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A GUIDE TO
RENEWABLE
ENERGY IN
SOUTHEAST ASIA



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FOREWORD



Globally, nations and regulators are rallying their people and businesses to combat climate change. There is compelling evidence that rapid climate change would constitute an existential threat for everyone. This has led to the [Paris Agreement](#), a legally binding international treaty that primarily aims to limit global warming to below 2 degrees Celsius. Parties to the Paris Agreement are required to submit an updated national climate action plan (referred to as the Nationally Determined Contribution or NDC) every five years, setting out the actions that they will take to reduce greenhouse gas (GHG) emissions to reach the goals of the Paris Agreement. At the most recent 2021 United Nations Climate Conference of the Parties ("COP26"), attaining net zero emissions by mid-century was underscored as a key outcome. To achieve this target, there is an urgent need to phase out the use of unabated coal and increase investment in renewable energy ("RE"). Examples of RE sources include wind, solar and hydropower.

The Association of Southeast Asian Nations ("ASEAN") member states ("AMS") have also affirmed their commitment to accelerate decarbonisation and cut emissions at the COP26. As a region, ASEAN aspires to achieve a 23% share of RE in the ASEAN energy mix by 2025. This includes increasing the share of RE in installed power capacity to 35% by 2025. This is set out in the [ASEAN Plan of Action for Energy Cooperation 2016-2025 \(Phase II: 2021-2025\)](#).

The International Renewable Energy Agency ("IRENA") also identified investment and deployment of RE as a key solution to decarbonisation and achieving the net zero emissions goal. In fact, IRENA projected that RE sources could supply four-fifths of the world's electricity by 2050.¹ In Southeast Asia, the ASEAN Centre for Energy (ACE) expects countries in the region to increase RE deployment in the coming years in order to meet their climate targets and goals to attain net zero emissions by 2050.²

In this regard, ASEAN countries have taken steps to varying extents and effectiveness for energy diversification, including efforts to deploy RE and develop RE technologies. For instance, to support and facilitate the incorporation of RE in its national energy mix, some countries in ASEAN have also developed and implemented various legislations, policies and regulations for energy efficiency and conservation. Such efforts and programmes include providing

¹ [IRENA website on "Renewable Energy: A key climate solution"](#)

² IHS Markit article on "[Southeast Asia to renew efforts to boost renewable capacity in 2022 after climate pledges: ASEAN researchers](#)" (11 January 2022)

subsidies such as feed-in tariffs, utilisation of net metering, as well as various regulatory enhancements to facilitate registration and participation of consumers and businesses in energy efficiency and conservation initiatives. For example, energy users may buy Renewable Energy Certificates ("**RECs**"), market-based instruments that serve as proof that electricity is generated from RE sources, to show that they utilise RE sources.

Each ASEAN country faces its own particular set of challenges and constraints in achieving its net zero emissions goal due to a myriad of factors including its stage of economic development, resources (financial and non-financial) and geographical constraints. As such, the policies and focus of each country in the deployment and development of RE may differ. For instance, land scarcity in Singapore makes it difficult for large-scale solar deployment, resulting in Singapore being likely to focus on RE imports and research and development instead of onshore generation.

In this Guide, we provide an overview of the RE landscape in the region and certain salient legal and regulatory issues affecting the development and deployment of RE in Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam.

*This publication is up to date as of **31 May 2022**.*

CAMBODIA

1. MAIN TYPES OF RENEWABLE ENERGY ("RE") BEING DEVELOPED

According to the Salient Report on Electricity Sector of Cambodia for FY2021 issued by the Electricity Authority of Cambodia ("EAC"), 26.55% of all energy consumed in Cambodia comes from imports from neighbouring states such as Thailand, Vietnam, and Lao PDR, while 73.45% comes from local production sources. Domestic energy production in Cambodia derived from five sources is illustrated in the table below.

Energy Sources (Domestic)	Energy Produced (GWh)	% in total domestic energy production
Coal	3,813.07	41.20%
Fuel oil	706.05	7.63%
Solar	589.04	6.36%
Biomass	58.98	0.64%
Hydro	4,088.60	44.17%
Total	9,255.73	100%

Under Cambodia's Updated Nationally Determined Contributions (2020) under the Paris Agreement of the United Nations Framework Convention on Climate Change ("**Cambodia's Updated NDCs (2020)**"), Cambodia recognises solar, wind, hydro, and biomass as its RE sources.

2. KEY REGULATORS AND STAKEHOLDERS

- The **Ministry of Industry, Mines, and Energy ("MME")** is in charge of setting and administering policies, strategies and planning for the electricity sector.
- **EAC** is an autonomous agency that regulates electricity services and governs the relationship between the delivery, receipt and use of electricity. Each electric power service provider is required to have a licence issued by EAC.
- The **Ministry of Environment** and the **Ministry of Water Resources and Meteorology** provide assessments on environmental impacts of power/energy



projects in general and for hydropower projects, respectively.

- The **Ministry of Economy and Finance** is also involved in discussions of potential government incentive plans such as net-metering and feed-in tariff schemes.
- The **Electricité du Cambodge ("EDC")** is a limited liability state-owned company that has the licence and authority for the generation, transmission, and distribution of electricity (of all sources) throughout Cambodia. According to the Regulation on General Conditions for Connecting Solar Photovoltaic Generation Sources to the Electricity Supply System of National Grid or to the Electrical System of a Consumer Connected to the Electricity Supply System of the National Grid dated 26 January 2018 ("**Solar Energy Connection Regulation**") adopted in 2018, electricity injected into the national grid by all sources including the solar photovoltaic system and injected at any level, either through the system owned by EDC or through a system owned by other licensees, must be purchased by and further distributed to consumers by EDC only, unless otherwise authorised by EAC.

3. REGULATORY FRAMEWORK AND SECTORAL POLICIES

At present, regulations and policies relating to RE are set out in certain legal and policy frameworks that cover a broader topic such as environment or climate change.

The main piece of legislation governing the power sector is the Cambodian Law on Electricity (dated 2 February 2001, subsequently amended on 22 June 2007 and 18 May 2015) ("**Electricity Law**").

Legal instruments specifically governing RE are limited. The Solar Energy Connection Regulation governs the required conditions for a solar photovoltaic energy generation to be eligible for being connected to or synchronised with the national grid adopted in early 2018, but there are no specific legal instruments that specifically address other RE sources.

At the policy level, RE has been included or referred to in certain broader policy papers adopted by the Cambodian government, including the Cambodian Climate Change Strategic Plan 2014-2023, the National Green Growth Roadmap (2009), the National Policy on Green Growth (2013), as well as the National Strategic Plan on Green Growth 2013-2030. Such policies include reaffirmations of the government's commitments to promote green energy growth, for instance, under Cambodia's Updated NDCs (2020), the government aims to produce and utilise RE (solar, wind, hydro, biomass) equivalent to 25% of overall energy consumed in the country by 2030. However, there are no other specific targets on the development of RE.

A draft Environment and Natural Resources Code ("**Draft Environment Code**") is currently underway and when adopted would widen the legal and regulatory framework in the power sector generally as well as the RE space particularly. Under the 11th version of the Draft Environment Code (version of 20 April 2018), the objectives of the sustainable energy framework include:

- Supporting and promoting sustainable energy projects;
- Affirming Cambodia's commitments under the United Nations Framework Convention on Climate Change;
- Ratifying sustainable energy projects;
- Prioritising investments on sustainable energy projects;
- Promoting environmentally-friendly technologies;
- Endorsing small-scale power sources and energy systems; and
- Promoting household solar photovoltaic system and energy production and reservoir.

Under the Draft Environment Code, the Ministry of Environment and MME are to jointly draft a national strategic plan on RE focusing on the:

- Creation of RE policies;
- Evaluation of the current energy and power production and distribution infrastructures;
- Description on the potential of sustainable energy production and distribution;
- Determination of target region for the creation of sustainable energy;

- Management of waste from RE projects;
- Environmental impact assessment of energy and power projects; and
- Creation of a collective resource consumption based on a cost and benefit analysis.

The adoption of the Draft Environment Code currently remains to be observed.

4. RE PROGRAMMES

Specific RE programmes such as feed-in tariff or net metering, etc. are currently unavailable. Legal instruments governing them are to be put in place pursuant to the Draft Environment Code. Under the Draft Environment Code, relevant authorities are to propose and adopt regulations on measurements of energy supplied by solar photovoltaic systems to the main national grids inclusive of tariff rates and payment mechanisms.

Under the Draft Environment Code, materials for the construction of RE projects are to be subject to tax exemption under existing investment laws, and individuals and legal entities installing solar photovoltaic systems for personal consumption would be entitled to connect to the national grid.

- 25% for the first two years;
- 50% for the next two years; and
- 75% for the last two years.
- Prepayment tax exemption during income tax exemption period;
- Minimum tax exemption provided that an independent audit report has been carried out; and
- Export tax exemption, unless otherwise provided in other laws and regulations.

Option 2:

- Deduction of capital expenditure through special depreciation as stated in the tax regulations in force;
- Eligibility for deducting up to 200% of specific expenses incurred for up to nine years (where specific industries, activities, expenses, and deduction period are to be separately defined in a sub-decree or the annual Law on Financial Management);
- Prepayment tax exemption for a specific period of time based on sectors and investment activities;
- Minimum tax exemption provided that an independent audit report has been carried out; and
- Export tax exemption, unless otherwise provided in other laws and regulations.

In addition, a domestically-oriented QIP is entitled to customs duty, special tax and value-added tax exemptions for the import of construction materials, construction equipment, and production equipment.

In addition to the basic incentives set out above, investment activities registered as QIPs also receive additional incentives as follows:

- Value-added tax exemption for the purchase of locally made production inputs for the implementation of the QIP; and
- Deduction of 150% from the tax base for any of the following activities:
 - Research, development and innovation;
 - Human resource development through the provision of vocational training and skills to Cambodian workers/employees;
 - Construction of accommodation, food courts or canteens where reasonably priced foods are sold,

5. GOVERNMENT INCENTIVES

An investment involving "green energy and technology contributing to climate change adaptation and mitigation" that is registered as a Qualified Investment Project ("QIP") is eligible for incentives under the Royal Kram No.NS.RK.1021.014 promulgating the Law on Investment of Cambodia dated 15 October 2021.

A QIP is entitled to choose basic incentives under the two options:

Option 1:

- Income tax exemption for three to nine years, depending on the sector and investment activities, from the time of earning its first income. After the income tax exemption period has expired, the QIP is entitled to pay income tax at a progressive rate proportional to the total tax due as follows:

nurseries and other facilities for workers/employees;

- Upgrading of machinery to serve the production line; and
- Provision of welfare for Cambodian workers/employees, such as comfortable means of transportation to commute from their homes to factories, accommodation, food courts or canteens where foods are sold at reasonable prices, nurseries and other facilities.

6. KEY ISSUES IN RE SECTOR

• Foreign investment

Under the current legal framework, there is no restriction on a foreign investor to own 100% of shares in a company operating a RE business. However, it should be noted that only a Cambodian national is allowed to own land in Cambodia, and as such a locally registered entity is authorised to own land only if it is identified as having a Cambodian nationality, which means foreign equity is restricted to a maximum of 49%.

• Restrictions on shareholding

So far as conflict of interest is concerned, the Electricity Law restricts all members or employees of EAC from directly owning any securities of, or having any economic interest in, or holding any position with any licensee or applicant for licences. The same law has further restriction such that the licensee or any person who directly or indirectly owns or controls such licensee shall not own shares in, or have any other direct financial interest in any other licensees. The Electricity Law also prohibits: (i) any licensee or its representative to provide any incentive, donation or benefit in any form, which is not generally provided to the public, to any member or official of EAC; and (ii) any member or official of EAC or his/her spouse or child to become a shareholder, employee, advisor or consultant of the company doing electricity business.

7. UPDATES AND DEVELOPMENTS

At this stage in Cambodia, there is yet to be any RE certificates (apart from certificates for general environmental impact assessment procedure), waste-to-energy programmes, carbon trading schemes, special RE storage plans, discussions on use of hydrogen in RE projects' policies, electricity trading schemes, or virtual power purchase agreements (PPAs).

INDONESIA



1. MAIN TYPES OF RENEWABLE ENERGY ("RE") BEING DEVELOPED

Based on the Indonesian Law No. 30 of 2007 on Energy ("**Energy Law**"), RE is defined as energy produced from sustainable energy resources, which consist of geothermal, wind, bioenergy, solar, hydropower, tidal and ocean thermal.

The most developed RE sources in Indonesia are hydropower and geothermal, followed by wind, solar, biomass, biofuel, biogas and coal gasification. Based on the National Electricity Company (*Perusahaan Listrik Negara* or "**PLN**")'s National Electricity Supply Business Plan (*Rencana Usaha Pembangkitan Tenaga Listrik* or "**RUPTL**") 2021-2030, the utilisation of RE in Indonesia in 2021 is as follows:

No.	Energy	Potential	Utilisation
1.	Geothermal	29,544 MW	4.9%
2.	Hydro	75,091 MW	6.4%
3.	Mini-micro Hydro	19,385 MW	1.0%
4.	Bioenergy	32,654 MW	5.1%
5.	Solar	207,898 MW	0.04%
6.	Wind	60,647 MW	0.01%
7.	Tidal Wave	17,989 MW	0.002%

2. KEY REGULATORS AND STAKEHOLDERS

- At the central governmental level, the **House of Representatives (DPR)** can enact laws on electricity. Further, the President can issue implementing regulations (as Presidential Regulations or Government Regulations).
- **Minister of Energy and Mineral Resources ("MEMR")** has the authority to oversee the electricity sector and is in charge of policy and decision-making to supervise Indonesia's energy sources and assets.
- **PLN** is the state-owned electricity firm who controls the electricity market in the country. PLN is responsible for most of Indonesia's electricity generation, with almost exclusive powers over the transmission, distribution,

and supply of electricity. PLN owns the majority of the power generation capacity. As of December 2020, PLN's generation capacity amounted to 44,174 MW or 69.75% of the total installed power generation capacity in Indonesia.

- **Ministry of Finance ("MOF")** is responsible for deciding the state budget, including administering subsidies, fiscal incentives and government guarantees for energy-related products, infrastructure and operations.
- **Ministry of Environment and Forestry ("MEF")** has the authority to issue and implement policies which have an impact on the environment and forestry. MEF is responsible for forest management (including sustainable forest management), forest management planning as well as forest authorisation. Utilisation of forest areas or remote and protected areas for RE projects such as the development of electricity transmission lines, geothermal power stations or hydropower plants must be authorised by MEF.
- **Ministry of Public Works and Housing (MPH)** supports the National Action Plan for Climate Change Mitigation and Adaptation and Disaster Risk Reduction by, among other things, carrying out public works and housing infrastructure development that uses new and RE and engaging in projects that convert waste into RE.
- **Ministry of Industry (MIA)** is responsible for developing and implementing industrial policies that, among other things, impose the minimum local content requirements for the development of RE.
- **PT Pertamina Geothermal Energy (PGE)** is a subsidiary of PT Pertamina (Persero) which is mandated by the government as the motor for the development of geothermal energy in Indonesia, as well as realising energy independence by expanding the installed capacity of Geothermal Power Plants in Indonesia.

3. REGULATORY FRAMEWORK AND SECTORAL POLICIES

The main regulations on energy and electricity in general are:

- Energy Law;
- Government Regulation No. 79 of 2014 on National Energy Policy;
- Law No. 30 of 2009 on Electricity as last amended by Law No. 11 of 2020 on Job Creation and its implementing regulations;
- MEMR Regulation No. 50 of 2017 on the Utilisation of Renewable Energy Resources for the Production of Electricity as last amended by MEMR Regulation No. 4 of 2020; and
- MEMR Regulation No. 11 of 2021 on Electricity Business Implementation.

Regulations that are specific to a certain type of RE include:

- Law No. 17 of 2019 on Water Resources as last amended by Law No. 11 of 2020 on Job Creation; and
- Law No. 21 of 2014 on Geothermal Energy as last amended by Law No. 11 of 2020 on Job Creation.

Additionally, two main master plans were issued setting out details on the national objectives in terms of development of generation, transmission, and distribution of energy infrastructure. These master plans are regularly updated.

- The National Electricity Master Plan (RUKN), as set out in MEMR Decree No. 143K/20/MEM/2019 which stipulates, among other things, the projection of the supply and demand of electricity and new or RE utilisation policy from 2019 to 2038; and
- RUPTL which sets out the power capacity and network development plan for Indonesia in the next 10 years. RUPTL has the objective of supporting Indonesia's target to have a 23% share of RE in the energy mix by 2025, to reduce greenhouse gas emissions by 29-41% by 2030 and to attain net zero emissions by 2060. Businesses, in particular those in the building and construction sectors, should take note of the directions in RUPTL when embarking on new projects.

4. RE PROGRAMMES

The tariff for electricity purchased by PLN is regulated under MEMR Regulation No. 50 of 2017 as last amended by MEMR Regulation No. 4 of 2020, which provides that PLN can purchase electricity from RE through a direct selection process. The tariff is calculated based on PLN's cost to generate electricity known as *Biaya Pokok Penyediaan* ("**BPP**"). If the generating BPP in the area where the plant will be located is higher than the average national generating BPP, then the PLN's purchase price shall be a maximum of 85% of the local generating BPP. However, if the local generating BPP is equal to or less than the average national generating BPP, the purchase price shall be agreed between PLN and the Independent Power Producer ("**IPP**"). The average national generating BPP and generating BPP of each region is determined by MEMR based on recommendation from PLN, in the form of MEMR regulations. The generating BPP is valid and effective for the period stated in the MEMR regulations.

5. GOVERNMENT INCENTIVES

The Government of Indonesia has enacted Presidential Regulation No. 49 of 2021 on Investment Business Activities (commonly known as the "**Positive List**"). Under the Positive List, some business lines were introduced as prioritised business lines that are entitled to certain fiscal incentives. An example of a prioritised business line is the RE electricity business which is eligible for income tax reduction facility.

Based on Presidential Regulation No. 4 of 2016 on Acceleration of Electricity Infrastructure Development as last amended by Presidential Regulation No. 14 of 2017, RE power projects may obtain incentives from the central and/or regional government in the form of, among others: (i) fiscal incentives; (ii) facilities for licensing and non-licensing; and (iii) subsidies.

In addition, based on MOF Regulation No. 21/PMK.011/2010 on Tax and Customs Facilities Incentives for Renewable Energy Utilisation Activities, the following main incentives are available for RE power projects:

- Income tax facility in the form of a 30% deduction of net income of investment value, accelerated depreciation of tangible assets and accelerated amortisation of intangible assets, a 10% dividend withholding tax concession and compensation for losses (for micro and mini power plants with an investment value of less than IDR 100 billion);
- Exemption of import duties for geothermal activities; and
- Facilities for income tax, value-added tax (VAT) and import duty.

6. KEY ISSUES IN RE SECTOR

• Complex land acquisition process

Land acquisition in Indonesia is a lengthy and complicated process. This is especially so for RE projects because most of the areas required for these projects are located in forest areas (e.g. rivers for hydropower, volcanos for geothermal) which require the IPP to obtain a permit from MEF to utilise the forest area, for instance, under Forest Area Licence (*Izin Pinjam Pakai Kawasan Hutan* or IPPKH) for production forests and Environmental Utilisation Business Permit (*Izin Usaha Pemanfaatan Jasa Lingkungan* or IUPJK) for production forests and protected forests. Obtaining these permits also requires the IPP to provide land compensation to replace the forest area used for the project.

• Lack of technology; requirement for local content

One other main challenge to developing power projects in Indonesia is that some technologies are not yet available in Indonesia, thus the IPPs must import such technologies, machineries and materials from abroad. This often creates difficulties for the IPP because there is a mandatory requirement to fulfil a certain level of local content. The Local Content Requirement in energy sector is regulated under various Minister of Industrial Affairs regulations, and non-compliance will be subject to penalties.

7. UPDATES AND DEVELOPMENTS

- **Renewable Energy Certificates ("RECs")**

PLN launched RECs to promote the use of the electricity from RE sources in Indonesia. However, to date, there is no specific legal and regulatory framework regulating RECs in Indonesia.

- **Carbon trading schemes**

On 29 October 2021, the Presidential Regulation No. 98 of 2021 on the Implementation of Carbon Economic Value to Achieve Nationally Determined Contribution Targets and Control Over Greenhouse Gas Emissions in Relation to National Development was issued. This Regulation prescribes mitigation and adaptation actions as the two main methods to tackle climate change and to achieve the nationally determined contribution. It also introduces the concept of "carbon economic value" and sets out a regulatory framework on carbon pricing and carbon trading arrangements (including registration and valuation, economic incentives, and carbon levies and taxes). This signals Indonesia's readiness to graduate from a voluntary carbon market into a compliance carbon market.

- **Waste-to-energy programme**

This programme in Indonesia is expected to contribute to the government's RE ambitions. To support the investment in Waste to Energy power projects, Presidential Regulation No. 35 of 2018 on Acceleration of Municipal Waste to Energy Power Plant Development came into effect on 16 April 2018 to develop a better regulatory infrastructure to attract more investors.

LAO PDR



1. MAIN TYPES OF RENEWABLE ENERGY ("RE") BEING DEVELOPED

According to the Renewable Energy Development Strategy in Lao PDR (October 2011) ("**RE Strategy**"), Lao PDR has a significant amount of RE resources, such as hydropower, biomass and solar energy.

Of the RE sources, hydropower is regarded as most significant. Currently, Lao PDR has 78 operational hydropower plants with a combined generation capacity of 9,972 MW, and annual power output of about 52,211 million kWh. **Electricite du Laos ("EDL")** has exported a total of 3,575 million kWh in 2020 and is expected to export about 6,017 million kWh in 2025.

Biomass energy sources includes energy crops (such as oily crops, sugar and starch etc.) and organic waste (such as by-products of the agro-forestry industry and municipal wastes etc.). It is predicted that producing biogas through using livestock waste can generate around 5×10^8 kWh of electricity.

There is also much solar energy potential in Lao PDR based on solar irradiance and sunlight hours. It is predicted that if photovoltaic technology was used (with an overall efficiency of 10%), it would generate 146 kWh/m²/year of electricity.

As at 2011, there is not much data on wind energy potential.

In Lao PDR, geothermal energy is not a viable source for energy utilisation.

2. KEY REGULATORS AND STAKEHOLDERS

- The **Ministry of Energy and Mines ("MEM")** is the main regulator of electricity business and activities covering both public and private sectors. It is in charge of developing energy policies, strategies and the overall management of the energy and mining sectors. There are several departments under MEM, each tasked with various aspects of regulating the energy sector. These include:

- The **Department of Energy Business ("DEB")** that looks after the private sector investments, including the development and monitoring of projects within the power sector.
- The **Department of Energy Policy and Planning** which is in charge of coming up with national energy policies and plans as well as implementing pricing policies for all types of supply, among other things.
- The **Ministry of Planning and Investment ("MPI")** represents the government to consider and approve any investment in controlled businesses, businesses under specific supervision, and concession businesses. Energy business is considered to be a controlled business. MPI also oversees the development of special economic zones.
- The **Ministry of Finance ("MOF")** also plays an important role by supporting MEM in the areas of financial management and accountability in the energy sector. It is also responsible for the strategy and investments of various **state-owned enterprises ("SOEs")** in the energy sector. A major SOE is **EDL**, which is a major offtaker for both domestic consumption and for export to neighbouring countries. EDL is responsible for the generation, transmission, distribution and provision of services to all grid-connected customers in the country. EDL owns EDL-Gen which is a public company that owns nearly all EDL generation assets and is in charge of EDL generation activities serving the domestic market in Lao PDR.
- Another significant state-owned enterprise is the **Lao Holding State Enterprise** which is in charge of the state's financial holdings in hydropower projects that are developed by foreign and private investors.
- The **Ministry of Agriculture and Forestry** is responsible for testing out various projects with small family-sized biogas digestors. It has also conducted studies on the growing fuel crops.
- The **Ministry of Natural Resources and Environment** is in charge of allocating land for the development RE projects, such as land for solar energy development.

- In the area of research and development to grow the RE sector, the **Ministry of Science and Technology** has conducted various research projects on using RE in Lao PDR. In 2021, these research projects were transferred to MEM. Other entities that are involved in research and development of RE include universities, research institutes and other non-profit organisations.
- Other line ministries and their main roles are set out in the RE Strategy.

3. REGULATORY FRAMEWORK AND SECTORAL POLICIES

The power sector is governed by the Law on Electricity No. 19/NA dated 9 May 2017 ("**Law on Electricity**"). The Law on Electricity determines the principles, rules and procedures regarding the organisation, planning, management and inspection of electricity activities of the country. It also sets out priorities for the electricity sector and RE – for instance, the state encourages both domestic and foreign entities to invest in electricity activities, with an emphasis on hydropower.

In addition, the Law on Electricity also covers other areas such as energy supply and infrastructure, trade and investment. In relation to investment, the Law on Electricity also touches on, among other things, financial incentives, regulation of independent power producers (IPPs) and investment climate development.

The government issued the RE Strategy in 2011 with a vision to "promote the development of RE as an important component of the national economic development to ensure energy security, sustain socio-economic development, and enhance environmental and social sustainability". Among other things, it aims to develop RE sources so as to reduce reliance on the non-renewable sources which will be depleted in the future. The RE Strategy states that Lao PDR's policies focus on small power development to ensure that Lao PDR is self-sufficient as well as for grid connection, production and marketing of biofuels as well as development of other clean energies. For details on the implementation of the government's strategies and policies, please refer to the "Road

Map for implementing up to 2025" set out in the RE Strategy.

In the report by the [Asian Development Bank on "Lao PDR Energy Sector Assessment, Strategy, and Road Map \(November 2019\)"](#), it is noted that hydropower is a very significant RE source in Lao PDR. The National Policy on Sustainable Hydropower underscores this, and requires government agencies and project developers to conduct proper analysis on hydro projects that are more than 15 MW, covering technical, engineering, financial, environmental and social considerations.

4. RE PROGRAMMES

Currently, the government promotes RE development through feed-in tariff and corporate power purchase agreements. However, EDL, the local offtaker which assists the developers to negotiate with existing energy buyers for higher tariffs, lacks financial resources to do so.

5. GOVERNMENT INCENTIVES

To help defray the high upfront investment requirements and funding problems for RE projects, the RE Strategy stated that the government will offer financial incentives and assistance to RE investors and projects. The Investment Law of Lao PDR sets out, among other things, investment incentives for RE projects.

Currently, most of the electricity generation businesses are in the form of built-operate-transfer projects under concession agreements entered into between the government and the project developer. Tax incentives for each project varies.

Generally, the developer enjoys import duty exemption for the import of all machinery and construction materials which are not available in the country and five years of profit tax holiday.

6. KEY ISSUES IN RE SECTOR

The main challenges are market and capacity of offtakers. Currently, due to the fact that the offtaker, EDL, lacks financial resources and is heavily indebted, the developers are required to look for

the ultimate buyer and to secure power purchase agreements on their own.

Other key challenges which are identified in the RE Strategy include:

- A lack of specific policies and strategies for the promotion of RE;
- Dearth of specific regulations and laws regulating RE;
- Poor or no coordination between various stakeholders in RE projects;
- Inadequate knowledge and understanding of RE by users;
- Shortage of public funding for the RE sector, in particular for research and development; and
- A lack of energy pricing regulation which makes it risky for investors.

7. UPDATES AND DEVELOPMENTS

There has not been much development since the RE Strategy that was issued in 2011.

Though the government plans to increase the RE to 30% of the total energy consumption in the country by 2025, to date, the ratio remains at 5%.

MALAYSIA

1. MAIN TYPES OF RENEWABLE ENERGY ("RE") BEING DEVELOPED



As of the end of 2020, the RE installed capacity in Malaysia was 7,995 megawatts ("MW"), forming approximately 22.4% of the total installed capacity for electrical generation in the country.³ The dominant RE sources in Malaysia are hydroelectric power and solar photovoltaic ("PV") power, which constitute 17.1% and 2.9% respectively of the RE installed capacity in Malaysia in 2019. This is followed by biomass at 1.2% and biogas at 0.4%.⁴

Blessed with hilly terrain and year-round rainfall, Malaysia hosts the largest hydroelectric power plant in Southeast Asia, the Bakun Hydroelectric Plant in Sarawak with an installed capacity of 2,400MW. The state of Sarawak alone has a hydropower RE installed capacity of 3,452MW compared to the Malaysian total large hydro generation capacity of 5,684MW.⁵ Sarawak Energy, the Sarawak government-owned power supply company, has ambitious plans to become the "Battery of ASEAN" as it sets its sights on developing the Mentarang Induk Hydroelectric Plant on Mentarang River, located in the North Kalimantan Province with an Indonesian company, PT Kayan Hydropower Nusantara.⁶ Its RE generation capacity will see an increase of 1,285MW when the Baleh Hydroelectric Project comes online in 2026.⁷

Even so, it is expected that solar power capacity growth will be stronger than hydropower capacity growth,⁸ as the solar power industry continues to thrive under initiatives led by the government, such as feed-in tariff ("FIT"), Net Energy Metering ("NEM") and Large-Scale Solar ("LSS"). In particular, the Fourth Competitive Bidding Round (generally referred to by the industry as "LSS4") for the development of LSS has received 137 bids

³ [Speech by the Prime Minister in the Dewan Rakyat on 27 September 2021 - Twelfth Malaysia Plan](#) ("Twelfth Malaysia Plan").

⁴ [Malaysian Energy Statistics Handbook 2020](#).

⁵ Malaysian Investment Development Authority ("MIDA") media release titled "[Energising the region with hydropower](#)" (21 September 2021).

⁶ Malay Mail article titled "[CM: Sarawak aims to be regional renewable energy powerhouse](#)" (21 February 2022)

⁷ MIDA media release titled "[Energising the region with hydropower](#)" (21 September 2021).

⁸ The Business Times article titled "[Malaysia's 2025 renewable target to be backed by strong solar power growth: Fitch Solutions](#)" (6 December 2021).

despite being launched at the start of the pandemic in May 2020.⁹ The Malaysian government has expressed an intention to focus on solar power in Peninsular Malaysia, which constitutes 80% of the country's electricity demands, and introduce battery energy storage systems from 2030 onwards.¹⁰ It is estimated that out of a total of 1,178MW of new RE capacities which will be developed in Peninsular Malaysia from 2021 onwards, 1,098MW will be solar.¹¹

The leading contributor of biomass in Malaysia is palm oil.¹² Considering the fact that Malaysia is one of the largest producers of palm oil in the world, it is a shame that biomass and biogas are not more prevalent sources of RE in Malaysia. The government in the Twelfth Malaysia Plan has identified remote locations and inconsistent feedstock supply as major challenges to increase the contribution of biogas and biomass sources of RE.¹³ In turn, the government has proposed in the Twelfth Malaysia Plan to establish bioenergy clusters as centralised collection points for feedstock, in order to ensure its sustainable supply.¹⁴ However as of now, there have not been any concrete plans to execute such a plan.

Other sources of RE such as wind and geothermal energy are not utilised in Malaysia. While back in 2019, the Malaysian government has considered developing wind turbines in the Malaysian East Coast,¹⁵ the proposal ultimately did not move forward any further. This could be attributed to Malaysia's location in a low-wind region and as of now, there does not appear to be any political will to restart conversations about wind energy in Malaysia. Plans of Malaysia's first geothermal plant in Apas Kiri, Tawau, with an approved capacity quota of 37MW, were scrapped in 2018

when the project was found abandoned.¹⁶ Since then, there have not been any discussions on the national stage of exploring or developing geothermal energy in Malaysia.

In 2021, Malaysia has set the target of 31% RE in its installed capacity in 2025 and 40% in 2035.¹⁷ Comparing the target figure to Malaysia's current RE installed capacity of 22.4%, with the RE installed capacity projected to more than double to 18,000MW by 2035, the target is indeed ambitious. However, the Malaysian government appears intent to meet its commitment under the Paris Agreement,¹⁸ and of becoming a carbon-neutral nation as early as 2050.¹⁹ Setting an ambitious target is further proof of the Malaysian government's intention to do better to combat climate change.

2. KEY REGULATORS AND STAKEHOLDERS

- The **Energy Commission of Malaysia ("EC")** is a statutory body established to regulate the electricity industry in Peninsular Malaysia and the State of Sabah, whereas the electricity industry in the State of Sarawak is regulated by the Electrical Inspectorate Unit under the Ministry of Utilities of Sarawak. The main RE programmes in Malaysia (ex Sarawak) that are regulated by EC are the large scale solar and self-consumption programmes, and EC is also responsible for the licensing of all conventional and renewable power plants in Malaysia (ex Sarawak).
- The **Sustainable Energy Development Authority of Malaysia ("SEDA")** is

⁹ Lexology article titled "[Malaysia's Large Scale Solar 4 / LSS@MENtARI: Analysis of Results](#)" (16 March 2021).

¹⁰ MIDA media release titled "[Malaysia aims 31% RE capacity by 2025](#)" (23 June 2021).

¹¹ [Report on Peninsular Malaysia Generation Development Plan 2020 \(2021-2039\)](#).

¹² SpringerLink article titled "[Biomass Energy in Malaysia: Current Scenario, Policies, and Implementation Challenges](#)" (21 January 2022).

¹³ Twelfth Malaysia Plan.

¹⁴ *Ibid*.

¹⁵ The Edge Markets article titled "[Malaysia mulling setting up wind turbines in the East Coast — Dr Mahathir](#)" (25 April 2019).

¹⁶ New Straits Times article titled "[Govt scraps country's first geothermal power plant project](#)" (6 December 2018).

¹⁷ [Malaysia's Energy Transition Plan 2021-2040 Featured at the Special Meeting of ASEAN Ministers on Energy and the Minister of Economy, Trade and Industry of Japan](#) (21 June 2021).

¹⁸ Under the Paris Agreement, the Malaysian government pledges to reduce its greenhouse gas emissions intensity of GDP by 45% by 2030 relative to the emissions intensity of GDP in 2005. CarbonBrief article titled "[Paris 2015: Tracking country climate pledges](#)" (16 September 2015).

¹⁹ The Diplomat article titled "[What's in ASEAN's First State of Climate Change Report?](#)" (29 October 2021).

responsible for administering and managing the implementation of the RE FiT mechanism (i.e. one of the RE programmes available in Malaysia under which FiT are currently available for bio-energy, geothermal and small hydro projects).

- **Tenaga Nasional Berhad ("TNB")** (for Peninsular Malaysia), **Sabah Electricity Sdn. Bhd. ("SESB")** (for Sabah) and **Syarikat SESCO Berhad** (for Sarawak) are the electricity companies who are the main offtakers and electricity providers to consumers in the respective regions. Currently, the majority of the power purchase agreements ("**PPAs**") for RE plants located in Peninsular Malaysia and Sabah are entered into by the power producers with TNB and SESB, respectively.
- Following several reforms within the Malaysian electricity supply industry, a Single Buyer model is currently adopted in Peninsular Malaysia, whereby the **Single Buyer** (a ring-fenced department of TNB) is responsible for managing the procurement of electricity from independent power producers and the electricity generation division of TNB. The **Grid System Operator** is also a ring-fenced department of TNB and is primarily responsible for the day-to-day real time operation and the management of the Peninsular Malaysia grid system.

3. REGULATORY FRAMEWORK AND SECTORAL POLICIES

The key legislations in relation to RE in Malaysia include the Renewable Energy Act 2011, Sustainable Energy Development Authority Act 2011 and the Electricity Supply Act 1990. The government of Malaysia has also recently introduced a comprehensive roadmap to enhance the growth of the RE sector in Malaysia.

- **Renewable Energy Act 2011 ("REA")** and its rules, which came into operation on 1

December 2011, is the legislation that governs the FiT programme for renewable energy projects in Malaysia (ex Sarawak). In addition, the REA also provides for the establishment and maintenance of a fund known as the "Renewable Energy Fund" which is intended to be used to promote growth of electricity generation from renewable resources.²⁰ The Renewable Energy Fund is administered and controlled by SEDA, and is raised primarily through a surcharge imposed on TNB's consumers' electricity bills (except for domestic customers with electricity consumption of 300kWh and below per month) at the rate of 1.6% of the amount consumed. The REA authorises distribution licensees to recover from the Renewable Energy Fund a sum equivalent to the difference between the tariff rates paid by them to their feed-in approval holder and the cost which the distribution licensee would have otherwise incurred to generate the amount of electricity generated by its feed-in approval holder.

- **Sustainable Energy Development Authority Act 2011 ("SEDA Act")** came into operation on 1 September 2011 and provides for the establishment of SEDA. The key functions of SEDA include: (a) advising the relevant government bodies on all matters relating to sustainable energy; (b) promoting, stimulating, facilitating and developing sustainable energy; and (c) implementing, managing, monitoring and reviewing the FiT system established under the REA.
- **Electricity Supply Act 1990 ("ESA")** provides for the regulation, supply and distribution of electricity in Malaysia. The ESA also governs and controls installation of electrical equipment designed for the supply of electricity in Malaysia. Under the ESA, any person who intends to construct or operate any energy installation is required to obtain a licence from the Energy Commission ("EC").

²⁰ [Kumpulan Wang Tenaga Boleh Baharu \(Kwtbb\) / Renewable Energy Fund.](#)

- Various **Guidelines** also apply to the self-consumption programme, net-energy metering programme and the new enhanced dispatch arrangement scheme, while the terms of the large-scale solar bidding rounds are informed by the respective requests for proposal issued by EC for each bidding round.
- On 30 December 2021, a strategic roadmap, **Malaysia Renewable Energy Roadmap 2035 ("MyRER")**,²¹ was launched by the government of Malaysia. The MyRER was developed by the Ministry of Energy and Natural Resources and SEDA, along with key industry stakeholders in Malaysia. The strategies formulated in the MyRER aims to support the government's aspiration in achieving a 31% RE share in the power capacity mix by 2025 and to further decarbonise the electricity sector in Malaysia through the 2035 milestone. The objectives of the MyRER are to determine RE targets in the electricity mix up to 2035 and strategies required to achieve the RE targets. According to the Minister for Energy and Natural Resources, the MyRER will also provide RE industry players a guide on the direction of national RE development in Peninsular Malaysia, Sabah and Sarawak as well as expected economic spillover value of the RE resources development, among others.²²
- In 2019, the government of Malaysia approved the **Malaysia Electricity Supply Industry 2.0 ("MESI 2.0")**,²³ a 10-year master plan to reform the power industry in Malaysia. MESI 2.0 aims to achieve three goals: increase industry efficiency; future-proof the industry structure, regulations and key process; and empower consumers, democratise and decentralise the electricity supply industry in Malaysia.²⁴ Key reforms set out in MESI 2.0 include: (a) establishing

a hybrid generation market by opening up for capacity and energy market and abolishing the guaranteed capacity and energy payments which are commonly provided under Malaysian PPAs; (b) enabling conventional independent power producers to source their own fuel (coal and gas); and (c) enabling third-party access for transmission and distribution. The status of the MESI 2.0 is unclear, as the government indicated in March 2021 that it would be reviewed.

4. RE PROGRAMMES

- **Large-scale solar PV plants competitive bidding programme**

Development of grid-connected large scale solar projects in Peninsular Malaysia which is run through a competitive bidding process and regulated by EC.

- **FiT programme**

A system which allows approved electricity producers to sell electricity produced from RE resources, such as biomass (inclusive of municipal solid waste), biogas (inclusive of landfill/sewage) and small hydro, to power utilities at a prevailing FiT rate. This system is administered and implemented by SEDA.

- **NEM scheme**

A scheme which allows consumers of TNB to generate, use and sell excess energy produced from an solar PV system installed at the consumer's premises back to TNB at a prevailing rate, the amount earned by the consumers which will then be credited and set-off against the consumer's electricity bill. SEDA is also the implementing authority for this scheme.

²¹ [Malaysia Renewable Energy Roadmap 2035 \(MyRER\)](#).

²² The Edge Markets article titled "[Putrajaya kicks off Renewable Energy Roadmap to achieve 40% RE capacity by 2035](#)" (30 December 2021).

²³ [Reimagining Malaysian Electricity Supply Industry \(MESI 2.0\)](#) issued by Ministry of Science, Technology and Innovation.

²⁴ [Towards a World-Class Energy Sector](#) issued by EC.

- **Self-consumption scheme**

A scheme which allows consumers of TNB to generate and use electricity (but not sell excess energy) produced from a solar PV system installed at the consumer's premises.

- **New enhanced dispatch arrangement**

A programme introduced by EC to enhance competition and cost efficiency in the electricity market by allowing certain large scale solar plants, and non-PPA/service level agreement ("SLA") generators such as co-generators, RE generators or producers, embedded generators and expired PPA/SLA generators to operate as "Merchant Generators", to sell energy to the Single Buyer at a prescribed price.

5. GOVERNMENT INCENTIVES

- **Green Technology Financing Scheme ("GTFS")**

GTFS is a financing programme offered to corporate borrowers or investors who are in the business of developing green technology projects, which include RE projects. The Malaysian Green Technology and Climate Change Centre (formerly known as GreenTech Malaysia or Green Technology Corporation) ("MGTC") is the main implementing agency of the GTFS. The first version of the GTFS expired in 2017 while GTFS 2.0 ran up to the end of 2020. Under GTFS 2.0, an eligible producer would be entitled to a rebate of 2% p.a. interest/profit rate subsidy for the first seven years of its financing, and the Malaysian government would also guarantee up to 60% of the loan/financing amount.

The National Budget 2021 speech announced by the Prime Minister on 1 July 2020 reiterated the government's aspiration

to promote Malaysia as a regional hub for sustainable finance. This is echoed in MGTC's extension of the GTFS scheme,²⁵ referred to as the new "GTFS 3.0". The government intends to allocate a fund size of RM 2 billion in GTFS 3.0, and the scheme will open for applications for two years up to the end of 2022. To date, the guidelines for application of GTFS 3.0 has not yet been published by MGTC.

- **Green Investment Tax Allowance ("GITA")²⁶**

GITA refers to the investment tax allowance offered for the development of green technology projects. Briefly, the GITA will be applicable towards 100% of qualifying capital expenditure (i.e. purchase of assets by a qualifying company verified by MGTC) for the development of green technology projects. RE projects are considered a qualifying green technology project, which include biomass, biogas, mini hydro, geothermal and solar PV projects (where such projects have been approved by EC or SEDA). The GITA may be offset against 70% of statutory income in the relevant year of assessment. For applications to the Malaysian Investment Development Authority ("MIDA") made from 1 January 2020 to 31 December 2023, the incentive period will be three years from the first date of qualifying capital expenditure incurred. Applications for the GITA are to be considered by both MIDA and MGTC.

- **Green Income Tax Exemption ("GITE")**

Another scheme managed and implemented by MIDA is the GITE,²⁷ which refers to the income tax exemptions which are applicable towards 70% of statutory income from the year of assessment for companies that deliver green technology services. Such qualifying green technology services include the implementation of RE projects such as

²⁵ [Malaysia's Budget 2021 Speech](#).

²⁶ Guideline on Application for Incentive and/or Expatriate Posts for Green Technology (w.e.f. 5 October 2020) issued by MIDA and

Green Technology Tax Incentive Guidelines issued by MGTC (w.e.f. 13 October 2020)

²⁷ *Ibid.*

system design, feasibility design and study, provision of advisory, consultancy, testing and commissioning under the purview of the renewable energy sector. The incentive period for GITE will be three years starting from when the first invoice related to such services is issued.

Taking a special recognition to solar PV projects, since early 2020, MIDA has offered income tax exemptions of 70% on statutory income ("**GITE Leasing**") of companies implementing solar PV leasing activities for a period of up to 10 years of assessment. It is a pre-requisite that the applicant must be a registered solar PV investor under the purview of SEDA and has obtained approval from SEDA to develop solar PV project(s) with minimum installed capacity of 3MW aggregated under the NEM programme and/or under self-consumption programme.

Applications for the GITE are to be considered by MIDA and the MGTC (save for GITE Leasing which shall be considered by MIDA and SEDA).

The above list of government incentives is not exhaustive.

6. KEY ISSUES IN RE SECTOR

- **Suitability of land**

A key consideration for investors and developers of RE projects (particularly large-scale solar projects) is the suitability of land. In Malaysia, land is subject to various categories of use and may also be subject to restrictions in interest (e.g. where the dealing of the land may be subject to approval from the respective State Authority). Developers have to ensure that the necessary approvals are obtained and the category of use imposed on the land is suited to the development.

- **Interconnection facilities**

In assessing the viability of projects, developers of RE plants also need to consider the technical requirements and the financial costs of laying transmission lines to connect to existing interconnection facilities or to develop new interconnection facilities to connect to the grid. Developers also need to consider the approvals or arrangements that may be required from the relevant authorities or with private landowners.

- **Foreign equity restrictions**

There is typically a 49% foreign equity cap imposed on participants in certain RE programmes in Malaysia. Foreign developers and investors who are keen to invest in RE projects in the country are advised to consider this carefully.

7. UPDATES AND DEVELOPMENTS

- **Cross-border electricity supply**

Malaysia has, since the 1980s, engaged in cross-border electricity trade with two neighbouring countries, Thailand and Singapore. Following the issuance of the revised Guide for Cross-Border Electricity Sales by the Energy Commission in October 2021, while participants under the Cross-Border Electricity Sale Scheme may still export RE to Thailand, the export of RE to Singapore is currently not permitted. This revised position is aimed at boosting the development of the local RE industry and to meet local climate change commitments.

- **Renewable Energy Certificates (RECs)**

In November 2021, the Ministry of Energy and Natural Resources launched the Green Electricity Tariff programme which allows domestic and industrial consumers in Malaysia to subscribe to electricity produced from RE sources such as solar and hydropower. In return, subscribers will be

entitled to receive a Malaysian Renewable Energy Certificate (mREC) which is redeemed from the internationally recognised I-REC registry. This opens up another avenue for Malaysian consumers to meet their sustainability goals.

- **Waste-to-energy**

As part of the Malaysian government's efforts to increase the RE mix and treat municipal solid waste effectively, the Ministry of Housing and Local Government had, in 2020, announced its plans to develop six waste-to-energy plants by 2025. Request for proposals for several plants have since been issued.

MYANMAR



1. MAIN TYPES OF RENEWABLE ENERGY ("RE") BEING DEVELOPED

The main types of RE in Myanmar are hydropower and natural gas. Currently, the country's electricity originates from 83 power plants, including 62 hydropower stations, 20 gas-fired plants, and one coal power plant. Myanmar has a poor electrification rate with approximately 70% of the rural population relying on kerosene, candles, batteries, and power generators for daily use.

The electricity generation in Myanmar (2020) is as follows:²⁸

Electricity Generation in Myanmar (2020)					
Source of Generation	Hydro	Natural Gas	Coal	Solar	Total
Total Generation Mix (Megawatts)	1990 (52%)	1,722 (45%)	76 (2%)	40 (1%)	3,838 (100 %)

2. KEY REGULATORS AND STAKEHOLDERS

The Ministry of Electricity and Energy ("**MOEE**") is responsible for the electricity industry in Myanmar. It is divided internally into two branches, the Electric Power branch and the Energy branch. Although private sector participation is permitted for projects for electricity generation, the sale and distribution of the produced electricity is strictly limited to government entities as offtakers.

Among these include the Electric Power Generation Enterprise ("**EPGE**") (formerly the Myanmar Electric Power Enterprise) which operates government electricity generation assets and plans the future generation of electricity in conjunction with the Department of Electric Power Planning (DEPP). EPGE buys electricity from private producers and sells electricity to distributors (such as the Yangon Electricity Supply Corporation and the Mandalay Electricity Supply Corporation).

²⁸ International Trade Association, "[Burma - Country Commercial Guide \(Energy\)](#)" (27 September 2021)

The Hydro Generation Enterprise ("**HPGE**") is another state-owned enterprise which is controlled by the Department of Hydropower Planning and the Department of Hydropower Implementation. HPGE is responsible for all hydroelectric projects and is the main offtaker for electricity produced by hydroelectric independent power producers (IPPs). HPGE also operates and maintains all large-scale public sector hydroelectric facilities.

3. REGULATORY FRAMEWORK AND SECTORAL POLICIES

The Myanmar Electricity Law of 2014 is currently the main piece of legislation governing the electricity sector in Myanmar. It provides for the formation of the Electricity Regulatory Commission ("**ERC**"), grants regulatory responsibilities to ERC and authorises the Ministry of Electric Power (MOEP), region and state governments, and leading bodies of self-administrated zones and self-administrated divisions the power to grant permits to entities to engage in electricity-related works such as generation, transmission, and distribution, thereby encouraging foreign and domestic investments in power projects.

Currently, there is no specific legal framework for RE in Myanmar. By way of policy, the development of medium and small projects (of capacity less than 30 MW), that are not connected to the grid, requires the permission of state and regional governments respectively. For large power projects, a permit from the Myanmar Investment Commission ("**MIC**") issued under the Myanmar Investment Law 2016 is required. Other regulatory institutions include the Directorate of Investment and Company Administration and the Central Bank of Myanmar.

In terms of RE and electrification targets, the Myanmar Energy Master Plan, which was published in January 2016, makes projections of the long-term energy demand and fuel supply mix up to the year 2030. The Myanmar Energy Master Plan anticipates that the share of solar and wind in the total energy mix by 2030 will be around 1.2%. Myanmar's National Electrification Programme 2015 ("**NEP**") aims to connect all Myanmar

households to a supply of electricity by 2030. As of 2017, Myanmar's electrification rate was 39%. The NEP targets an electrification rate of 50% by 2020, 75% by 2025 and 100% by 2030.

The NEP comprises a grid extension programme and an off-grid programme. In the short- to medium-term, off-grid solar home systems and mini-grid solar/solar/hybrid projects aim to connect households in remote locations where the costs of grid access are prohibitively expensive.

4. RE PROGRAMMES

Currently, Myanmar only has one utility-scale solar power project that has reached full commercial operation, the 170 MW Minbu solar project located in Minbu Township, Magwe Region.

Other than non-utility scale rooftop solar projects, there is a general paucity of developed solar projects in the pipeline. Several additional projects are in various stages of discussion and documentation and, if realised, could contribute an additional 1.3 GW of solar capacity. Currently, Myanmar does not have any regulations aimed specifically at the solar rooftop business and does not operate a net metering scheme.

With funding from the World Bank, the Asian Development Bank and other international development finance organisations, off-grid household solar projects and mini-grid solar projects have been a key driver of electrification in Myanmar. To date, they have mostly been utilised for households, villages, schools and hospitals, although such initiatives have been stalled since the military coup in February 2021.

In terms of Power Purchase Agreements ("**PPAs**"), Myanmar does not use a standard form PPA and they are negotiated on a project-by-project basis. The terms of the PPA are negotiable and vary greatly between 20 to 30 years.

The PPA for the Myingyan 225 MW gas-fired power project, which was executed in 2016, was drafted with the assistance of the International Finance Corporation and other international transaction advisers to the Myanmar Electric Power Enterprise (now EPGE). The PPA was

comprehensive and consistent with the risk allocation generally expected in emerging markets.

The Myingyan PPA was expected to form a precedent for future gas-fired projects. However, in practice, this agreement has been substantially amended for subsequent projects.

There are no other model RE PPAs in Myanmar at present.

5. GOVERNMENT INCENTIVES

Currently, Myanmar does not provide any incentive schemes for RE projects specifically. However, foreign investors are typically entitled to a package of tax incentives under the Myanmar Investment Law once they have obtained a MIC permit or endorsement.

Income tax holidays are potentially available for foreign sponsors for periods of three, five or seven years, subject to MIC's discretion and the zone in which the project is located. Zone 1 includes the least developed areas of Myanmar, excluding Yangon and Nay Pyi Taw; Zone 2 (moderate) includes more developed zones, and Nay Pyi Taw, but still excludes Yangon; and Zone 3 (developed zones) includes Yangon and Mandalay. The income tax holidays are inclusive of the year in which the project company begins operations.

An MIC permit may also grant exemptions of internal taxes on imported raw materials within the first three to seven years of commercial production, exemption or relief from income tax on profits of the business kept in reserve funds and reinvested in the business within one year, the right to deduct accelerated depreciation from the profit regarding machinery, equipment, building and assets, and exemption or relief of customs duty or domestic taxes on imported machines and other equipment during the period of construction.

6. KEY ISSUES IN RE SECTOR

• Lack of feed-in tariff ("FiT") scheme

The average generation cost of hydropower varies from MMK 35 to 70 per kilowatt-hour,

while gas costs vary from MMK 120 to 130 per kilowatt-hour based on the 2019 new tariff pricing which was counted by electricity consumption units and categorised by domestic and industrial channels.²⁹ The electricity generation rates of all power plants remain unable to provide enough feed for electricity demand. Tariffs for renewable and non-renewable electricity projects in Myanmar are negotiated on a project-by-project basis. There is no prescribed FiT, each project is considered on a case-by-case basis.

• Lack of transparency in the process to obtain permits

ERC (that is to be formed under the Electricity Law) is yet to be formed. There are no clear procedures issued by MOEE on application by private investors seeking to get involved in the RE sector and power production.

• Potential time delay in land acquisition and conversion for project use

Land law in Myanmar remains to be complicated with various types of land which includes Grant land, Farmland, Agricultural land, Permit/licensed land, Vacant/Virgin land, Industrial land and Religious land. Commonly, land acquisition for electrification projects is made on Farmland or Agricultural land which does not permit any other activity apart from farming and agricultural purposes. Such land is then converted to La Na 39 land, which is a category named for its authorisation under Article 39 of the Land Nationalisation Act 1953. La Na 39 land is basically recategorised for use of other purposes including electricity production. This conversion process takes time and may cause delay with the land acquisition.

• PPAs

Compensation on termination for PPAs is determined on a case-by-case basis. Although recent PPAs have included detailed termination payment provisions consistent with regional precedent, lenders are entitled to recover the value of the debt when EPGE opts to take the plant. EPGE is not obliged to

²⁹ *Ibid.*

take the plant and pay compensation if the PPA terminates because of default on the part of the project company.

7. UPDATES AND DEVELOPMENTS

Currently there are no RE certificates, licenses or permits issued under the Electricity Law. There are also no waste-to-energy programmes and carbon trading schemes. It is reported that the MOEE is drafting a RE law since 2018, but it has yet to be published to the public.

PHILIPPINES



1. MAIN TYPES OF RENEWABLE ENERGY ("RE") BEING DEVELOPED

The RE mix in the Philippines consists of geothermal, hydropower, solar, biomass, and wind sources. In 2020, RE accounted for 21.2% (21,609 GWh) of the total power generated in the Philippines, of which 49.8% was geothermal, 33.3% hydropower, 6.4% solar, 5.8% biomass, and 4.7% wind.³⁰ As of 30 September 2021, there was a total of 933 RE projects in the Philippines.³¹

2. KEY REGULATORS AND STAKEHOLDERS

Key Regulators

- The **Department of Energy ("DOE")** – executive department of the Philippine Government responsible for preparing, integrating, coordinating, supervising, and controlling all plans, programs, projects, and activities of the Government relative to energy exploration, development, utilisation, distribution, and conservation.
- The **Energy Regulatory Commission ("ERC")** – an independent regulatory body responsible for promoting competition, encouraging market development, and ensuring customer choice. It exercises quasi-judicial, investigative, and regulatory powers.
- The **Philippine Electricity Market Corporation ("PEMC")** – a non-stock, non-profit corporation that acts as the governance arm of the Wholesale Electricity Spot Market ("WESM"), the centralised market for trading electricity.
- The **Independent Electricity Market Operator of the Philippines ("IEMOP")** – a non-stock, non-profit corporation that serves as the independent market operator of the WESM and the central registration body for Retail Competition and Open Access ("RCOA"). Under the Electric Power Industry Reform Act of 2001 ("EPIRA"), RCOA refers to the mechanism that gives the end-users with a certain minimum monthly average peak

³⁰ 2020 Department of Energy (DOE) Power Statistics, available [here](#) on the DOE website.

³¹ Summary of Renewable Energy (RE) Projects under the RE Act of 2008 (as of 30 September 2021), available [here](#) on the DOE website.

demand the opportunity to secure retail supply contracts from licensed suppliers.

The ERC, PEMC, and IEMOP were created pursuant to the EPIRA.

Key Stakeholders in four main sectors are:

- **Generation sector:** Among the key generators in the Philippines are the Power Section Assets and Liabilities Management Corporation, and the generation companies of Aboitiz Power, San Miguel, First Gen, and AC Energy groups.³²
- **Transmission sector:** The National Transmission Company ("NTC"), a government corporation, owns the country's transmission assets. The National Grid Corporation of the Philippines ("NGCP"), a private corporation, has a 50-year franchise for the operation, maintenance, and management of such assets pursuant to the privatisation scheme contemplated in the EPIRA.
- **Distribution sector:** Currently, distribution utilities ("DUs") are mostly private corporations or electric cooperatives. The Manila Electric Railroad and Light Company (Meralco) is the largest private electric distribution utility company in the Philippines covering 36 cities and 75 municipalities.³³
- **Supply sector:** To date, there are 72 licensed retail electricity suppliers ("RES") (44 RES³⁴ and 28 local RES³⁵), many of which are associated with generation companies and DUs.

3. REGULATORY FRAMEWORK AND SECTORAL POLICIES

The EPIRA and the Renewable Energy Act of 2008 ("RE Act") are the major laws governing the energy sector.

The EPIRA mandated the restructuring of the electric power industry, privatisation of the government's generation assets, the operation of

the government's transmission assets, and creation of the WESM and RCOA to increase efficiency and competition in the industry. It also created the ERC to oversee the implementation of the mandates of the EPIRA.

The RE Act provides the framework for the accelerated development, advancement, and utilisation of RE resources in the Philippines to achieve energy self-reliance. It directed the implementation of various government programmes to promote RE in the Philippines which are discussed in section 4 (RE Programmes) below.

4. RE PROGRAMMES

• Feed-in tariff ("FiT")

Under the FiT system, eligible plants receive a guaranteed fixed payment for a given period of time for electricity generated from RE technologies and delivered to the grid. On-grid consumers supplied with electricity through the grid shall share in the cost of the FiT through a uniform charge and applied to all billed kilowatt-hours. The funds shall be collected by the NGCP, DU, and suppliers from their respective customers and remitted to a fund administered by the NTC for distribution to the eligible RE plants.

• Net metering

The net metering program allows customers who use eligible RE systems (i.e., wind, solar, biomass, biogas, or other RE systems capable of being installed in the premises of the customer) to have a two-way connection to the grid. Net-metering allows customers to export and import energy to/from the grid, and they would only be charged or credited the difference between the imported and exported energy.

• Renewable Portfolio Standards ("RPS")

The RPS mandates electric power industry participants to source or produce a specified portion of their electricity requirements from eligible RE resources. The DOE sets the

³² 37th Electric Power Industry Reform Act (EPIRA) Implementation Status Report, Pages 55-58, available [here](#) on the DOE website.

³³ Corporate Profile available [here](#) on the Meralco website.

³⁴ List of RES, available [here](#) on ERC website.

³⁵ List of Local RES, available [here](#) on ERC website.

minimum annual RPS requirements which must be complied with by on-grid and off-grid electric power industry participants.

- **Green Energy Option Program ("GEOP")**

The GEOP is a mechanism established by the DOE to provide end-users with the option to choose RE resources as their source of energy. Under the GEOP, qualified end-users (i.e., end-users with an average peak demand of 100 kW and above for the past 12 months) have the option to contract directly with an RE supplier.

- **RE Market ("REM")**

The REM is a market for RE developers to trade RE Certificates. It was established in 2019 and trading thereon began in June 2021.³⁶ It was created as a venue for trading of RECs (which represent the amount of power generated from RE resources) and a facility for compliance with RPS obligations.

- **Green Energy Auction ("GEA")**

The GEA is a mechanism which facilitates the selection of eligible RE plants through a competitive selection process or auction. RE plants that have been built and will be built after the RE Act may offer their uncontracted capacity for bidding under the GEA program.

5. GOVERNMENT INCENTIVES

Among others, RE developers are entitled under the RE Act to:

- an income tax holiday for seven years from the start of commercial operations;
- special realty tax rates which shall not exceed 1.5% of the original cost less accumulated normal depreciation or book value on equipment and machinery;
- zero percent value-added tax rate on sale of fuel or power generated from RE;
- cash incentive for RE developers for missionary electrification;
- tax exemption of carbon credits; and
- priority connection to the grid.

6. KEY ISSUES IN RE SECTOR

A key issue in the industry is that foreign equity in entities engaged in the exploration, development, and utilisation of natural resources is limited to 40%. Thus, foreign entities interested in investing in the RE industry in the Philippines (except biomass) can acquire only minority holdings and must generally partner with Philippine entities to do so.

Another issue that potential investors in the RE industry face is the public ownership requirement for generation companies. Under the EPIRA, existing generation companies, which are not publicly listed, are required to offer and sell to the public a portion not less than 15% of their common shares of stocks within five years from the effective date of the EPIRA. New companies must comply with the public offering requirement within five years from the issuance of their certificate of compliance.

7. UPDATES AND DEVELOPMENTS

Please refer to section 4 (RE Programmes) above.

³⁶ [DOE Advisory dated 18 August 2020](#), available on the DOE website.

SINGAPORE



1. MAIN TYPES OF RENEWABLE ENERGY ("RE") BEING DEVELOPED

Given Singapore's land scarcity, resource constraints, and local weather conditions, its RE options remain somewhat limited. Natural gas, the cleanest fossil fuel available, is Singapore's key fuel source and accounts for about 95% of its electricity supply.

Nonetheless, Singapore has seen active developments particularly in the area of solar energy, which remains Singapore's most promising RE source. Being now one of the most solar-dense cities in the world with an average annual solar irradiance of 1,580 kWh/m²/year and about 50% more solar radiation than temperate countries,³⁷ solar photovoltaic ("PV") generation has the greatest potential for wider deployment in Singapore. Singapore has witnessed a steady increase in the number of solar PV installations over the years, with 4,585 installations as at end Q1 2021.³⁸ In July 2021, Singapore also unveiled the completion of one of the world's largest floating solar farms, spanning an area the size of 45 football fields and comprising 122,000 solar panels on the surface of Temeh Reservoir.³⁹ Besides solar energy, Singapore is also working on increasing its RE imports, as well as exploring the potential of harnessing geothermal energy as a potential source of indigenous clean energy following new developments in technology.⁴⁰

Today, Singapore continues to support research and development for low-carbon alternatives in key areas such as hydrogen and carbon capture, utilisation and storage. In October 2021, the Singapore government awarded S\$55 million to support 12 projects on low-carbon energy technology solutions.⁴¹ Singapore has also signed Memorandums of Understanding with Australia and Chile to exchange knowledge and experience in low-carbon hydrogen.⁴²

³⁷ Energy Market Authority ("EMA") website on [Solar Photovoltaic Systems](#).

³⁸ EMA website on [Installed Capacity & Number Of Grid-Connected Solar PV Systems](#).

³⁹ The Straits Times article titled "[How Singapore built one of the world's biggest floating solar farms](#)".

⁴⁰ EMA media release titled "[EMA to Explore the Potential of Geothermal Energy for Power Generation](#)" (26 October 2021).

⁴¹ Channel News Asia article titled "[Singapore intends to import 30% of its electricity supply from low-carbon sources by 2035](#)" 25 October 2021).

⁴² [Annual Report 2020/21: Smart Energy Sustainable Future \(2021\)](#) ("EMA Annual Report") at page 13.

2. KEY REGULATORS AND STAKEHOLDERS

Key Regulators

- **Energy Market Authority ("EMA")** is a statutory board under the Ministry of Trade and Industry and the main regulator overseeing the gas and electricity industries in Singapore.
- **Energy Market Company ("EMC")** operates Singapore's wholesale electricity market. It oversees the buying and selling of electricity from power generation companies ("**gencos**"), providing the IT systems, trading environment and governance.

Key Stakeholders

- **National Environmental Agency ("NEA")** is the leading public organisation that promotes the use of clean energy, clean technologies and efficient pollution control technologies in Singapore.
- **SP Group**
 - **SP PowerAssets** is the transmission licensee which owns the power grid delivering electricity islandwide.
 - **SP PowerGrid** operates the power grid that delivers electricity islandwide.
 - **SP Services** is the sole market support service licensee that sells electricity to non-contestable consumers and provides services such as meter reading, meter data management and facilitating customer transfers between retailers.⁴³
- **National Climate Change Secretariat (NCCS)** was established under the Prime Minister's Office (PMO) to develop and implement Singapore's domestic and international policies and strategies to tackle climate change.

3. REGULATORY FRAMEWORK AND SECTORAL POLICIES

The Electricity Act 2001 is the main legislation governing the electricity sector in Singapore. It seeks to regulate the generation, transmission, supply and use of electricity, as well as regulate the issuance of electricity licences in Singapore. The Market Rules, administered by EMC, governs the wholesale operations of Singapore's national electricity market, including the activities of market participants. As the market regulator, EMA also introduces new policies and Codes of Practice from time to time to keep abreast with the changing environment in the energy market.⁴⁴

In the Singapore Budget 2022, Singapore announced its commitment to meeting its new net-zero carbon emissions timeline by or around mid-century. Since achieving its solar deployment target of 350MWp in 2020, Singapore is currently on track to achieving its new goal of 2 GWp of solar capacity by 2030 – the equivalent of powering the annual needs of about 350,000 households and constituting about 4% of Singapore's total electricity demand in 2030. In tandem with increasing solar capacity, Singapore hopes to meet its Energy Storage Systems (ESS) target of at least 200 MW beyond 2025,⁴⁵ and intends to tap into regional power grids to import 30% of its electricity supply from low-carbon sources by 2035 (translating to about 4 GW of low-carbon electricity).⁴⁶

4. RE PROGRAMMES

Singapore does not provide subsidies such as feed-in tariffs or utilise net metering. Instead, Singapore focuses on regulatory enhancements to facilitate registration and participation of consumers and businesses who wish to sell their excess solar electricity back to the grid. For instance, EMA's Enhanced Central Intermediary Scheme introduced in 2017 allows consumers with solar capacity of less than 10MWac to register with SP Services directly and be paid at the prevailing half-hourly wholesale energy price

⁴³ Open Electricity Market website on [Market Overview - Singapore's Electricity Market](#).

⁴⁴ EMA website on [Electricity Policies and Regulations](#).

⁴⁵ EMA Annual Report at page 11.

⁴⁶ Channel News Asia article titled "[Singapore intends to import 30% of its electricity supply from low-carbon sources by 2035](#)" (25 October 2021).

for their solar energy excess.⁴⁷ Proposed enhancements moving forward include the implementation of an intermittency pricing mechanism to ensure fair cost allocation of reserves and regulation charges on all generation sources.⁴⁸

Despite Singapore's limited land availability for renewable projects, corporate power purchase agreements ("PPAs") have continued to gather momentum in Singapore. One notable project is Microsoft's clean energy deal with the local Sunseap Group in March 2018, a 20-year PPA for Microsoft to purchase 100% of the renewable output from Sunseap's 60MWp solar project to power its data centres in Singapore.⁴⁹ In 2014, Singapore also launched SolarNova, a government-led programme to promote and aggregate solar demand across government agencies.⁵⁰

To facilitate imports of low-carbon electricity, EMA has indicated its intention to issue at least two Requests for Proposal ("RFP") to import electricity into Singapore on a competitive bid basis. EMA has since issued the first RFP (RFP1) in November 2021 for the import of up to 1.2 GW of low-carbon electricity with estimated delivery to take place by 2017. In March 2021, EMA had appointed YTL PowerSeraya Pte Ltd for a trial to import 100MW of electricity from Peninsula Malaysia.⁵¹ Other electricity imports trials include a pilot with a consortium led by PacificLight Power Pte Ltd to import 100 MW equivalent of non-intermittent electricity from a solar farm in Pulau Bulan, Indonesia (expected to be commissioned by around 2024), and a Lao PDR-Thailand-Malaysia-Singapore Power Integration Project to import up to 100 MW of power from Lao PDR to Singapore via Thailand and Malaysia using existing interconnections, from 2022 to 2023.⁵²

5. GOVERNMENT INCENTIVES

Singapore introduced a carbon tax via the Carbon Pricing Act 2018 to motivate corporates to reduce their carbon emissions or switch to more energy efficient technologies. The current carbon tax (at S\$5 per tonne of emissions) will be raised to S\$25 per tonne in 2024 and 2025, with a view to hit S\$50 to S\$80 per tonne by 2030. Large emitters may purchase carbon credits to offset up to 5% of taxable emissions from 2024. It is hoped that the increase in carbon tax, coupled with allowing for offsets as a means for reducing tax liability, will help encourage a shift towards clean energy.⁵³

Businesses can also purchase Renewable Energy Certificates ("RECs")⁵⁴ which are tradable assets representing green energy generated by RE sources. With RECs, solar energy generators can monetise their solar panel systems, while non-generators can offset their carbon emissions.⁵⁵

The Singapore government has primarily focused its financial support for renewables on improving energy or resource efficiency. The Energy Efficiency Fund (E2F), for instance, subsidises up to 50% of qualifying costs for businesses' resource efficient design or adoption of energy efficient equipment technologies. EMA's Genco Energy Efficiency Grant Call also offers up to 50% of qualifying costs to encourage gencos to invest in such energy-efficient equipment or technologies.

To incentivise research and development in renewables, the Singapore government has actively supported initiatives such as the Renewable Energy Integration Demonstrator ("REIDS") initiative in 2014 – Southeast Asia's first major RE integration microgrid testbed. REIDS provides a platform for researchers and the industry to develop, test and demonstrate the integration of RE technologies on Singapore's Semakau landfill.⁵⁶

⁴⁷ EMA website on [Guide to Solar PV](#).

⁴⁸ EMA website on [Upcoming Enhancements](#).

⁴⁹ Economic Development Board website, "[Microsoft and Sunseap sign agreement on largest-ever solar project in Singapore](#)" (1 March 2018).

⁵⁰ Housing Development Board website on [SolarNova](#).

⁵¹ EMA website on [First Request for Proposal \(RFP1\)](#).

⁵² EMA website on [Electricity Imports](#).

⁵³ The Business Times article titled "[Budget 2022: Quick Takes on carbon taxes and other green initiatives](#)" (18 February 2022).

⁵⁴ One REC is the equivalent of 1MWh of electricity produced by solar panels.

⁵⁵ Solar AI Technologies website, "[Switching to Solar in Singapore: Top 3 Financial Incentives](#)" (13 May 2021).

⁵⁶ Nanyang Technological University (NTU) website, "[Renewable Energy Integration Demonstrator – Singapore](#)".

6. KEY ISSUES IN RE SECTOR

Due to limited land availability in Singapore which impedes large-scale solar deployment, Singapore will likely focus on RE imports and research and development rather than onshore generation to help Singapore meet its new net-zero carbon emissions timeline by or around mid-century. Land constraints have also spurred movement towards the creative use of building-integrated PVs and reservoirs or offshore spaces for floating solar deployment. The recently introduced Energy (Resilience Measures and Miscellaneous Amendments) Act in 2021 seeks to amend several key legislations in Singapore to safeguard energy security (in particular, the reliability, availability and continuity of the supply of electricity) by enabling EMA to construct, acquire and manage electricity infrastructure required for the generation, import or export of electricity. It is believed that this will help reduce curtailment risk and connectivity issues overall and facilitate Singapore's green energy transition.

While there is no specific restriction on foreign ownership of electricity companies or generation assets, approval from EMA is required for any acquisition of equity interests in designated electricity licensees, designated entities and designated business trusts relating to transmission systems resulting in a change in shareholding or ownership beyond certain levels under section 30B of the Electricity Act 2001.⁵⁷

To prevent structural increases in electricity generation market concentration, EMA has also established a market share cap of 25% on the generation capacity market share of certain generation companies in Singapore, with the exception of several key gencos who will be subject to the higher of the 25% cap or their respective licensed capacity cap until the expiry of their generation licences.⁵⁸

7. UPDATES AND DEVELOPMENTS

As mentioned, energy users and businesses in Singapore can purchase RECs to fulfil their sustainability commitments. EMA recently launched a new Singapore Standard (SS) 673: Code of Practice for RECs in October 2021 to improve the integrity of measurement, reporting and verification requirements, providing more assurance on the credibility of RECs in the marketplace.⁵⁹

Given that about 37% of Singapore's waste is incinerated at its four waste-to-energy incineration plants, NEA has announced plans to construct Tuas Nexus – an Integrated Waste Management Facility ("IWMF") at Tuas View Basin with an incineration capacity of 5,800 tonnes/day. Besides incinerable waste, IWMF will also process source-segregated food waste, household recyclables and dewatered sludge from its adjacent used water treatment plant. Its first phase is targeted for completion by 2025.⁶⁰

July 2020 saw Senoko Energy launch a pilot programme to introduce peer-to-peer trading of RE, where rooftop solar producers experimented with selling their excess electricity directly to local consumers across the electricity network at their preferred prices.⁶¹ Beyond local trading, Singapore hopes to facilitate regional trading of clean electricity – as mentioned, RFPs have been issued for clean electricity imports, with three trials with Malaysia, Indonesia and Laos announced so far.⁶²

Singapore ventured into the voluntary carbon market scene in 2021 with Climate Impact X ("CIX") – a joint venture between four major players in the financial industry to create a global carbon exchange and marketplace for corporates to trade high quality carbon credits and support effective solutions to tackle climate change. A high bar is set on projects delivering credits to CIX and

⁵⁷ This section states that notice must be given to EMA if between 5% but less than 12% of the total equity interest is acquired in that licensee, entity or business trust. In addition, the same section provides that prior approval by EMA is required for anyone who seeks to become a 12% controller, a 30% controller or an indirect controller, or acquire as a going concern the business of that licensee, entity or business trust.

⁵⁸ EMA website, "[First Request for Proposal \(RFP1\) to Appoint Licensed Electricity Importers \(for Delivery by 2027\)](#)"

⁵⁹ EMA media release titled "[New Singapore Standard launch to support management and use of Renewable Energy Certificates](#)" (26 October 2021).

⁶⁰ National Environmental Agency website, "[Integrated Waste Management Facility \(IWMF\)](#)".

⁶¹ Senoko website on [SolarShare](#).

⁶² The Straits Times article titled "[Singapore to strengthen regional collaboration in clean electricity and hydrogen trading: Tan See Leng](#)" (26 October 2021).

CIX intends to utilise satellite monitoring, machine learning and blockchain technologies to provide transparent impact and pricing data to all its users.⁶³

In addition, the Singapore government recently announced its intention to issue green bonds of up to S\$35 billion by 2030 to fund public sector green infrastructure projects such as the Tuas Nexus IWMF, or to finance acceleration in infrastructure upgrades for electric vehicles.⁶⁴ The Land Transport Authority of Singapore is also looking to launch a large-scale tender in the first half of 2022 for the deployment of 12,000 charging points across nearly 2,000 Housing Development Board ("HDB") carparks, with the goal for all HDB carparks to have at least three charging points for electric vehicles from 2025.⁶⁵

Moving forward, it is believed that the Singapore government will continue to work actively with the private sector and regional partners to support and explore new initiatives to further the development of RE and technologies in Singapore.

⁶³ [Climate Impact X website](#).

⁶⁴ The Business Times article titled "[Budget 2022: Quick Takes on carbon taxes and other green initiatives](#)" (18 February 2022).

⁶⁵ Channel News Asia article titled "[LTA launching tender for deployment of 12,000 EV charging points across HDB carparks](#)" (29 March 2022).

THAILAND



1. MAIN TYPES OF RENEWABLE ENERGY ("RE") BEING DEVELOPED

In 2021, the RE sources for the electricity generation in Thailand include biomass (5,028 MW), solar (3,839 MW), wind (1,540 MW), bio-energy (540 MW), waste energy (496 MW), hydropower (163 MW) and other types of RE (379 MW).⁶⁶

2. KEY REGULATORS AND STAKEHOLDERS

The main body with governmental oversight in the energy sector in Thailand is the Ministry of Energy, which manages the RE area through the following agencies:

- **Energy Policy and Planning Office ("EPPO")** – an agency under the Ministry of Energy overseeing the development of national energy policies and planning with due consideration of economic, social development and environmental protection, whereby such policies will be proposed to the National Energy Policy Council for further submission to the cabinet. Other duties of the EPPO include supervising, monitoring and evaluating the effectiveness of the national energy policy and energy management plans, as well as performing other duties designated by the cabinet or the National Energy Policy Council.
- **Department of Alternative Energy Development and Efficiency ("DEDE")** – an agency under the Ministry of Energy which is responsible for the supervision and promotion of efficient and conserving use of energy and aims to promote sustainability and environmentally friendly production and consumption of energy.
- **Energy Regulatory Commission ("ERC")** – an agency under the Ministry of Energy which has the authority and duties to regulate energy industry operations to be in compliance with the policy framework. ERC is empowered to issue regulations, rules and announcements to regulate issues in the

⁶⁶ Operating Plan, Expenditure Budget and Revenue Estimate for Fiscal Year 2022 prepared by the Energy Regulatory Commission, Page 25.

industry, such as granting licenses, setting standards for energy industry operations including tariff setting, and protection of the rights of energy consumers and energy industry operators by ensuring fair competition. The role of ERC also includes promoting economical and efficient use of energy, RE and energy that has minimal impact on environment.

With regard to electricity generation, transmission and distribution, the main state-owned power utilities are the Electricity Generating Authority of Thailand ("**EGAT**"), the Metropolitan Electricity Authority ("**MEA**") and the Provincial Electricity Authority ("**PEA**").

EGAT is the single buyer of bulk electricity, under terms and regulations set by the ERC and its main function involves procuring electricity from various sources. One main source is from EGAT's purchase of electricity from independent power producers (IPPs) (whose generation capacity exceeds 90 megawatts) and small power producers (SPPs) (whose generation capacity exceeds 10 megawatts but up to 90 megawatts), of which are licensed by ERC. EGAT then sells the electricity to MEA and PEA, among others, for further distribution to end-customers.

MEA is in charge of electricity distribution within the Bangkok metropolitan area. PEA, on the other hand, is in charge of electricity distribution within the other provinces of Thailand other than the Bangkok metropolitan area. In addition, MEA and PEA may directly purchase electricity, most of which is generated from renewable sources, from very small power producers (VSPPs) (whose generation capacity is up to 10 megawatts).

3. REGULATORY FRAMEWORK AND SECTORAL POLICIES

Major Laws and Regulations

- In Thailand, the development of national energy policies and planning is regulated by the National Energy Policy Council Act B.E. 2535 (1992) (as amended) ("**NEPCA**"). The NEPCA established the National Energy Policy Council, with EPPO acting as the

secretariat. The National Energy Policy Council's main duties include recommending national energy policies and national energy management and development plans to the cabinet, and monitoring, supervising, co-ordinating, supporting and expediting the operations of relevant government bodies to ensure that their operations comply with national energy policies and national energy management and development plans.

- The key legislation in relation to RE is the Energy Industry Act B.E. 2550 (2007) ("**Energy Industry Act**"). Pursuant to the Energy Industry Act, ERC is designated to regulate the energy industry (i.e., the electricity industry, the natural gas industry, or the energy network system business) undertaken anywhere in Thailand. The key objectives of the Energy Industry Act include promotion of competition in the energy business and prevention of abuse of power in energy business operations; promotion of efficient and environmentally responsible use of energy resources; and promotion of use of RE for electricity business operations with less impact on the environment.

Government Policies and Targets

- A main regulatory framework governing this sector is the recently updated (on October 2020) Alternative Energy Development Plan 2018-2037 ("**AEDP**") issued by the Ministry of Energy, as part of the overarching Power Development Plan. These plans set out the country's long-term planning for energy and paves the way for the operations of the energy industry. The AEDP aims to promote energy production by utilising RE resources and sets targets to achieve its objectives while taking into account the economic, social and environmental development of the country.
- The main target of the AEDP is to increase the share of RE in the form of electricity, thermal energy and biofuel to 30% of final energy consumption by 2037. The AEDP's total target for installed capacity of alternative energy generation is 18,696 MW in 2037.

4. RE PROGRAMMES

- **Feed-in tariffs ("FiT")**

Regulated by ERC, the FiT is one of the support programmes rolled out to promote the development of RE and various RE projects in Thailand. The FiT programme serves as a pricing incentive which applies to the price calculation under power purchase agreements ("PPAs").

- **Competitive bidding**

Further to the discussion of FiT, the basis on which projects were procured has changed from the first-come-first-serve method to the competitive bidding method. Under this competitive bidding method, the most cost-competitive (in terms of fixed FiT (FiT_F)) project offers will first be selected until the quota is met.

Generally, ERC will, from time to time, issue an announcement to tender for the purchase of electricity generated from a particular type of RE by applying the FiT pricing mechanism. Interested project developers of such type of RE would then need to submit an application to ERC for further selection. The successful bidder would then enter into a PPA with the relevant authority, i.e., EGAT, MEA or PEA, as the case may be.

- **Net metering**

Currently, Thailand does not have an official net metering programme or electricity billing mechanism which offers credits to those who generate excess electricity (mostly with their own solar panels) and send it back to the grid in order to use those credits to deduct from the actual amount of energy consumed as accounted for in the monthly electricity bill.

However, recently, ERC announced a regulatory sandbox for energy sector innovations ("**ERC Sandbox**") which was initiated to promote innovations in the sector

with various benefits and offerings. One of the programmes under the ERC Sandbox includes net metering which aims to test, research and develop its structure in order to help promote its use in the sector in the future.

5. GOVERNMENT INCENTIVES

Under the current investment promotion regime in Thailand, RE project developers may apply for the investment promotion certificate to obtain certain government incentives with the Office of the Board of Investment of Thailand ("**BOI**") under Category 7.1.1 (*Production of Electricity or Electricity and Steam*) of the list of activities which are eligible to apply for investment promotion prescribed by BOI.

To be eligible to apply for the investment promotion certificate, RE projects must be approved by relevant government agencies and the applicant must also comply with other conditions prescribed by BOI (if any).

Examples of the incentives under the BOI scheme include an 8-year corporate income tax exemption, exemption of import duty on machinery and permission for the foreign investor to own land used for the operation of the project.

6. KEY ISSUES IN RE SECTOR

- **Foreign equity and investment**

The Energy Industry Act provides that legal entities intending to apply for the licence to operate the electricity generation business must be incorporated under Thai law, but does not prohibit nor limit foreign ownership of the company. Therefore, up to 100% of the capital shares of the applying company may be held by foreign persons and/or entities. In such case, even though the foreign majority-owned company will be regarded as a "foreigner" under the Foreign Business Act B.E. 2542 (1999) (as amended) ("**FBA**"),⁶⁷

⁶⁷ Pursuant to Section 4 of the FBA, the term "foreigner" means any of the following:

- (a) a natural person who is not of Thai nationality;
- (b) a juristic person not registered in Thailand;
- (c) a juristic person registered in Thailand, being of the following descriptions:
 - (i) being a juristic person at least one half of capital shares of which are held by persons under (a) or (b) or a juristic person in which investment has been placed by the

- persons under (a) or (b) in the amount at least equivalent to one half of the total capital thereof; or
- (ii) being a limited partnership or a registered ordinary partnership the managing partner or the manager of which is the person under (a); or
- (d) a juristic person registered in Thailand at least one half of the capital shares of which are held by persons under (a), (b), or (c) or a juristic person in which investment has been placed

such company will **not** be required to obtain a foreign business licence. However, such company shall have the minimum capital for the commencement of the business operation in Thailand of not less than THB 2 million pursuant to the FBA.

- **Ownership of land**

Foreign companies are generally not permitted to own land in Thailand. However, if foreign developers of RE projects have obtained the investment promotion certificate from the BOI as mentioned above, they will be permitted to own land which will be used for the operation of the projects pursuant to the conditions of the investment promotion certificate.

and the recently launched Thailand Carbon Neutral Network (TCNN) in 2021, which aims to establish the Thailand Carbon Credit Exchange Platform.

7. UPDATES AND DEVELOPMENTS

- **Renewable Energy Certificate ("REC")**

In Thailand, EGAT is the authorised certifier of RE generation using the International Renewable Energy Certificate Standard ("Standard"). RE generation facilities that meet the Standard are eligible to be issued a REC for every unit of electricity generated. Nowadays, as an increasing number of companies around the world are committed to consume electricity from renewable sources as much as possible, those companies are in need of a reliable way to prove their RE consumption, of which the REC serves as evidence. Thus, the REC and their associated environmental attributes can then be sold by the certified developers of RE projects to any interested purchasers.

- **Carbon trading scheme**

There is currently no legal framework or mandatory programme on the carbon trading scheme in Thailand. However, carbon trading is one of the main issues addressed in the National Climate Change Master Plan 2015 – 2050 to achieve targeted emission reductions in key industries and promote energy efficiency. The Thai government and other relevant stakeholders have started several voluntary carbon trading mechanisms, such as the Thailand Voluntary Emission Reduction Program and the Thailand Carbon Offsetting Program in 2013,

by the persons under (a), (b) or (c) in the amount at least equivalent to one half of the total capital thereof.

VIETNAM



1. MAIN TYPES OF RENEWABLE ENERGY ("RE") BEING DEVELOPED

As at the end of 2021, Vietnam has increased its total installed power capacity of all systems by 7.5 megawatts ("MW") from 2020 to 76,620 MW. The total installed power capacity from RE sources is 20,670 MW, accounting for 27% of the entire system. Specifically, hydropower accounts for around 30%, solar power accounts for around 23% and wind power accounts for around 5%. Biomass and waste energy only account for a small percentage.

As of 31 October 2021, among the 146 wind power projects that have entered into power sale and purchase agreements ("PPAs") with the Vietnam Electricity Group ("EVN") (with a total capacity of around 5,755 MW), 84 projects have achieved commercial operation with a total capacity of around 3,980 MW. Investors were required to operationalise their wind power projects by this date in order to be eligible for the Feed-in-Tariff ("FiT") price (FiT 2) that was set in the Prime Minister's Decision 39/2018/QD-TTg dated 10 September 2018.

For solar power projects, as of 31 December 2020, 148 projects have achieved commercial operation with total capacity of around 8,652 MW. Investors were required to operationalise their solar power projects by this date in order to be eligible for the FiT that was set in the Prime Minister's Decision 13/2020/QD-TTg. Most of the solar power projects are in the central and southern regions of Vietnam where there is high solar radiation.

2. KEY REGULATORS AND STAKEHOLDERS

The Government of Vietnam performs unified state management over electricity activities and usage nationwide through the Ministry of Industry and Trade ("MOIT").

Pursuant to Decision 2068/QD-TTg on Vietnam Development Strategy of Renewable Energy, MOIT is assigned to take primary responsibility in the development and utilisation of RE which shall, among others, design and propose policies, regulations and implementation plans to the government for consideration and approval, as well as ratifying and issuing the relevant guidelines relating to the RE sector.

The Ministry of Construction, Ministry of Science and Technology, Ministry of Finance, Ministry of Planning and Investment, and other ministries are responsible for cooperation with MOIT as well as concerned parties to promulgate and implement relevant specialised regulations, such as technical standards, tax policies, investment incentives, and policies regarding RE projects within their power and functions.

Electric grid management units are responsible for signing grid connection agreements with enterprises and purchasing produced electricity. EVN is authorised to purchase all power yields from RE projects.

3. REGULATORY FRAMEWORK AND SECTORAL POLICIES

There is currently no unified law regulating RE projects. There are several laws which regulate different areas and matters of a RE project. For example, the Law on Electricity (No. 28/2004/QH11) regulates the electricity sector; the Law on Investment (No. 61/2020/QH14) regulates investment policies and procedures for a project; and the Law on Construction (No. 50/2014/QH13) regulates construction activities.

Notably, the State has issued numerous separate legal documents, resolutions, and policies to specifically promote the development of the RE sector. Resolution 55-NQ/TW dated 11 February 2020 of the 12th Politburo emphasised the need for a comprehensive, sensible, and diversified development of sources of energy, with a special focus on effectively and completely utilising RE sources, new energy, and clean energy. The goal is for RE sources to reach 15-20% of the total preliminary power supply by 2030 and 25-30% by 2045, corresponding to 30% of nationwide energy production by 2030 and 40% by 2045 for RE production.

The above targets are generally consistent with the development strategy through 2030 and the vision for 2050 for RE under Decision 2068/QD-TTg on 25 November 2015 of the Prime Minister.

To implement the strategy, the government has adopted various special policies to encourage the use of RE, for example:

- Adopting a mechanism to encourage wind power development with the application of the FiT price (Decision 37/2011/QD-TTg; Decision 39/2018/QD-TTg).
- Adopting a mechanism to encourage the development of solar power projects in Vietnam (Decision 11/2017/QD-TTg).
- Stipulating project development and sample power purchase agreements applicable to solar power projects (Circular 18/2020/TT-BCT).
- Adopting a mechanism to support the development of biomass power projects (Decision 24/2014/QD-TTg; Decision 08/2020/QD-TTg).

4. RE PROGRAMMES

The government provides numerous incentive mechanisms for each RE source. For instance, the table below shows purchase price incentives for various RE sources.

RE type	Techno-logy type	Incentive mecha-nism & term of effect	Sale price (exclusive of value added tax (VAT))	Legal basis
Small-scale hydro power (below 30MW)	Power production	Avoidable cost tariff	Announced yearly by MOIT	For the year 2022, pursuant to Decision 131/QD-BCT dated 28 Jan 2022 of MOIT
Wind energy ⁶⁸	Onshore wind project	FiT for 20 years	8.5 UScents/kWh	Decision 39/2018/QD-TTg dated 10 Sept 2018 of the Prime Minister
	Offshore wind project	FiT for 20 years	9.8 UScents/kWh	
Biomass ⁶⁹	Co-generation of heat-electricity	FiT for 20 years	7.03 UScents/kWh	Decision 08/2020/QD-TTg dated 5 March 2020 of the Prime Minister
	Non Co-generation of heat-electricity	FiT for 20 years	8.47 UScents/kWh	
Waste energy ⁷⁰	Incinerate	FiT for 20 years	10.05 UScents/kWh	Circular 32/2015/TT-BCT dated

⁶⁸ For projects that achieved commercial operation from 1 November 2018 to 31 October 2021.

⁶⁹ For projects in operation from 25 April 2020 to date.

⁷⁰ For all projects to date.

RE type	Technology type	Incentive mechanism & term of effect	Sale price (exclusive of value added tax (VAT))	Legal basis
	Bury	FiT for 20 years	7.28 UScents/kWh	8 Oct 2015 of the MOIT
Solar energy ⁷¹	Floating solar	FiT for 20 years	7.69 UScents/kWh	Decision 13/2020/QĐ-TTg dated 6 April 2020 of the Prime Minister
	Ground solar	FiT for 20 years	7.09 UScents/kWh	
	Rooftop solar	FiT for 20 years	8.38 UScents/kWh	

To accelerate the development of the electricity market in general, the government is also implementing a roadmap to develop the electricity market on three levels: the competitive power generation market, the wholesale electricity market, and the retail electricity market. The competitive electricity generation market has been operating since July 2012, and 101 power plants now participate in the competitive electricity generation market. The competitive wholesale electricity market has been in operation since 2019 following the issuance of Circular 45/2018/TT-BCT, according to which EVN is no longer the sole electricity wholesaler, but five other power corporations also participate in buying electricity. Recently, MOIT issued Decision 2093/QĐ-BCT dated 7 August 2020 approving the plan for implementing a competitive electricity retail market.

5. GOVERNMENT INCENTIVES

In addition to incentive mechanisms on the electricity purchase price, RE projects in Vietnam also enjoy other government incentive programmes such as corporate income tax ("CIT") incentives, equipment import tax incentives, land use incentives, and access to finance.

The current general corporate income tax is 20%. However, new investment projects in RE generation would enjoy CIT exemption for the first four years from the year of generating taxable income, thereafter enjoy a preferential CIT rate of 5% for the following nine years after the fourth year, and 10% CIT for the next two years after the ninth year. Only after 15 years of having taxable

income will RE projects be subject to a general 20% CIT for the remaining years of the project.

RE projects with an investment capital of at least VND30,000 billion and disbursing at least VND10,000 billion within three years from the issuance date of the investment registration certificate or the approval for investment guidelines may potentially enjoy the special investment incentives under Decision 29/2021/QĐ-TTg of the Prime Minister. For example, the preferential CIT rate of 9% would be applied for a period of 30 years to incomes earned by the business entity from such RE projects. More favorable CIT rate may be given if such GE projects also satisfy the criteria on high technology projects, technology transfer, value added levels or having Vietnamese enterprise joining the value chain at certain levels.

RE projects also benefit from an import duty exemption for imported goods to establish fixed assets, materials, and semi-finished products which are not manufactured domestically.

In addition, other incentives include land use tax exemptions and land rental exemptions.

6. KEY ISSUES IN RE SECTOR

• Restrictions on foreign investment

There is no specific legal restriction of foreign investors in the electricity generation sector, i.e., a foreign investor can invest and own a 100% foreign-invested company to develop and implement RE projects in Vietnam.

As a result, Vietnam has seen significant inflows of foreign direct investment (FDI) in RE projects. That being the case, Vietnamese authorities still retain a sole discretion to appraise and grant approvals for foreign investors for a RE project subject to investor capacity and requirements for each specific project on a case-by-case basis.

In the field of transmission and distribution of electricity, these services have traditionally been closed to foreign investors because of the monopolistic role played by EVN and its

⁷¹ For projects that have acquired in-principle approvals before 23 November 2019 and have achieved commercial operation from 1 July 2019 to 31 December 2020.

subsidiaries. However, there have been some exceptions to cater for the sale of electricity to users outside of the national power system (and where EVN is not the offtaker).

- **Complex legal procedures to implement an RE project**

The procedures for investment project registration and implementation of a RE project in Vietnam are complicated. We set out below a broad summary of the stages of implementing an RE project.

- *Stage 1 (Preparation)*: The investor needs to first survey a potential project and site selection, conduct a pre-feasibility study, apply to include the project into the State's Power Plan (if not yet included), apply for an in-principle investment approval, and apply for an investment registration certificate for the project. The investor would need to incorporate a project company to develop the project.
- *Stage 2 (Development)*: The investor/project company shall conduct a feasibility study, issue technical designs for the power plant, sign key agreements (such as a land lease agreement, power purchase agreement, facility agreement, construction agreement etc.), and obtain necessary permits and licences (such as a construction permit, land use right certificate, registration of offshore loan (if any) for capital mobilisation etc.).
- *Stage 3 (Implementation)*: The investor/project company shall produce detailed designs, disburse capital and construct the power plant.
- *Stage 4 (Operation and Maintenance)*: The investor shall obtain an operation certificate, perform commission testing and obtain a connectivity licence and electricity generation licence.
- *Stage 5 (End)*: End of operation/suspension of operation of the project.

One of the main barriers for foreign investors to conduct a new RE project in Vietnam is the complicated legal procedures. Preparing and applying for investment licenses for a project is challenging and time-consuming. If a

project is not yet included in the State's Power Development Plan, it would take a long time to adjust and include the proposed new RE project into such plan first. Some foreign investors prefer to acquire existing projects that have already been licensed (albeit at a price premium) rather than pursuing a greenfield RE development project.

- **Challenges in obtaining land for RE projects**

Power projects normally require large areas of land to build power generation plants and transmission lines. Project locations may overlap and pass through densely populated areas, industrial areas, economic zones, and areas related to national security. The use of land for the implementation of power plants may raise concerns affecting the environment, security and public facilities. The main difficulties in obtaining land for RE project are related to land clearance and conversion of land use purposes. There could be disputes and conflicts in the land withdrawal and clearance process if land compensation is not satisfactory.

In addition, the procedures for conversion of land use purposes are lengthy and complicated, especially the conversion of land use purposes of different types of protected forest and national defence and security land into land for electricity production.

Therefore, investors need to carry out the investment preparation stage thoroughly and carefully. Cooperating with local authorities is crucial as local authorities play a critical role in the selection of a project site and location, as well as in the process of land acquisition, compensation and site clearance.

- **Power Purchase Agreements ("PPAs")**

MOIT issues PPA model contracts for RE projects. The form of PPA for solar power is issued under Circular 18/2020/TT-BCT, and the form of PPA for wind power is issued under Circular 02/2019/TT-BCT. In general, investors must execute the PPAs under the regulatory model contracts, and there is little opportunity to adjust the main content of the model contracts. Some of the necessary

adjustments that are specific to each specific project would be made through signing the appendices of the model contract on a case-by-case basis.

7. UPDATES AND DEVELOPMENTS

- **Diversified and balanced planning and apportionment of power sources**

RE sources, such as solar and wind power can fluctuate unreliably. Therefore, it is important to plan for a diversified and balanced use of power sources between renewable electricity and traditional electricity sources. There is also a need to consider how to apportion energy sources across regions. These are key issues considered by MOIT and other State agencies in promulgating the Power Development Plan VIII (the National Power Development Plan for the period of 2021 - 2030 with a vision to 2045).

- **Problems with existing legal and support framework for RE sector**

The government and relevant authorities are still in the process of reviewing the legal framework for RE projects, especially the FiT for solar power projects that have achieved commercial operation from 2021 until now and wind power projects that have achieved commercial operation from 1 November 2021 to date (which are not eligible for the FiT price), which may be expected to apply the competitive bidding and auction schemes for purchase of electricity generated from such projects. The lack of guidance and mechanism on the applicable FiT or another price scheme for such RE projects for quite a long time have caused several challenges to investors. The current legal framework also lacks many standards and conventions for RE projects. One of the recent concerns relates to the lack of technical requirements for the management and handling of equipment of a RE project, such as the inverter system, battery backup, charging of a solar power plant, and a turbine system of wind power due to environmental concerns. Accordingly, it is expected that moving forward, Vietnamese legislators will study and promulgate more regulations and policies to improve the legal framework to encourage the development as well as manage the market for RE in Vietnam.

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