners to undertake energy efficient retrofits by providing financing for building owners, Management Corporations, ESCOs and Special Purpose Vehicles to ease upfront cost issues	<ul style="list-style-type: none"> <li>Loan</li> <li>Energy Performance Contract (EPC) arrangement</li> </ul>	<ul style="list-style-type: none"> <li>Max. loan up to SGD 4 million (may cover the cost of equipment, installation and professional fees) or 90% of the total retrofit costs</li> <li>Interest rate: financial institution to decide</li> <li>Max. loan tenure &lt; 5 years</li> </ul>
SGBC-BCA Zero Capital Partnership Scheme	Provide capital and technical expertise for small building owners to implement energy efficient retrofit projects	<ul style="list-style-type: none"> <li>Grant</li> <li>Expertise of EPC firm</li> </ul>	Building owners to tap on the following grants through the SGBC-BCA Capital Partnership Scheme: <ul style="list-style-type: none"> <li>GMIS-EBP</li> <li>GMIS-EB 'Health Check'</li> <li>BREEF</li> </ul>

Source: NEW (2017).

<sup>29</sup> The remaining 50% of the Health Check cost will have to be borne by the building owner.





- **Green Mark Incentive Scheme for Existing Buildings (GMIS-EB) - SGD 100 million**  
Launched in 2009, the GMIS-EB scheme is targeting energy intensive buildings that have central air-conditioning system. Existing residential buildings are not eligible because they are usually not centrally air-conditioned, and the energy consumed by these residential buildings are mainly attributed to household loads. The GMIS-EB scheme provides: (i) a cash incentive for upgrading and retrofitting, and (ii) a “Health Check” which is an energy audit to determine the efficiency of the air-conditioning plants (See Table 27 above). The GMIS-EB Health Check was extended effectively on 29 April 2014 and lasts for a period of 5 years or expire on earlier date, as determined by BCA, while the funds have been fully committed (BCA GMIS-EB, 2018).<sup>30</sup>
- **Green Mark Gross Floor Area (GM-GFA) Incentive Scheme**  
Introduced in 2009, the GM-GFA aims to encourage the private sector to develop buildings (residential and non-residential) that attain higher tier Green Mark ratings (i.e. Green Mark Platinum or Green Mark GoldPlus). It is applicable to all new private developments, redevelopments and reconstruction developments as well as existing private developments if they undergo substantial EE enhancement. The extended GM-GFA Incentive Scheme is effective from 29 April 2014 and shall last for a period of five years or an earlier date, as directed by BCA (BCA GM-GFA, 2018).<sup>31</sup>
- **Green Mark Incentive Scheme - Design Prototype (GMIS-DP) - SGD 5 million**  
The GMIS-DP provides funding support for the engagement of Environmentally Sustainable Design consultants to conduct collaborative design workshops and assist in simulation studies early in the project to achieve a breakthrough and optimal design for green buildings. To be eligible, the project should be in its preliminary concept design stage, aim to achieve beyond Green Mark Platinum, demonstrate energy savings of at least 40% above the current base code or equivalent, and meet an Energy Efficiency Index (EEI) target for different building types. The extended GMIS-DP is effective from 1 December 2014 and will expire four years later or when the fund is fully committed, whichever is earlier (BCA GMIS-DP).<sup>32</sup>
- **Green Mark Incentive Scheme for Existing Buildings and Premises (GMIS-EBP) - SGD 50 million**  
The GMIS-EBP is targeted mainly at building owners and tenants of premises. It is focused on SMEs; therefore, the incentive applies to building owners and tenants who are SMEs as well as building owners with at least 10% of its tenants who are SMEs. The scheme is not applicable to buildings from the public sector, since such projects have already been substantially funded by the Government, nor to industrial buildings or residential buildings. The amount of co-funding will vary depending on the Green Mark rating and the respective qualifying criteria that is achieved. The GMIS-EBP is effective from 1 October 2014 and will expire on 30 April 2019 or when the GMIS-EBP fund is fully disbursed, whichever earlier (BCA GMIS-EBP, 2017).<sup>33</sup>

<sup>30</sup> For more detailed information on GMIS-EB, please visit <https://www.bca.gov.sg/GreenMark/gmiseb.html>.

<sup>31</sup> For more detailed information on GM-GFA, please visit <https://www.bca.gov.sg/greenmark/gmgfa.html>.

<sup>32</sup> For more detailed information on GMIS-DB, please visit <https://www.bca.gov.sg/GreenMark/gmisd.html>

<sup>33</sup> For more detailed information on GMIS-EBP, please visit <https://www.bca.gov.sg/greenmark/gmisebp.html>



**Table 42. Co-funding amount for building owners and tenants under GMIS-EBP**

Co-funding rate	Cap amount	Green Mark rating	Qualifying criteria
<b>a. For buildings using water-cooled chilled water system</b>			
35%	SGD 1,500,000	Gold or better	<ul style="list-style-type: none"> <li>Aircon System Efficiency</li> <li>Airside Efficiency</li> </ul>
40%	SGD 2,250,000	Gold <sup>Plus</sup> or better	
50%	SGD 3,000,000	Platinum	
<b>b. For buildings using Variable Refrigerant Flow (VRF) System</b>			
35%	SGD 500,000	Gold or better	<ul style="list-style-type: none"> <li>Aircon System Efficiency for VRF</li> <li>GFA ≤ 8,000 m<sup>2</sup></li> <li>Achieve min. 10% energy savings for Total Building Energy Consumption</li> </ul>
40%	SGD 600,000	Gold <sup>Plus</sup> or better	
50%	SGD 700,000	Platinum	
<b>c. For buildings undergoing Optimisation</b>			
35%	SGD 500,000	Gold or better	Aircon and Airside System Efficiency
40%	SGD 600,000	Gold <sup>Plus</sup> or better	
50%	SGD 700,000	Platinum	
<b>d. For office tenants</b>			
40%	SGD 30,000	Certified & Gold	Energy Efficient Index (EEI) and lighting power budget
50%	SGD 40,000	Gold <sup>Plus</sup> or better	
<b>e. For other types of tenants (retail, restaurant or supema)</b>			
40%	SGD 30,000	Certified & Gold	Lighting power budget
50%	SGD 40,000	Gold <sup>Plus</sup> or better	

Source: BCA GMIS-EBP (2017)

- Building Retrofit Energy Efficiency Financing (BREEF) Scheme**  
 The BREEF aims to offset the high upfront costs, through an energy performance contract arrangement. It facilitates financing for the purchase and installation of energy efficient equipment or RE system. Applicants can obtain financing from the Participating Financial Institutions (such as DBS Bank, Hitachi Capital Asia Pacific, Orix Leasing Singapore Ltd, etc) and pay off the loan through the energy savings it reaped. The credit facilities are to be used for EE retrofits of existing buildings, which will lead to the building achieving the minimum Green Mark certified standard; the building must maintain its Green Mark certification for the duration of its loan tenure. The BREEF scheme will end on 31 March 2023.
- SGBC-BCA Zero Capital Partnership Scheme (ZCPS)**  
 The Zero Capital Partnership Scheme (ZCPS) by the Singapore Green Building Council in collaboration with the Building and Construction Authority (SGBC-BCA) address the concerns of small building owners who may not have the capital expertise necessary for energy efficient retrofit projects. The ZCPS provides accredited Energy Performance Contracting (EPC) firms for building owners, which will serve as a one-stop solution for minor and major retrofit options, including provide financing options and facilitate the application of relevant grants or incentives to fund the projects. The assigned ZCPS firm is to conduct an energy audit and propose retrofit and optimisation solutions, finance the retrofit works and/or assist building owners to obtain relevant grants (GMIS-EBP, GMIS-EB, or BREEF), and facilitate the assessment process for Green Mark Scheme Certification. (Singapore Green Building Council, 2018)





#### **3.8.3.1.5. Singapore Certified Energy Manager (SCEM) Programme and Training Grants**

The SCEM Programme is designed to develop local expertise and capability in professional energy management in the industrial sector. It helps participants to develop the technical skills and competencies needed to manage energy use within the organisations they serve. A training grant is also offered to cover up to 35% of the training cost at the Professional Level SCEM Programme.

### **3.8.3.2. Programmes for EE in Singapore**

#### **3.8.3.2.1. Energy Efficiency National Partnership (EENP) programme**

The EENP is a voluntary partnership programme for companies that wish to be more energy efficient, thereby enhancing their long-term business competitiveness and reducing their carbon footprint. It seeks to encourage companies to put in place an energy management system and adopt practices and measures to improve energy efficiency. As of April 2018, a total of 263 companies have joined as partners<sup>34</sup>. The EENP programme supports companies through its learning network activities, and provision of EE-related training, resources, incentives and recognition. A key event under the EENP learning network is the biennial National Energy Efficiency Conference which brings together EE experts and industry energy professionals to share best practices and case studies of successful projects. The annual EENP Awards was introduced in 2011 to foster a culture of sustained EE improvement in the industry by identifying and sharing best practices for companies to emulate. There are four EENP Awards categories for the industrial sector, namely: (i) Excellence in Energy Management, (ii) Best Practices, (iii) Outstanding Energy Manager of the Year, and (iv) Outstanding Energy Services Provider of the Year.

#### **3.8.3.2.2. ESCO Accreditation Scheme**

The objective of the accreditation scheme is to increase the professionalism and quality of services offered by the ESCOs. This enhances confidence in the energy services sector and helps promote growth in the industry. The accreditation is open to any locally-established company which provides services in energy auditing and implementation of EE projects for buildings and industrial facilities. Accreditation is differentiated according to the level of experience of the ESCO and the types of systems expertise the ESCO possesses, namely: (i) provisional accreditation for newly formed ESCO and (ii) full accreditation for ESCOs that are already in operation for at least 3 years. Detailed requirements for its accreditation can be found in the Application Guidelines for the Assessment and Accreditation of Energy Services Companies (NEA ESCO, 2017).<sup>35</sup>

#### **3.8.3.2.3. Public Sector Taking the Lead in Environmental Sustainability (PSTLES)**

To ensure that the expected energy savings are realised, public sector agencies are encouraged to adopt the Guaranteed Energy Savings Performance contracting model when undertaking building retrofit projects. As of March 2018, 32 large building owners have called Guaranteed Energy Savings Performance contracts for their building retrofit works. On average, these contracts help building owners save 16% of their total electricity use, enabling the public sector to save a total of S\$11.3 million annually.

<sup>34</sup> For more detailed information on EENP, please visit [http://www.e2singapore.gov.sg/Programmes/Energy\\_Efficiency\\_National\\_Partnership.aspx](http://www.e2singapore.gov.sg/Programmes/Energy_Efficiency_National_Partnership.aspx)

<sup>35</sup> For more detailed information on ESCO Accreditation Scheme, please visit [http://www.e2singapore.gov.sg/Programmes/ESCO\\_Accreditation\\_Scheme.aspx](http://www.e2singapore.gov.sg/Programmes/ESCO_Accreditation_Scheme.aspx)



The ESCO is responsible for the entire project from audit to post-implementation monitoring and maintenance.<sup>36</sup> The building and facility owners are assured of the energy performance savings during the contract term because ESCO guarantees the performance of systems. A permanent monitoring system with specific accuracy requirements is also long-termed installed and continuously monitors the performance.

### 3.8.3.2.4. The Investment Allowance – EE Scheme (IA)

The IA scheme provides an additional 30% investment allowance for EE investments against taxable income, on top of its normal capital allowances. It is intended to encourage industries to invest in capital equipment that allows them to be more energy efficient in their operations (NEA Presentation, 2016).

### 3.8.4. Stakeholders

The Energy Efficiency Programme Office (E2PO) is a multi-agency committee led by the National Environment Agency (NEA) and Energy Market Authority to promote and facilitate the adoption of EE measures in Singapore (Singapore NEA, 2018). The E2PO comprises of the Economic Development Board (EDB), Land Transport Authority (LTA), Building and Construction Authority (BCA), Housing and Development Board (HDB), Infocomm Development Authority of Singapore (IDA), Agency for Science, technology and Research (A\*STAR), Urban Redevelopment Authority (URA), Jurong Town Corporation (JTC) and National Research Foundation (NRF). The Ministry of the Environment and Water Resources (MEWR) and Ministry of Trade and Industry (MTI) are also represented in the committee.

Figure 27. Stakeholders of Singapore Energy Efficiency Programme Office (E2PO)



Source: Singapore NEA (2018)

<sup>36</sup> Under the Guaranteed Energy Savings Performance contracting model, an ESCO is engaged to carry out an energy audit and identify energy savings measures, implement the recommended energy savings measures, provide comprehensive maintenance to the retrofitted equipment during the contract term for better accountability, and guarantee the chilled water plant or air-conditioning system efficiency and the annual energy savings from the implementation of other energy savings measures over the contract term (i.e. typically 5 years).





Singapore has identified the following thrusts for energy efficiency, namely:

- Promoting the adoption of energy efficient measures and technologies;
- Building capacity to sustain and drive energy efficiency efforts and developing local knowledge-base in energy management;
- Raising awareness amongst the public, households and industry/businesses;
- Supporting research and development efforts to enhance Singapore’s capacity in energy efficient technologies.

### 3.8.5. Challenges and Recommendations

Despite the extensive development and implementation of EE&C measures, Singapore still faces some challenges in financing its EE&C activities. Table 43 below summarises the challenges and recommendations on how to overcome them.

**Table 43: Challenges and Recommendations for EE&C Financing in Singapore**

Challenges	Recommendations
Limited understanding about EE technologies; status quo bias for “tried and tested” products	Introduce tax or other financial regulatory incentives to invest more in energy efficiency (e.g. seeing future cost savings as collateral)
Limited capital as EE investments compete with other investment opportunities	Finance pilot projects and build capacity to improve understanding about energy efficiency technologies
High upfront costs in EE investments deter investors	Change real estate regulations to improve incentives to increase more investments in energy efficiency (e.g. allowing increased bills or tax benefits)
Split incentives – decision makers do not reap benefits of investment	Introduce suitable measures to address sharing incentives among decision makers and the beneficiary, e.g. in the case of tenants and owners.



### 3.9. Thailand

#### 3.9.1. Country Overview, EE status and Target

With a GDP of USD 407 billion, Thailand is one of the largest economies within ASEAN countries. Thailand’s population and electric power consumption have increased steadily in recent years and now stand at 68 million people and 2,540 kWh per capita. After targeting an increased access to electricity for its population, Thailand went from 65% of its population having access to electricity in 1990, to 100% in 2014. Thailand’s electricity production is largely based on gas (71.4%) and coal (19.5%), followed by biofuels (4.1%), hydro (2.7%) and solar PV (1.3%). Waste energy, oil and wind represent about 1% of the country’s total generation.

Table 44. Country Overview, EE Status, and Target in Thailand

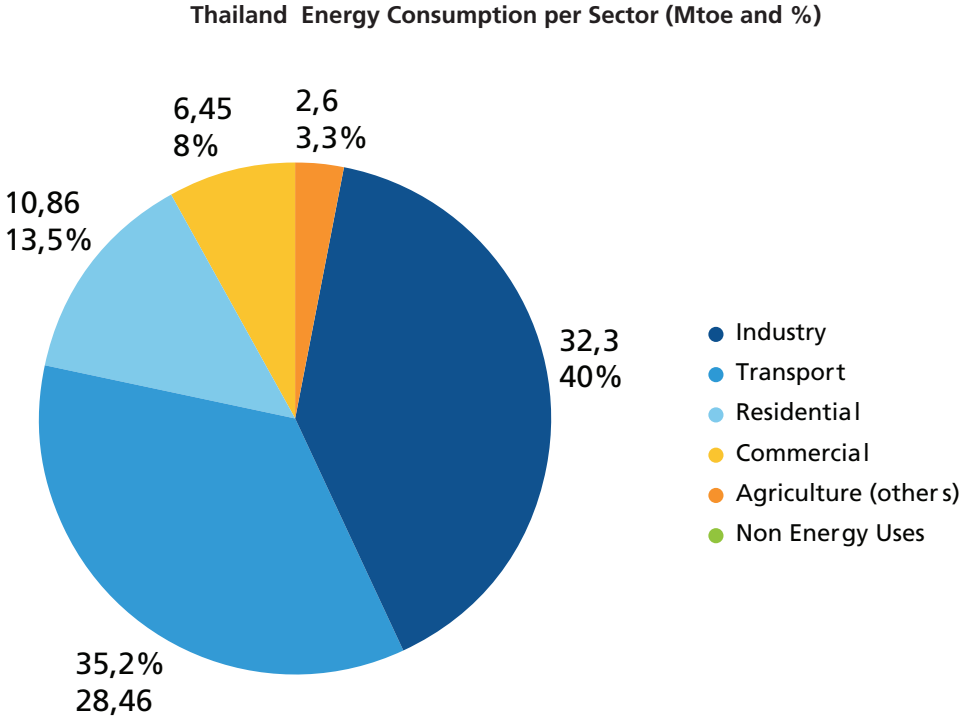
<b>EE&amp;C target</b>	<ul style="list-style-type: none"> <li>To reduce energy intensity by 30% compared to 2010 baseline</li> </ul>		
<b>Population (2016)</b>	68,023,000	Population growth (annual, 2010 – 2016)	0.3%
<b>GDP (2016)</b>	USD 407.05 billion	GDP growth (annual, 2010 – 2016))	3 %
<b>Energy use (kg of oil equivalent / capita) (2015)</b>	1,900	Electric power consumption (kWh per capita) (2015)	2,540
<b>Access to electricity (2017)</b>	100%	Energy intensity level of primary energy (kg of oil eq. / USD 2005 PPP GDP)	139

Sources: ASEAN Centre for Energy Database (2018)

Even though most ASEAN countries have managed to decrease their energy intensity in the last two decades, Thailand has seen an increase of 1 MJ/USD 2011 PPP GDP from 1990 to 2014. In 2010, the Government of Thailand set a target to reduce energy intensity by 25% in 2030 with a 2005 baseline, however after two revisions in 2011 and 2014, the target was revised to a reduction of energy intensity by 30% in 2036, with a 2010 baseline. The Government’s strategy has a series of compulsory and voluntary measures that will be applicable to the industrial, commercial, residential and transport sectors.



The largest energy end-use sectors are industry (40%), transport (35.2%), followed by residential (13.5%), commercial (8.0%) and agriculture (3.3%) sectors. The breakdown of energy consumption by sector in Thailand is illustrated in Figure 28 below:



**Figure 28. Energy Consumption by Sector in Thailand**

Source: (Department of Alternative Energy Development and Efficiency , 2017)

**3.9.2. Policies, Rules and Regulations**

In early 1990s, the country experienced a quick economic growth of about 10% per year which came with an increased demand for energy resources. The Government identified EE&C as an effective strategy to meet the rising demand for energy and in 1992 passed the Energy Conservation Promotion Act and created the Energy Conservation Promotion Fund (ENCON Fund). Since then, Thailand developed a comprehensive EE strategy including the development of the National Demand-side Management plan (DSM), the establishment of multiple funds to support EE&C, the introduction of several tax incentives across different sectors and the recent Energy Efficiency Plan 2015 (EEP 2015). The EEP 2015 is a part of the Thailand Integrated Energy Blueprint (TIEB) published in 2015. The EEP sets Thailand’s EE&C target to reduce energy intensity by 30% in 2036 compared to 2010 level. The projected energy savings is around 56,142 ktoe by 2036, in which most energy savings are expected to come from thermal energy (85%) and electricity (15%). To achieve this target, the EEP 2015 has set 10 measures devised under a combination of compulsory, voluntary and complementary programmes. The Plan will receive funding from the ENCON Fund totalling THB 123,300 million or about 5,600 million THB/year throughout its implementation period.

The EEP 2015 addresses the following components: (i) mandatory requirements via rules, regulations and standards, (ii) energy conservation promotion and support, (iii) public awareness creation and behavioural change, and (iv) promotion of technology development.

The policy framework for EE&C in Thailand is summarised in Table 45:

**Table 45. EE&C Policy Framework in Thailand**

Key policy documents	<ul style="list-style-type: none"> <li>• Energy Conservation Promotion Act issued by the Government of Thailand</li> <li>• The Energy Efficiency Plan (2015)</li> </ul>	
	Sectors	Policy measures
Key policy framework	Building	<ul style="list-style-type: none"> <li>• Standards - Enforcement of energy conservation standards in designated buildings, as well as establishment of building energy code for new buildings</li> </ul>
	Residential	<ul style="list-style-type: none"> <li>• Labelling - Enforcement of energy labelling on equipment and appliances including high and low energy performance standards</li> </ul>
	Transport	<ul style="list-style-type: none"> <li>• Labelling - Promotion of high efficiency standard vehicles and EE labelling</li> <li>• Financial - Promotion of EE measures in public transport through subsidies</li> <li>• Other – Development of transport infrastructure and fuel price policy</li> </ul>
	Industry	<ul style="list-style-type: none"> <li>• Standards - Enforcement of EE resource standards to regulate designated factories, utilities and large-scale energy producers to encourage energy savings amongst end users</li> <li>• Promotion of ESCO business</li> </ul>
	Cross sectoral	<ul style="list-style-type: none"> <li>• Capacity building activities to raise public awareness on EE&amp;C</li> <li>• Voluntary agreements to save energy between business associations and large-scale business from commercial or industrial sectors</li> <li>• Financial – support for the operation of ESCO companies by providing further credit lines through the ESCO fund</li> </ul>

**3.9.3. Financing Schemes, Mechanism and Incentives**

Thailand has been at the forefront of EE&C initiatives in the region since early 1990s when the Energy Conservation Promotion Fund (ENCON Fund) was established. Thailand has actively generated policies to bolster administrative and economic factors associated with EE&C. Throughout these years, Thailand has worked together with national and international stakeholders to unlock local and international financing from the public and private sectors.



### 3.9.3.1. Energy Conservation and Promotion Fund (ENCON Fund)

The Energy Conservation and Promotion (ENCON) Fund was institutionalised in 1992 and became operational in 1995 with the objective of facilitating access to finance EE&C projects. The Fund was originally envisioned to support designated factories and buildings and later opened to ESCOs. The Fund collects its revenue by taxing petroleum products at USD 0.002 per litre, raising about USD 200 million annually. By 2017, the Fund's value is around USD 1.1 billion. The ENCON Fund is overseen by a committee of representatives from various ministries, chaired by the Deputy Prime Minister. As part of its operations, the ENCON Fund provides financial support to other schemes such as tax incentives implementation, the Energy Efficiency Revolving Fund (EERF) and the ESCO Fund. The Fund uses loans, venture capital, subsidiaries to covers the cost of preliminary audits, capacity building activities, R&D and other activities that promote EE&C.

### 3.9.3.2. Energy Efficiency Revolving Fund (EERF)

The EERF was established in 2003 with financial support from the ENCON Fund and under the supervision of the Department of Alternative Energy Development and Efficiency (DEDE). The EERF aims at stimulating large scale EE investments, energy intensive industries, while building capacities within local banks on financing of EE and RE projects. The fund was set up at THB 2 billion (USD 64 million) and received technical assistance from Global Environment Facility (GEF) and the Danish Government. Figure 19 shows the initial structure of the EERF.

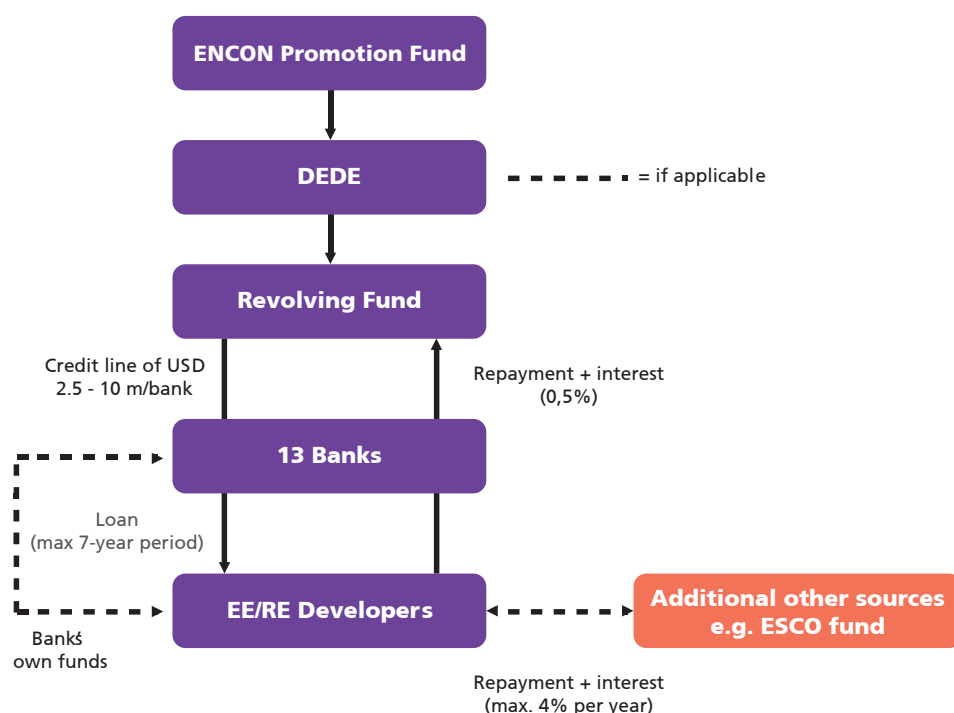
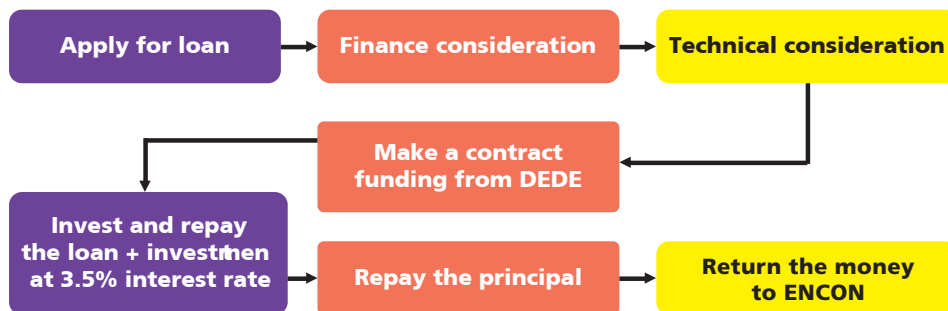


Figure 29. Initial Structure of EERF

Source: CCAP (2012)

The EERF directly engages a series of local commercial banks by providing low interest rates as well as long repayment periods. To be eligible for financial support, a project should have a payback period of less than 7 years. The maximum amount that EERF provides as a loan for individual projects is THB 50 million (USD 1.60 million). It is provided at a maximum of 3.5% flat interest rate with a repayment period of 5 years. Actual interest rate may vary depending on the collaterals/project details. Figure 20 shows the usual process followed by project developers to obtain support from EERF.



**Figure 30. EERF's Loan Eligibility Process**

Source: Maethasith (2017)

DEDE executes a standard contract with the relevant bank, where the total amount to be loaned, interest rates to be charged to the bank as well to the borrower, repayment conditions and others are defined. The EERF is now entering its 6th phase, having financed 295 projects which have saved 320 ktoe.


### 3.9.3.3. Energy Service Company (ESCO) Fund

The Energy Service Company (ESCO) Fund was established by DEDE in 2008 with an initial budget of THB 500 million (USD 15.9 million). The ESCO Fund has the objective of addressing the lack of equity capital for SMEs which are willing to develop EE&C and RE projects. To tackle this challenge, the ESCO Fund aims at expanding the ESCO market by stimulating private investment through the following schemes (CCAP, 2012):

**Table 46. Types of ESCO Schemes in Thailand**

Scheme	Description
Venture capital	The equity investment finances projects and covers 30% of the registered capital of the targeted ESCO up to THB 50 million (USD 1.6 million) per project. The investment payback period is 5-7 years; investors need to pay an exit price set at market rate by selling shares, finding a new partner or listing in Thailand's stock market.
Equity investment	Co-investing in EE or RE projects up to 50% not exceeding THB 50 million (USD 1.6 million) per project with an exit period of 3-7 years and an internal rate of return on projects of 9-15%.
Equipment leasing	Long-term leasing for EE and RE equipment at 3.5% interest rate, with a repayment of up to 5 years. Up to 100% of the equipment costs can be covered up to THB 10 million (USD 0.32 million).
Technical assistance	Financial support for activities related to technical assistance (e.g. energy audits, feasibility studies) up to THB 100 thousand (USD 3.19 thousand).
Carbon Credit Facility	Support for the development of Clean Development Mechanism (CDM) documents including project idea notes, design documents and other.
Credit guarantees	Assistance for entrepreneurs accessing long-term loans from financial institutions by providing guarantees of up to THB 10 million (USD 0.32 million) at low premium rates.

Source: Elaboration based on CCAP (2012)



Like the EERF, the ESCO Fund receives grant support from the ENCON Fund. Fund managers have been appointed to manage the ESCO Revolving Fund. They are in charge of the project appraisal and due diligence processes. On a higher level, there is an investment committee who defines policies and criteria and supervises the fund. This committee consist of officials and experts from DEDE, Energy Policy & Planning Office under the Ministry of Energy (EPPO), Department of Industrial Works (DIW), Ministry of Industry (MOI), Federation of Thai Industry, and additional energy and finance experts. The ESCO Fund finished its 4th phase of implementation in 2017, having supported 145 projects amounting for THB 5,415 million (USD 172.9 million), saving 41.7 ktoe.

### 3.9.3.4. Tax Incentives and Subsidies

#### 3.9.3.4.1. Direct Subsidy

Since 2006, the Thai government has introduced both subsidies and taxes as incentives for EE&C projects.

The direct subsidy scheme is the major grant-arm of the ENCON Fund which exclusively offers grant financing for EE initiatives in Thailand. Most direct subsidy programmes run for one fiscal year<sup>37</sup> from 1<sup>st</sup> October to 30 September.

In 2017, the total budget of direct subsidies was THB 500 million, of which 100% was disbursed to EE projects. In 2018, the total available budget was slightly lower with THB 300 million. The minimum and maximum funding amount in 2018 was THB 30,000 (USD 900) and THB 1.5 million (USD 45,000), respectively. Minimum and maximum funding amounts are revised every fiscal year.

Three types of direct subsidy schemes are currently available:

**(i) 20% Direct Subsidy:**

- offers grant finance contribution of 20% of the total EE equipment costs
- targets at large factories or industrial facilities

**(ii) 30% Direct Subsidy:**

- offers grant finance contribution of 30% of the total EE equipment costs
- targets at small and medium enterprises (SMEs)

**(iii) 40% Direct Subsidy:**

- offers grant finance contribution of 40% of the total EE equipment costs
- aims to enhance investments into new and innovative technology (e.g. absorption chiller)
- maximum funding amount of THB 6 million

A list of defined eligible new and innovative equipment is available at the DEDE website<sup>38</sup> and is updated for each new funding cycle. Funding for equipment is not included in the list, although it is possible subject to individual consideration of a DEDE committee.

#### 3.9.3.4.2. Tax Incentive

Tax incentive can be offered under the ENCON Fund's grant support<sup>39</sup> which offers a total of 25% VAT tax exemption over a period of 5 years, i.e. a tax exemption of 5% can be applied each year for five years. The tax incentive is currently not available but may be re-activated in the future.

<sup>37</sup> A fiscal year in Thailand starts at 1<sup>st</sup> October and ends on 30<sup>th</sup> September

<sup>38</sup> DEDE Website: <http://weben.dede.go.th/webmax/>

<sup>39</sup> Funding for the tax incentive does not come from the ENCON Fund but from the Ministry of Finance



### 3.9.3.4.3. Demand-Side Management (DSM) Subsidy

DSM is a performance-based subsidy in which projects proposed under this programme will be subsidised based on the proposed savings. During the latest phase of the programme, DEDE accepts projects involving refrigeration system, air-conditioning system and cooling system. The rate of subsidy is THB 1/kWh for projects with a payback period less than 3 years and THB 2/kWh for projects with payback period of more than 3 years. The project must have energy savings of at least 50,000 kWh per year to be eligible for the subsidy.

### 3.9.4. Stakeholders

The Ministry of Energy is responsible for energy policy, regulation, and development. It has five departments, two state enterprises, a public organization and an independent entity. The main department that is responsible in promoting EE is the Department of Alternative Energy Development and Efficiency (DEDE), while the Energy Policy and Planning Office (EPPO) is responsible for overall energy policy and planning, including for RE and EE.

Besides the Ministry of Energy, there are some other ministries that provide specific support when addressing energy related issues in specific sectors. These include the Ministry of Finance, Ministry of Transport, Ministry of Industry, Ministry of Interior, Ministry of Commerce, Ministry of Science and Technology, Ministry of Education and others.

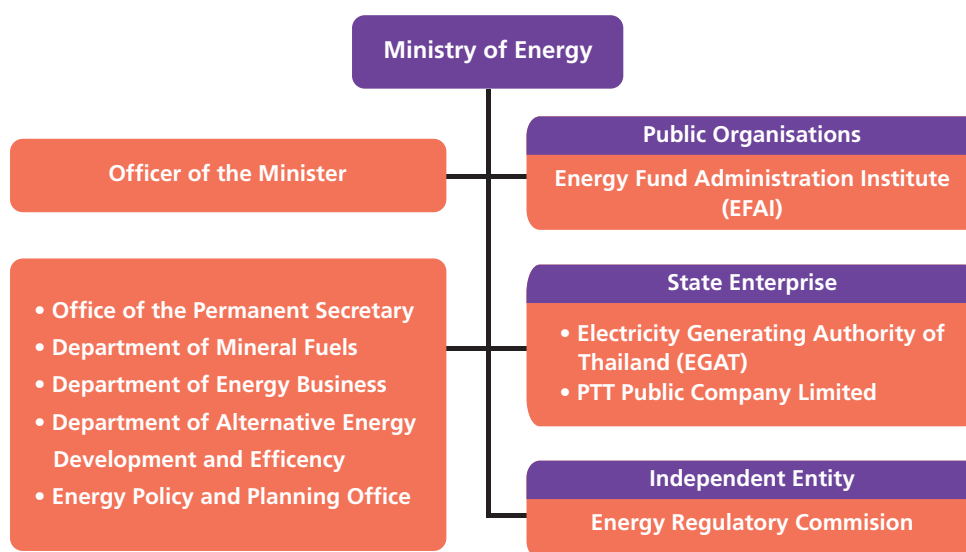


Figure 31. Institutional Framework for Energy Sector in Thailand

Source: ADB (2015)

### 3.9.5. Challenges and Recommendations

UNEP (2015) identifies high subsidies in the energy sector, as well as lack of effective enforcement mechanisms and technical capacities amongst energy agencies to be some of the barriers preventing the adoption of EE&C measures in the country. As fossil fuels continue to be subsidised, energy consumers are not being incentivized to change their consumption patterns. The latter is particularly relevant in those cases where EE&C measures are voluntary and often require large initial investments by consumers such as those in the transport sector and residential sectors. In order to address these challenges, the Government could explore the implementation of tax exemptions for EE technologies and rebates schemes.





Additional challenges in Thailand’s context have been identified, particularly those associated with the integration of EE&C in the financial sector, such as EE&C projects not being attractive to financial institutions. The authors explain that EE&C projects require relatively small sized investments, which increase transaction costs and limit potential profits from financial institutions. Additionally, they highlight that this lack of attractiveness to investors is particularly damaging to EE&C investments when these are grouped in financing schemes with RE projects. The latter are preferred by investors in most cases because they are naturally larger and obviously have more revenue paths and benefits. Such was the case with the first two phases of the ESCO Fund, in which RE projects obtained 65% of the government’s loan funds.

Bearing in mind the above, there are still opportunities for the government to improve the existing schemes as well as to develop more effective ones. The Government should aim to achieve a more efficient distribution of EE&C responsibilities in order to ensure that current policies are enforced. The latter is particularly important for energy intensive sectors where the lack of enforcement has been identified as a limiting factor for further investments such as the building sector.

In order to further increase energy financing, it is necessary to have independent mechanisms that focus solely on EE and address its challenges, e.g. high transaction costs, perceived technology risks due to wide range of technologies, lack of technical capacities. The latter should be paired with capacity building initiatives to raise awareness amongst project developers, investors and public. International donors can play a crucial role in providing funding for these types of initiatives.

Table 47 shows the challenges in EE&C financing faced by Thailand and recommendations for the Government on how to overcome them.

**Table 47: Challenges and Recommendations for EE&C Financing in Thailand**

Challenges	Recommendations
Public support for commercial energy lending has been inconsistent	Explore implementation of tax exemptions and rebate schemes to incentivize users in adopting energy efficiency measures
Financial institutions are reluctant to provide loans for ESCOs because they are not convinced of ESCOs’ ability in managing larger EE&C projects.	Establish independent mechanism focusing solely on energy efficiency projects  Develop capacity building initiatives to raise awareness among project developers, investors, and the public
Limited regulatory standards and enforcement	Ensure efficient distribution of energy efficiency responsibilities to enforce current policies

## 3.10. Vietnam

### 3.10.1. Country Overview, EE status and Target

The energy economy of Vietnam has changed rapidly in the past few decades with the transformation from an agricultural economy based on traditional biomass fuels, to a modern mixed economy. The GDP per capita has increased nearly 20 times, from USD 114 in 1990 to USD 2,170 in 2016. According to the draft report of the National Energy Development Plan for the period 2016-2025 with the vision to 2035, prepared by the Institute of Energy under the Ministry of Industry and Trade, the forecast on energy demand in the BAU scenario indicates that by 2035 the total final energy demand will be nearly 2.5 times higher than in 2015 (MOIT, 2017).

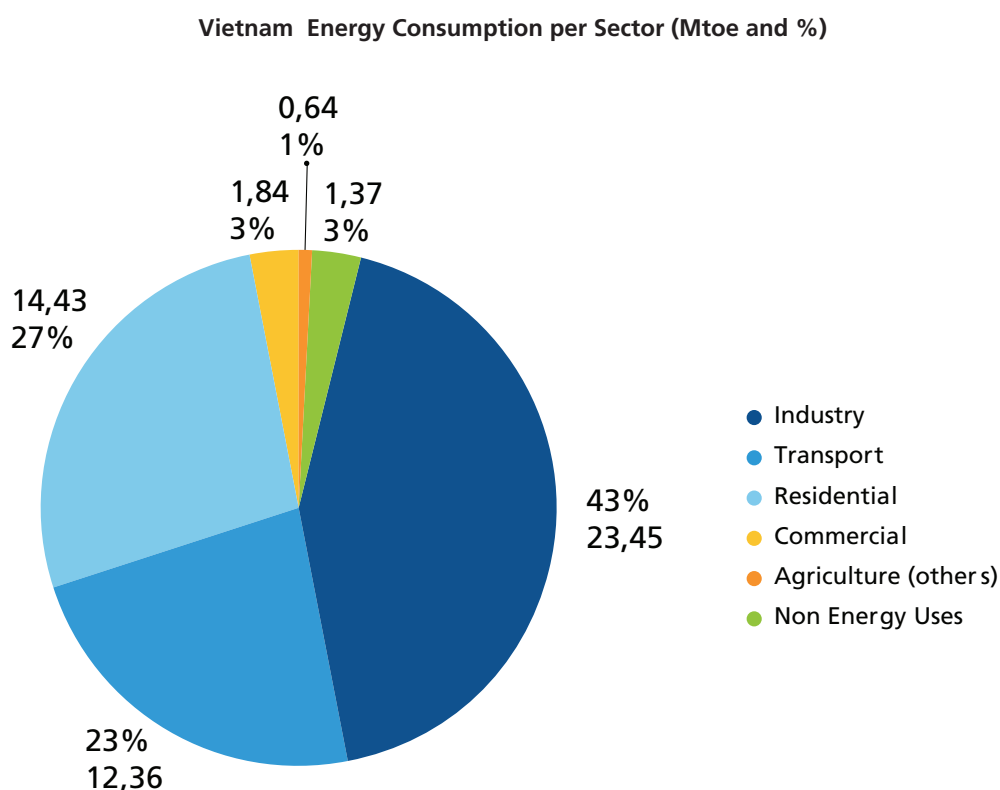
**Table 48. Country Overview, EE Status, and Target in Vietnam**

<b>EE&amp;C target</b>	<ul style="list-style-type: none"> <li>• Reduce energy consumption by 8-10% and above by 2020 (BAU)</li> <li>• Reduce GHG emissions by 8% by 2030 compared to BAU; and up to 25% with international support</li> <li>• Reduce GHG intensity per GDP unit by 20% by 2030 from 2010 levels</li> <li>• Increase commercial electricity savings to more than 10% of total power consumption by 2020 relative to BAU.</li> </ul>		
<b>Population (2016)</b>	92,677,000	Population growth (annual, 2010 – 2016)	1.1%
<b>GDP (2016)</b>	USD 198.2 billion	GDP growth (annual, 2010 – 2016)	9.3%
<b>Energy use (kg of oil equivalent / capita) (2015)</b>	770	Electric power consumption (kWh per capita) (2015)	1,565
<b>Access to electricity (2017)</b>	98.9 %	Energy intensity level of primary Energy (kg of oil eq. / USD 2005 PPP GDP)	153

Sources: ASEAN Centre for Energy Database (2018)



In 2035 the energy consumption in the transportation sector is projected to achieve the highest growth (5.7% per year), while the industrial sector has a growth of 5 % per year over the period of 2016-2030. The breakdown of energy consumption by sector in Vietnam is illustrated in the following figure:



**Figure 32. Energy Consumption by Sector in Vietnam in 2015**

Sources: ASEAN Centre for Energy Database (2018)

### 3.10.2. Policies, Rules and Regulations

**Table 49. EE&C Policy Framework in Vietnam**

<b>EE&amp;C target</b>	<ul style="list-style-type: none"> <li>Reduce energy consumption by 8-10% and above by 2020, relative to BAU</li> <li>Reduce GHG emissions by 8% by 2030 compared to BAU; and up to 25% with international support</li> <li>Reduce GHG intensity per GDP unit by 20% by 2030 from 2010 levels</li> <li>Increase commercial electricity savings to more than 10% of total power consumption by 2020 relative to BAU</li> </ul>
<b>Key policy framework</b>	<ul style="list-style-type: none"> <li>The revised Power Development Plan VII for the 2011-2020 period with a vision to 2030.</li> <li>Energy Efficiency and Conservation (EE&amp;C) (Decree 102/2003/ND-CP)</li> <li>Vietnam National Energy Efficiency Programme (VNEEP) (2006–2015)</li> <li>Law on Energy Efficiency and Conservation (2010 EE&amp;C law)</li> <li>Energy Efficiency Labelling: Decision 51/2011/QD-TTG, Decision 68/2011/QD-TTG, Circular 08/2006/TT-BCN, Circular 4142/TCHQ-QSQL</li> </ul>

The EE Law (2010) is the cornerstone of the legal EE framework. EE Law 2010 is a regulatory framework that mandates strict requirements for all sectors to improve their EE. The Government also issued several decisions, decrees, and circulars as secondary legislation to support the law. EE legislation is generally in place, but the Government would need to ensure that enforcement is at a level that commensurate with the policy goals.

The Vietnam National Energy Efficiency Programme 2012-2015 (VNEEP) sets out a comprehensive plan to implement measures for improving EE across the economy. The Government is also implementing a number of EE programmes, with the support from donors and regional agencies, including the EE promotion in the building sector, the EE and clean production. The Vietnam's NDC proposes 17 EE and RE measures to reduce GHG emissions.

The revised Vietnam Power Development Plan VII sets realistic targets for EE savings of "above 10% of total electricity consumption" relative to BAU conditions, by 2020. It also sets a target to reduce the ratio of electricity consumption per output GDP from 1.74 (2010-2014 level) to 1.53 by 2030. The Plan, together with the Vietnam National EE Programme, identify significant savings in the industrial, residential and commercial sectors, as well as significant improvements in EE indicators (energy intensity and energy elasticity), resulting from advances in technical standards and high-performance equipment in energy-intensive industries (ADB, 2015).

### 3.10.3. Financing Schemes, Mechanism, and Incentives

In the past few years, the Government has played an important role of securing investments in the energy sector through mobilisation of state finance from state-owned enterprises and partly investment capital from private and foreign investors via energy sector development policies. Various financing instruments for EE&C activities such as commercial loans, equity investment, ESCO model, and guarantees are available in Vietnam. These instruments are operated by a few key existing financing institutions as well as through donor supported projects/programmes (VNEEC, 2017).

#### 3.10.3.1. Vietnam Environment Protection Fund (VEPF)

VEPF receives capital sources from the State's budget, sponsors, contributions, commissions from domestic and international organisations, and individuals to support financing for environment protection activities throughout the country. VEPF activities include:

- Loans with preferential interest based on the Minister of Natural Resources and Environment-signed Circular No. 03/2017 / TT-BTNMT (Vietnam Environment Administration, 2017). The interest rate is set by VEPF but may not exceed 50% of the State's investment credit interest rate (announced by the competent authority at the time of lending). For a project, the loan interest rate is determined at the time of signing the credit contract for investment in environmental protection and is fixed throughout the loan period. The loan term is determined on the basis of the ability to recover capital, in line with the business cycle of the trade and repayment ability of the investor but does not exceed 10 years and the operating period of the business. The maximum grace period for a project is two years.
- Support loan interest, guarantee loans for environmental projects;
- Support finance for developing and implementing projects to prevent and reduce environmental pollution, environmental risks and accidents, etc.

VEPF charter capital is USD 24 million and is supplemented from other sources such as the environmental protection tax, CER (certified credits of reducing greenhouse gas emissions. One CER is confirmed by one ton of CO<sub>2</sub> equivalent) selling fee and budget allocation (VNEEC, 2018). VEPF gives priorities to the application of clean, environment-friendly and energy saving technologies.<sup>40</sup>

<sup>40</sup> For further information on VEPF, please visit <http://www.vepf.vn/?lang=en-US>





### 3.10.3.2. National Technology Innovation Fund (NATIF)

NATIF is affiliated with the Ministry of Science and Technology and operates for non-profit purposes. Its function is in granting and lending capital to implement scientific and technology projects proposed by organisations or individuals.<sup>41</sup> The charter capital of the Fund is USD 47 million, which is mainly to support enterprises, organisations and individuals who conduct activities to innovate technology applications, commercialise the results of scientific research and technological development to bring to the market new products and services that have high technological content and high-added value (VNEEC, 2018).

### 3.10.3.3. Vietnam Development Bank (VDB)

VDB focuses on financing development projects and exporting enterprises in the sector of infrastructure and key industries, rural agriculture and disadvantaged areas in line with the socio-economic development strategy of the country.<sup>42</sup> VDB's total assets and charter capital are nearly USD 12 billion and USD 470 million respectively (VNEEC, 2018). The main financial instruments of VDB include investment lending, investment credit guarantee, medium and small-enterprise credit guarantee, post-investment support, export credit, bid security, and export contract performance security.

Apart from the above-mentioned key financial institutions, there are also existing/on-going projects/programmes to support EE in Vietnam such as Vietnam Low Emission Energy Programme funded by the United States Agency for International Development (USAID), and Vietnam Energy Efficiency for Industrial Enterprises Project funded by the World Bank.

## 3.10.4. Stakeholders

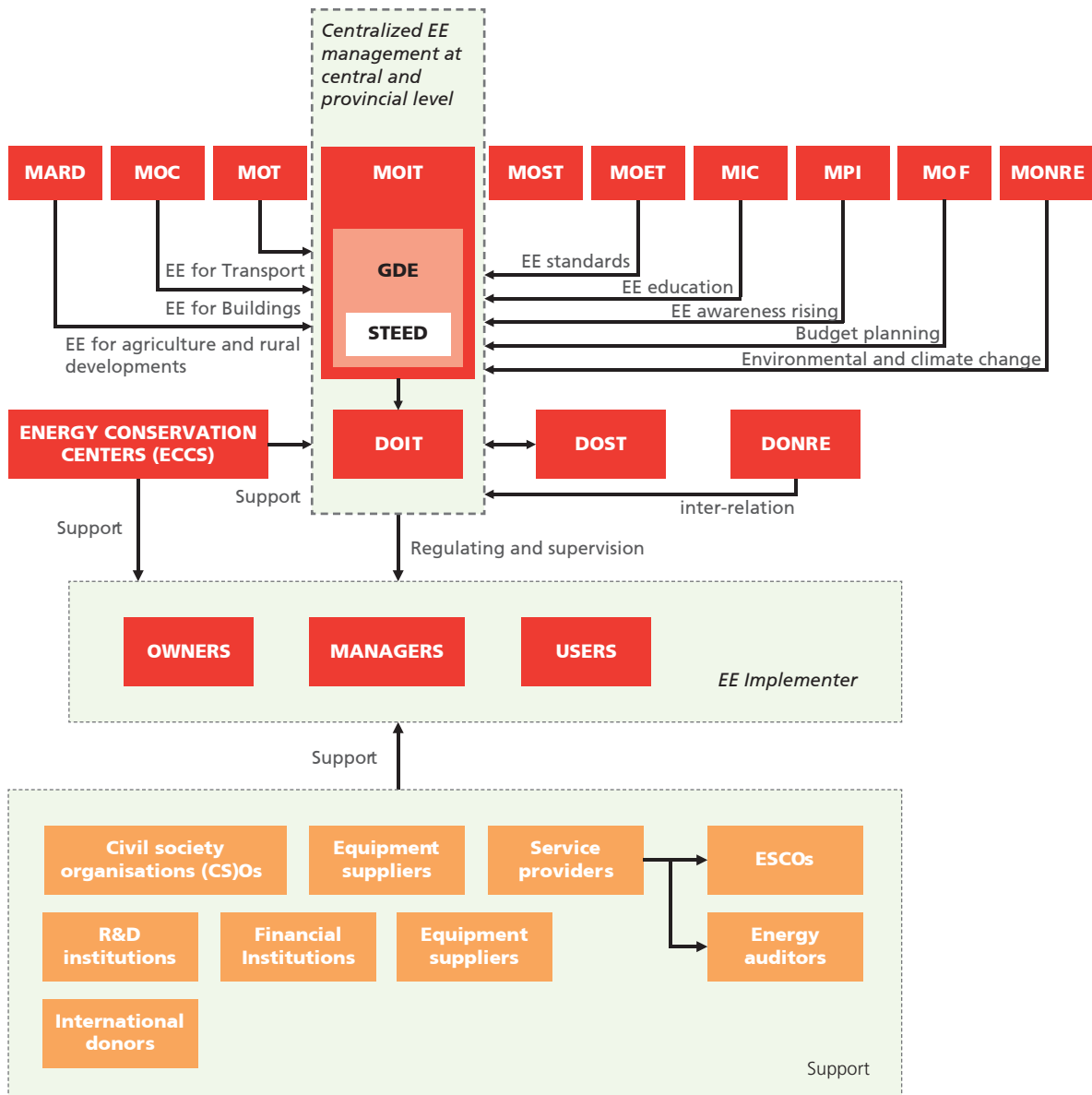
Vietnam appears to have a reasonably strong institutional framework for advancing EE&C despite experiencing insufficient institutional capacity to implement its EE&C laws and policies. Key stakeholders in the Vietnam's institutional framework for EE&C includes government and public sector, private sector, research and development institutions, financial institution, donor and civil society organisation as summarised in Figure 23.

VNEEC (2017) reported that MOIT takes the lead in EE sector and is responsible for the state management of EE. Within MOIT, the Science, Technology and Energy Efficiency Department (STEED) under the General Directorate of Energy (GDE) is the specialised unit for EE sector in general and for the implementation of VNEEP in particular. Other ministries that are involved in EE&C activities include the Ministry of Natural Resources and Environment (MONRE), which is also the national focal point for climate change, the Ministry of Planning and Investment (MPI) and the Ministry of Finance (MOF), which are responsible for securing budget for implementation of the VNEEP as well as incentives for EE measures, the Ministry of Transport (MOT), the Ministry of Science and Technology (MOST), the Ministry of Construction (MOC), the Ministry of Agriculture and Rural Development (MARD), and the Ministry of Education and Training (MOET).

In addition, the Vietnam EE Network launched in July 2017 provides a platform to connect companies to improve EE by sharing and learning from each other. The first eight local companies from the textile, paper, logistical, rubber, and plastic sectors are the first members of the network.

<sup>41</sup> For further information on NATIF, please visit <http://natif.vn/en.html>

<sup>42</sup> For further information on VDB, please visit <http://en.vdb.gov.vn/VDB/products--services/investment-credit>



**Figure 33. Stakeholders Map for EE&C in Vietnam**

Source: Pre-Study to Support the NAMA Development on EE Sector, 2017 (VNEEC Report submitted to GIZ Vietnam under "Creation of an Overarching Framework for NAMA and MRV in Vietnam" project)





### 3.10.5. Challenges and Recommendations

Several studies in the industrial sector as well as building sector have revealed a considerable financially viable potential in reducing energy intensity by upgrading technologies and adopting measures to manage more efficiently the resources. Financial institutions (FIs) in Vietnam are quite reluctant to provide EE financing as a specific mainstream business line since their current product offerings are mainly focused on corporate loans, trade finance, working capital, etc. which are all collateral based. Many local FIs consider EE incomprehensible, too technical and risky. FIs fall short in terms of internal capacity to appraise EE projects, and verify technical information provided by clients.

FIs often do not have a good understanding and experience with EE technologies and market opportunities. If local FIs were to hire technical consultants, the transaction costs will increase and slow down the loan process; they do not know how reliable external consultants can be. Thus, the initial start-up costs for local FIs to go into this new EE business area can be rather significant, especially if they have to conduct market studies, sector studies, hire technical staff, train credit- and relationship officers, develop marketing strategy, and establish the complete deal generation system including, appraisal, technical verification, and loan monitoring. As a result of these hurdles, both real and perceived, financing at current market rates, which includes interest rate caps, do not provide FIs with a sufficient return to venture into the “sustainable energy” business line. Capacity building in FIs is therefore crucial to help encourage them in providing loans to EE&C projects.

Apart from these technical hurdles, FIs in Vietnam, especially private FIs, have limited access to long-term funding. Their resources are much more dependent on the mobilization of short-term deposits. In recent years, concerns over inflation and speculation on interest changes have affected depositors in sticking to short-term funding often of only up to 6 months. Meanwhile, funding with maturities of more than one or two years can be quite limited from commercial banks. Even without extending current loan tenors, local FIs face a major maturity mismatch. While the payback on some investments can be shorter termed (2-3 years), many EE investments require longer term funding. Since local private FIs have a limited access to long-term funding, they offer long-term loans to their clients only in conventional business cases. The EE concepts are also relatively new in Vietnam, and there is no track record either from the end users’ side as well as the FIs’ side. This area therefore is perceived to carry significant risks as mentioned above.

Small credit lines were set up by the Government through VDB on an ad-hoc basis to provide policy loans (sometimes offered at zero-interest rate). This makes the local FIs even more reluctant to enter this business area, fearing they would not be able to offer competitive prices to clients. Additionally, due to the global crisis over the past years, the Government was concerned about inflation and has thus decided to cap lending interest rates on short-term VND deposit and USD, and credit growth rates of commercial banks. This practically ties up the credit supply and makes it more difficult for small and medium enterprises (SMEs) to access loans.

The lack of awareness on the benefits of EE&C technologies in SMEs is also identified as another challenge in EE&C development in Vietnam. SMEs are often only focusing on their core business and do not have the intention on implementing EE&C saving measures. They often only focus on capital expenditures of an investment instead of the long-term cost savings potential. The high collaterals required by banks (70% of the equity) further compounds their reluctance in investing in EE&C saving measures. The Government needs to raise awareness on the potential energy savings and thus reduce the costs from EE&C projects to encourage SMEs to invest in EE&C technologies, as well as introduce loan guarantees to increase SMEs credit profile.

For the time being, there are not many sources of large-scale funding to local FIs for EE in Vietnam other than through the source of international IFC/WB/ADB funds<sup>43</sup>. Other bilateral donors’ funding (e.g. DANIDA, GIZ, JICA among others) is often limited in the form of grants, and are mainly for demonstration programmes only.

Table 50 summarises the challenges in EE&C financing in Vietnam and the recommendations on how to address the barriers.

**Table 50: Challenges and Recommendations for EE&C Financing in Vietnam**

Challenges	Recommendations
Limited technical knowledge about EE&C initiatives among financial institutions	Conduct capacity building activities among financial institutions
Insufficient return for financial institutions to venture into sustainable energy business line	Introduce credit lines or guarantees to financial institutions to enhance maturity, reduce cost of lending, and improve risk-return ratio for commercial banks
Financial institutions have limited access to long-term funding	Liberalise regulations on short-term debt to allow for market rates
Limited awareness on the benefits of EE&C among SMEs; EE&C projects are seen as extra expenditure.	Conduct awareness raising programmes for private sectors



Credit: GIZ – MOIT

<sup>43</sup> For more information, please visit [http://www.climateinvestmentfunds.org/sites/default/files/Vietnam%20FI%20CTF%20proposal-%20CTF\\_PID%2026Aug10.pdf](http://www.climateinvestmentfunds.org/sites/default/files/Vietnam%20FI%20CTF%20proposal-%20CTF_PID%2026Aug10.pdf)





## 4. Regional Challenges and Recommendations for EE&C Financing in ASEAN

Despite the existing financial support mechanisms for EE&C in most AMS, various challenges still exist in the development of EE&C in the region. As alluded in section 3, most AMS are facing several common barriers in EE&C development, particularly in EE&C financing. Some of the key challenges include limited availability of EE&C financing support mechanisms, insufficient information on the existing EE&C financing support mechanisms, government subsidy on energy prices, insufficient policy frameworks to support EE&C implementation and limited capacity from stakeholders.

In Brunei Darussalam, Cambodia, Lao PDR and Myanmar, limited regulatory frameworks and financing support mechanisms are the main barriers in EE&C financing. They cause challenges as these policy frameworks would have provided the underlying foundation to establish EE&C institutions and provide clear targets and strategies for EE&C development. The governments in these countries may review various successful financing schemes in other countries and adapt them to their national context. The establishment of these government-backed financing schemes is essential in propelling the development of EE forward as it has been proven in Malaysia, Singapore, and Thailand where investments in EE projects have been increasing after the governments introduced various EE financing schemes.

Affordable fossil fuel is another key challenge in most AMS. In Brunei Darussalam, where fossil fuels are abundant and cheap, or in most AMS where electricity is heavily subsidised, EE&C initiatives thus become less attractive. Therefore, establishing suitable support frameworks and incentives is crucial in these countries to incentivize adoption of EE&C initiatives. It is also imperative for the governments to gradually remove fossil fuels subsidy and introduce market prices.

In comparison, several countries (e.g. Indonesia, Malaysia, Singapore, Thailand) have established a series of regulatory framework as well as financing schemes to support EE&C projects. However, the implementation of these support frameworks has been hindered due to limited understanding of EE&C initiatives and ineffective enforcement of the regulations. Financial institutions, for example, have limited technical understanding of EE&C projects and associated risks, making them reluctant in providing loans for project developers/ESCOs. Limited understanding on EE&C benefits also prevents facility owners to invest in EE&C measures. Often, many companies do not consider EE&C initiatives to be beneficial and rather see that the EE&C investment as an additional expenditure. The cumbersome processes and unclear procedures in acquiring funds further hinder facility owners to adopt EE&C measures. To address this issue, capacity building in all sectors is therefore crucial. The government may also streamline approval process and publish standard documentations as a guideline for stakeholders.

The key challenges in EE&C financing commonly faced by AMS and recommendations on how to overcome them are summarised in Table 51 below.

**Table 51: Regional Challenges in EE&C Financing in the ASEAN region**

Challenges	Recommendations
The availability of energy efficiency financing support mechanisms is limited and information on mechanisms is often incomplete or outdated	Adapt most successful financing schemes in the region to the AMS context. Relevant information to be provided and updated regularly through stakeholders' consultation
Lack of transparency and unclear approval procedures for financial products and service contracts between the financiers and project developers	Develop relevant guidelines that include step-by-step processes for project developers and other stakeholders
Low energy prices and subsidies often become a challenge to various financing schemes	Revise fossil fuel subsidies and introduce market prices that reflect real economic costs
Limited legislative measures to support the effective implementation of EE&C	Introduce policies, laws, rules, and regulations along with schemes on voluntary- or mandatory basis, such as rating systems and MEPS
Limited awareness on EE&C measures, financing and skilled manpower often lead to challenges in policy development and implementation on ground	Conduct awareness raising for both policy makers and implementing practitioners (e.g. commercial banks), and share related information with all key stakeholders
Stakeholders' consultations involving private players are often missing, leading to weaker implementation	Increase involvement of private players in the implementation, financing, reporting and verification of EE projects
Adequate policy frameworks to enable private investments are missing	Government to provide adequate regulatory frameworks for the private sector to act within





## 5. Conclusion

As projected in the 5<sup>th</sup> ASEAN Energy Outlook, the region has already achieved 18% reduction in Energy Intensity in 2015 and is well placed to reach its 20% target by 2020. AMS have been on track by adopting EE&C policies, target, programs and roadmaps to achieve energy savings across different sectors. However, in order to achieve the long-term target of 30% reduction in EI by 2025, there is a need to innovate the Energy Efficiency Financing schemes and mechanisms and develop supporting policies. AMS such as Indonesia, Malaysia, Singapore, Thailand and Vietnam have been able to develop more advanced frameworks by creating dedicated financing mechanisms, whereas other AMS have introduced new financing schemes in addition to traditional instruments.

The implementation of financing mechanisms and schemes often face challenges as highlighted in the study. Some of the crucial issues include projects with high rates of return which remain unimplemented because of high investment risks, unavailable information on incentive schemes and mechanisms to project developers, lack of awareness on EE measures and lack of legislative measures to support the effective implementation of EE&C. To overcome AMS' specific and common challenges, further efforts could be implemented, such as introducing policies, laws, rules and regulations along with schemes on voluntary and mandatory basis (e.g. rating systems, minimum energy performance standards, etc.) and conduct awareness raising for both policy makers and those in the implementation (e.g. commercial banks) and make available related information to all key stakeholders. Lastly, an active collaboration between AMS governments can play a crucial role in developing policies and ensuring its effective implementation.



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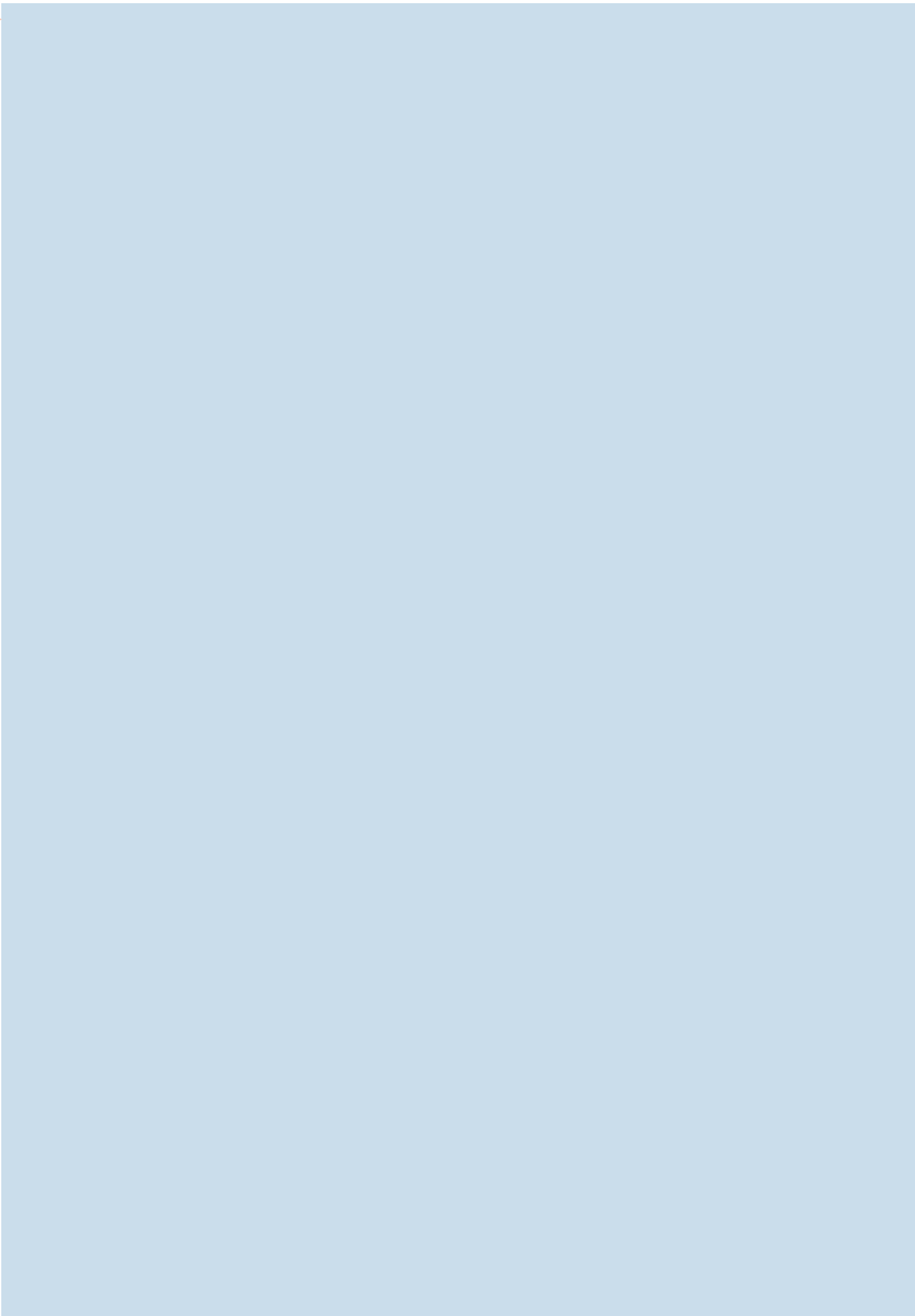
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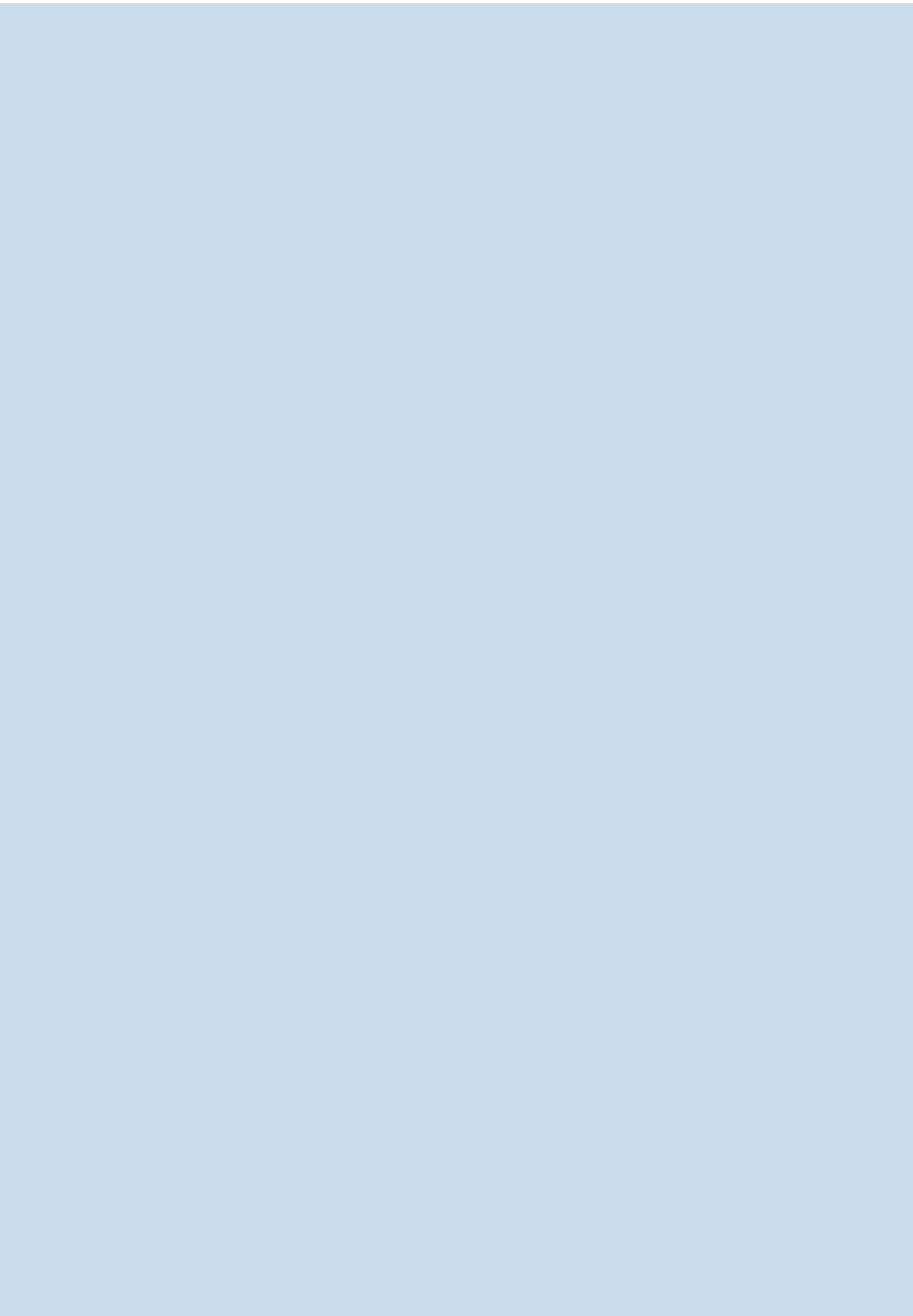
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