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A GUIDE TO
RENEWABLE
ENERGY IN
SOUTHEAST ASIA



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FOREWORD



The Association of Southeast Asian Nations ("**ASEAN**") recognises the crucial role of energy in driving the region's growth. This has led to two key priorities: (1) energy security – to ensure reliable and affordable energy access for its growing population and economies; and (2) clean energy development – to create favourable conditions for ASEAN's goals in clean energy development, including promoting energy transition by embracing renewable energy ("**RE**") sources to combat climate change and foster sustainable development. ASEAN aims for a 23% RE share by 2025 in the ASEAN Energy Mix (or TPES: Total Primary Energy Supply), with discussions underway for an even more ambitious target soon.¹

Southeast Asia has abundant RE resources, but several hurdles remain, for instance, infrastructure (grids need modernisation to handle the variability of RE), the need for policy harmonisation (cross-border investment requires streamlined regulations and incentives), and community engagement (to ensure that local communities benefit from and participate in the transition).

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. 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 **January 2024**.*

¹ Priority Areas of Cooperation, ASEAN Energy Cooperation, link [here](#).

CAMBODIA



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

As of 2023, the RE sources in Cambodia are hydropower, solar and biomass. According to the report on the Salient Features of Power Development in the Kingdom of Cambodia until December 2023 issued by the Ministry of Mines and Energy ("**MME**") and Electricity Authority of Cambodia ("**EAC**"), the RE sources contributed 48.65% of the total energy resources in Cambodia. The table below illustrates the total energy production in Cambodia:

Sources of Energy in 2023			
		Energy Produced (GWh)	% in total Energy Production
RE	Hydropower	7,287.84	43.50%
	Solar power	804.05	4.79%
	Biomass power	61.54	0.36%
Non-RE	Coal	7,593.23	45.32%
	Fuel Oil	53.79	0.32%
Import	Thailand	167.42	0.99%
	Vietnam	717.94	4.28%
	Lao PDR	65.47	0.39%
Total		16,751.29	100%

2. KEY REGULATORS AND STAKEHOLDERS

- The **MME** is in charge of setting and administering policies, strategies and planning for the electricity sector.
- The **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 the environmental impacts of power/energy projects in general and for hydropower projects, respectively.

- The **Ministry of Economy and Finance ("MEF")** is also involved in discussions of potential government incentive plans such as net-metering and feed-in tariff ("**FIT**") schemes. In addition, MEF acts as a competent institution for leading and managing Public-Private Partnerships ("**PPP**") projects by reviewing and assessing the proposals and risks, respectively based on its policies, strategies, and planning.
- The **Électricité 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

The main law governing the power sector in Cambodia is the Law on Electricity dated 02 February 2001, which was subsequently amended twice on 22 June 2007 and 18 May 2015 ("**Electricity Law**"). Licences, electricity tariffs, transmission, technical standards are also regulated under other regulations such as Sub-decree, Prakas, principles, regulations orders, etc.

The specific regulations on RE in Cambodia are:

- The Solar Energy Connection Regulation for solar photovoltaic energy generation to be eligible for being connected to or synchronised with the national grid.

- Prakas No. 0159 on the Principles for Permitting the Use of Rooftop Solar Power ("**RSP**") in Cambodia dated 25 April 2023 was presented in a high-level forum hosted by the MME, however not yet officially available to the public. This Prakas aims to permit the use of RSP and to provide the management measures for such RSP permits.

Other newly adopted laws applicable to the RE sector include:

- The Environment and Natural Resources Code ("**Environment Code**") was adopted on 29 June 2023 and will come into force on 29 June 2024. This Environment Code provides certain provisions on energy and RE which aims are:
 - Supporting and promoting sustainable energy projects;
 - Promoting environmental technologies;
 - Encouraging and giving priority to projects that have energy efficient technology, low-carbon footprint, and waste discharge lower than the determined environmental standard;
 - Giving priority to power projects under development plans that provide the best energy security and energy sustainability;
 - Assessing the impacts of the projects in relation to the environment;
 - Permitting the use of RSP; and
 - Introducing tax incentives for RE and tax exemptions for all types of equipment used for the instalment of RE technology.
- The Law on Public-Private Partnership was adopted on 18 November 2021 ("**PPP Law**") and the SOPs for the PPP project were adopted in 2022 to replace the concession law and aim to promote and enhance the use of the PPP mechanism with the

government's support (investment incentive, direct fiscal commitment, payment or performance guarantee, etc.). Mines and energy sector which includes the production, transmission and distribution of electricity, oil and gas pipelines, or other related public services is specified as one of the eligible sectors under the PPP Law. The PPP Law and SOPs provide for the detailed process from the project identification and selection until the management of the PPP contract and handover, if applicable.

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 Policy on Green Growth (2013), the National Strategic Plan on Green Growth 2013-2030, Long-Term Strategy for Carbon Neutrality 2021, the National Energy Efficiency Policy 2022-2030 as well as the Power Development Masterplan 2022-2040 ("PDP"). Such policies include reaffirmations of the government's commitments to promote green energy growth.

4. RE PROGRAMMES

Specific RE programs such as FiT or net metering, are currently unavailable. Under the 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 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 as long as they comply with the existing regulations thereof.

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:
 - 25% for the first two years;
 - 50% for the next two years; and
 - 75% for the last two years.
- Prepayment tax exemption during the 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 (specific industries, activities, expenses, and deduction period are 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, 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%. Notwithstanding this, a new trust law regime has been recently adopted to enable a trust arrangement that may provide solution to this restriction.

• Competitive tariff

The EDC has put in place a bidding process allowing for a more transparent selection process. Also, one of the PDP objectives is being to provide affordable energy. These factors have led to the tariff becoming extremely competitive.

7. UPDATES AND DEVELOPMENTS

At this stage in Cambodia, there are 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 (VPPAs).

In addition, under the PDP, the government of Cambodia has three main objectives: (i) fulfil the future demand for power by providing a reliable and affordable supply of electricity, (ii) strengthen energy security by reducing dependency on energy imports and maximizing the development of domestic energy resources, and (iii) increase the share of clean energy.

The table below indicates the goals that the PDP aims to achieve by 2030 and 2040:

Sources of Energy based on PDP (2022-2040)			
Year		2030	2040
Non-RE	Coal	40%	21.4%
	Fuel	8.7%	4.6%
RE	Hydropower	27.7%	28.1%
	Solar power	17.9%	29.8%
	Biomass power	1.7%	1.9%
	BESS	3.6%	5.7%
Import	Thailand	700 MW	1,000 MW
	Vietnam	N/A	N/A
	Laos	3,095 MW	3,095 MW

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 Pembangunan 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.

- **JETP** or the Just Energy Transition Partnership was established during the G20 Leaders' Summit in November 2022. It is spearheaded by the International Partners Group ("**IPG**"), consisting of the Japanese government, US government, and the Indonesian government through the National Energy Transition Taskforce. Its aim is to mobilise a US\$20 billion fund in public and private financing, marking the largest energy transition financing package globally to date.

The JETP Secretariat focuses on developing clean energy sources, expediting the early retirement of coal-fired power plants ("**CFPPs**"), implementing energy efficiency programs, and fostering industries which support RE. In November 2023, the JETP Secretariat published its long-anticipated Comprehensive Investment and Policy Plan ("**CIPP**"). Although the CIPP is a non-binding investment plan, it serves as a strategic document that the Indonesia government intends to use as a foundation for power sector planning and policymaking.

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;
- MEMR Regulation No. 11 of 2021 on Electricity Business Implementation;

- Presidential Regulation No. 112 of 2022 on the Acceleration of RE Development for Power Supply;
- MOF Regulation No. 103 of 2023 on the Provision of Fiscal Support Through the Funding and Financing Framework for the Acceleration of Energy Transition in the Electricity Sector; and
- MEMR Regulation No. 12 of 2023 on the Utilisation of Biomass Fuel as a Fuel Blend in Steam Power Plants.

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.

Meanwhile, Presidential Regulation No. 112 of 2022 on the Acceleration of RE Development for Power Supply focuses on banning new CFPPs, implementing a ceiling tariff structure for renewables, streamlining procurement processes, providing tax and import duty facilities for renewables, and providing incentives for geothermal energy.

Furthermore, in line with the foregoing Presidential Regulation, the government has issued several regulations in 2023 to support RE initiatives and early retirement of CFPPs.

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.

One of the implementing Regulations of Presidential Regulation No. 112 of 2022 on the Acceleration of RE Development for Power Supply is MOF Regulation No. 103 of 2023 on the Provision of Fiscal Support through the Funding and Financing Framework for the Acceleration of Energy Transition in the Electricity Sector. This MOF Regulation establishes a mechanism for fiscal support in the termination of CFPPs and transition to RE through the Energy Transition Platform ("**ETP**"). The ETP facilitates the termination of CFPP operations through early termination of the power purchase agreements and the development of RE plants as substitutes for CFPPs. The ETP is supervised by the MOF and operated by the state-owned enterprise PT Sarana Multi Infrastruktur (Persero), which acts as its platform manager. Additionally, the ETP is funded through the state budget and other sources, including cooperation with international financial institutions. The facilities offered by the

ETP include: (i) loans or other financing schemes, which may involve government investment and guarantees; and (ii) facilities through public-private partnerships. Eligible recipients of ETP facilities include PT PLN (Persero) and its subsidiaries, entities that have obtained business licences for electrical power supply activities and their sponsors, as well as investors.

Another implementing Regulation of Presidential Regulation No. 112 of 2022 on the Acceleration of RE Development for Power Supply is MEMR Regulation No. 12 of 2023 on the Utilisation of Biomass Fuel as a Fuel Blend in Steam Power Plants. This Regulation governs biomass cofiring in steam power plants, where various fuels, including coal and different types of biomass, are burned simultaneously to replace a portion of coal use. MEMR Regulation 12/2023 regulates the mechanism, standards, implementation, procurement, pricing, and occupational health, safety, and environmental standards related to biomass fuel utilisation in biomass cofiring.

Apart from the abovementioned implementing Regulations, it is worth noting that the government also recently amended the Minister of Industry Regulation No. 54/M-IND/PER/3/2012 of 2012 on the Guidelines for the Utilisation of Domestic Products for the Development of Electricity Infrastructure. This Regulation governs the minimum percentage of domestic components, including both goods and services, required in the construction of electricity infrastructure. Moreover, it specifies that the minimum local content requirement for solar modules will increase from 40% to 60%, effective on 1 January 2025. This increase in local content requirement applies to solar power plants, with solar modules being their primary components.

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.

- **RE target**

Presently, the RE goal of 23% by 2025 and 31% by 2050, as mandated by the Energy Law and 2014 National Energy Policy, still applies. As of February 2024, the Indonesian National Energy Council is reportedly in the process of lowering the target for the RE mix to become 17% to 19% in by 2025.

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.

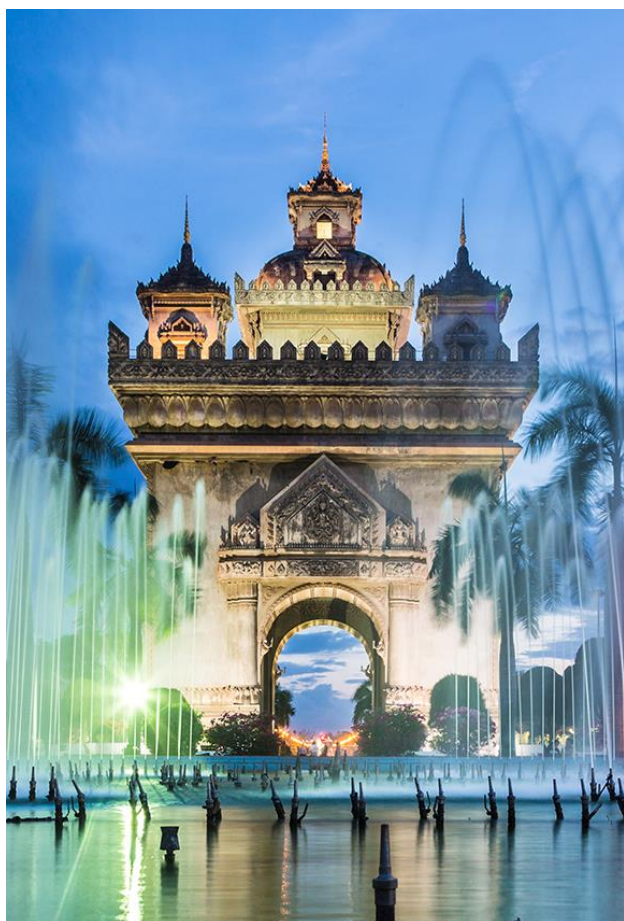
There is also much solar energy potential in Lao PDR based on solar irradiance and sunlight hours. It is predicted that if photovoltaic technology was used (with an overall efficiency of 10%), it would generate 146 kWh/m²/year of electricity.

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



Malaysia is blessed with substantial RE resources and is estimated to have the technical potential of almost 290GW across the country. Solar photovoltaic (PV) technical potential alone is estimated to reach 269 GW. Currently, only a small fraction of this RE potential has been realised, with just over 9 GW or 5% of installed capacity. That means over 95% of technical potential in Malaysia remains to be explored and realised.¹

As of 2023, the RE installed capacity in Malaysia has reached 25% of 31% RE share in the national installed capacity mix by 2025.² Recently, the Sustainable Energy Development Authority ("**SEDA**") has approved the establishment of 22 RE projects primarily from biogas and biomass, with a capacity of 36.534 megawatts ("**MW**").³

In May 2023, Malaysia reaffirmed its commitment to unlock economic opportunities through a low-carbon transition, setting out the ambitious target to achieve 70% RE installed capacity in the power mix by 2050, a significant increase from its previous targeted installed capacity of 40% in 2040.⁴ Comparing the target figure to Malaysia's current RE installed capacity of 25%, with the RE installed capacity projected to more than double to 18,000MW by 2035, the target is indeed ambitious. Further, the Malaysian government also intends to meet its commitment under the Paris Agreement,⁵ and of becoming a carbon-neutral nation as early as 2050.⁶ The National Energy Transition Roadmap ("**NETR**") was designed to reinforce these ambitions and inform an accelerated pathway to scale RE uptake in Malaysia over the next three decades.

In 2022, the generation of electricity in Peninsular Malaysia utilised sources including coal, gas, hydroelectricity, solar and oil and distillate. The

¹ National Energy Transition Roadmap (NETR).

² Malaysian Investment Development Authority (MIDA) media release titled "[Malaysia's current renewable energy capacity level is at 25, says Nik Nazmi](#)" (20 March 2023).

³ SEDA news insight titled "[Govt approves 22 RE projects with total capacity of 36.534MW](#)" (24 January 2024).

⁴ National Energy Transition Roadmap (NETR).

⁵ 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).

⁶ The Star article titled "[Malaysia committed to becoming carbon-neutral by 2050, says PM](#)" (5 June 2022).

Malaysian government has expressed an intention to focus on other RE sources including solar energy, hydropower and biomass energy in Peninsular Malaysia.⁷ The RE is intended to constitute the majority share of installed capacity by 2050. The share of coal-fired power generation is expected to ramp down over time, driven by natural retirement timelines of existing coal-fired power plants. No new coal-fired power generation will be developed, leading to an almost complete phase out by 2045. Gas is expected to act as a lower-carbon transition fuel away from baseload coal, and will be the dominant source of fuel for baseload power.⁸

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.⁹ 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.¹⁰ Its RE generation capacity will see an increase of 1,285MW when the Baleh Hydroelectric Project comes online in 2027.¹¹

Even so, it is expected that solar power capacity growth will be stronger than hydropower capacity growth,¹² 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 fact, one of the key observations outlined in the NETR states that the ambition to achieve 70% RE share

of installed capacity by 2050 is expected to be achieved, predominantly driven by solar PV installation. Since 2011, solar PV remains the most encouraging segment of the national RE landscape with an installed capacity compound annual growth rate (CAGR) of 48%, expanding from 0.1 GW to 2.6 GW. Significant solar capacity growth is required in the next three decades, with 59 GW of installed capacity by 2050 in order to achieve Malaysia's target.¹³

The leading contributor of biomass in Malaysia is palm oil.¹⁴ 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.¹⁵ 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.¹⁶ Recently, the SEDA Malaysia has shared its plans on leveraging new technologies, alongside the initiative to bridge the gap between unrealised potential highlighted in the Malaysian Renewable Energy Roadmap (MyRER).¹⁷

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,¹⁸ 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

⁷ MIDA media release titled "[Malaysia's potential in RE transition](#)" (31 May 2023).

⁸ National Energy Transition Roadmap (NETR).

⁹ MIDA media release titled "[Energising the region with hydropower](#)" (21 September 2021).

¹⁰ Malay Mail article titled "[CM: Sarawak aims to be regional renewable energy powerhouse](#)" (21 February 2022).

¹¹ MIDA media release titled "[Hydropower remains focus of Sarawak's energy source - Abang Jo](#)" (31 May 2023).

¹² The Business Times article titled "[Malaysia's 2025 renewable target to be backed by strong solar power growth: Fitch Solutions](#)" (6 December 2021).

¹³ National Energy Transition Roadmap (NETR).

¹⁴ SpringerLink article titled "[Biomass Energy in Malaysia: Current Scenario, Policies, and Implementation Challenges](#)" (21 January 2022).

¹⁵ Twelfth Malaysia Plan.

¹⁶ *Ibid.*

¹⁷ New Straits Times article titled "[SEDA Malaysia aims to take the lead in bioenergy clustering initiative](#)" (11 December 2023).

¹⁸ The Edge Markets article titled "[Malaysia mulling setting up wind turbines in the East Coast — Dr Mahathir](#)" (25 April 2019).

when the project was found abandoned.¹⁹ Since then, there have not been any discussions on the national stage of exploring or developing geothermal energy in Malaysia.

One of the current biggest challenges in meeting the RE targets identified by the Malaysian government is the lack of common alignment on timing, quantification and funding mechanism of grid investment. It is recognised that overcoming the grid limitations to accommodate higher RE penetration is essential, so is the development of a third-party access ("TPA") regulatory framework to address supply-demand mismatches for corporate green power. Furthermore, the absence of an RE exchange platform inhibits the potential to capitalise on price premiums associated with exporting RE and sharing of reserves. Transparent price discovery mechanisms for willing buyer-willing seller are also lacking. Addressing these challenges will be crucial in fostering the growth of RE on a larger scale in Malaysia.²⁰

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).
- SEDA is 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 off-takers 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. 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.²¹ The

¹⁹ New Straits Times article titled "[Govt scraps country's first geothermal power plant project](#)" (6 December 2018).

²⁰ National Energy Transition Roadmap (NETR).

²¹ [Kumpulan Wang Tenaga Boleh Baharu \(Kwtbb\) / Renewable Energy Fund](#).

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. The REA is not applicable in Sarawak.

- **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. The SEDA Act is only applicable in Peninsular Malaysia.
- **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"). The ESA is not applicable in Sarawak. The main legislation governing the electricity supply in Sarawak is the Sarawak Electricity Ordinance.
- 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.

- In 2023, the Ministry of Economy of Malaysia launched the **NETR**, setting out the roadmap to accelerate the country's energy transition and providing a framework for the country's shift from a traditional fossil fuel-based economy to a high-value green economy. The two-part NETR covers the following:
 - Part 1 that was announced on 27 July 2023, outlines 10 flagship catalyst projects and initiatives based on six energy transition levers including the energy efficiency, RE, hydrogen, bioenergy, green mobility and carbon capture, utilisation and storage (CCUS).
 - Part 2 that was announced on 29 August 2023, focuses on establishing the low-carbon pathway, national energy mix and emissions reduction targets, together with enablers needed for energy transition.

In developing the NETR, the Government undertook a comprehensive scoping and stocktaking process of macro and sectoral policies, including the Twelfth Malaysia Plan, the National Energy Policy 2022-2040, Malaysia's 4th Biennial Update Report Under the United Nations Framework Convention On Climate Change, the National Energy Efficiency Action Plan (NEEAP), Malaysia Renewable Energy Roadmap (MyRER), Malaysia Energy Transition Outlook (METO), National Low Carbon Cities Masterplan, Green Technology Master Plan Malaysia 2017-2030, Low Carbon Mobility Blueprint, and GHG emissions reduction plans from the state governments and private sector.

RE is recognised as one of the six energy transition levers identified in the NETR. The NETR sets out the following decisions that the Government of Malaysia has made in relation to RE:

- Increase the country's installed RE capacity from 40% in 2035 to 70% by 2050;

- Introduce the concept of a self-contained system according to the "willing buyer, willing seller" principle to the RE development framework;
- Increase the installation of solar systems on government buildings; and
- Allow cross-border RE trade through the establishment of an electricity exchange system, complementing the ASEAN power grid initiative.

The key initiatives relating to RE announced in the NETR include the establishment of solar parks, the promotion of floating solar and agrivoltaic technology, expansion of virtual aggregation model for rooftop solar, development of plan for accelerated investments for grid infrastructure, development of TPA framework to the grid and the setting up of RE exchange hub to enable cross-border RE trading.

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 a 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.

- **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.

Following the expiry of the GTFS 3.0, the government continues to support the development of green businesses with the reinstatement of the GTFS 4.0 up to RM1.0 billion for the period until 31 December 2025. The GTFS will continue its support to six key sectors which include energy, manufacturing, transport, building, waste and water.

GTFS 4.0 will also continue to provide the 60% to 80% government guarantee on the green

component cost financed by Participating Financial Institutions (PFIs) as well as the rebate of 1.5% per annum on interest/profit rate.

The implementation of GTFS 4.0 is important to ensure green technology-based projects continue to receive support, which will directly contribute to the growth and development of the green technology industry and also catalyst to the Climate Change policy. The MGTC has published a guideline for GTFS 4.0²² which set out the features for different types of financing available under the GTFS 4.0.

To be eligible for the GTFS 4.0, the company will need to be a legally registered Malaysian company with at least 60% Malaysian shareholding. Further, the projects will need to comply with any of the following general criteria:

- Minimise degradation of environment;
- Zero or low greenhouse gas emission;
- Safe for use and promotes healthy and improved environment for inhabitants;
- Conserve the use of energy and natural resources; and
- Promote the use of renewable energy resources.

There are other specific criteria which are applicable to the energy sector. The GTFS 4.0 is available to projects with all RE sources, apart from solar projects for business or self-consumption.

- **Green Investment Tax Allowance ("GITA")²³**

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, wind 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 2024 to 31 December 2026, the incentive period will be five years from the first date of qualifying capital expenditure incurred. Applications for the GITA for RE projects are to be considered by MIDA.

- **Green Income Tax Exemption ("GITE") for Solar PV Leasing**

Another scheme managed and implemented by MIDA is the GITE,²⁴ which refers to the income tax exemptions which are applicable towards 70% of statutory income from the year of assessment for solar PV leasing activity for a period of up to 10 years of assessment depending on the tier. For capacity of >3MW - ≤10MW, the incentive period will be five years; while capacity of >10MW - ≤30MW will be eligible for an incentive period of 10 years.

GITE is given to qualifying companies which provides solar PV leasing services which been verified by SEDA and been registered and listed under the Registered Solar PV Investor (RPVI) Directory. The qualifying companies must have at least 60% equity being held by a Malaysian citizen. GITE is also available to companies which possess a minimum installed capacity of 3MW solar PV projects aggregated under the NEM programme or self-consumption programme which have achieved commercial operation.

²² Features of GTFS, available [here](#).

²³ 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); [Malaysia's Budget 2024 Speech](#).

²⁴ *Ibid.*

Applications for the GITE are to be made to MIDA within the period from 1 January 2024 to 31 December 2026.

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 / energy exchange**

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. Notwithstanding the foregoing, the Natural Resources, Environment and Climate Change Minister had announced Malaysia's plan to establish an Energy Exchange to support the export of RE to neighbouring countries.²⁵ The EC will be preparing a working paper on the Energy Exchange. To date, no further details on this Energy Exchange scheme have been announced.

- **5th Cycle of LSS Programme**

The Government announced that it will soon open up the bids for the 5th LSS programme, with a quota of up to 2GW. The EC aims to issue the request for proposal (RFP) documents from 1 April 2024.

The 5th LSS programme looks to introduce a new category of floating solar with a quota of up to 500MW. A bidder will be able to bid for up to 500MW this round, which is a significant increase from the limit of 50MW in the 4th LSS programme. The bidding limit is increased to ensure a developer selection process that is transparent and fair, as well as to obtain power generation tariff offers at the most competitive rates.

The extent to which foreign players can be involved in the 5th LSS programme remains

²⁵ MIDA article titled "[Malaysia to introduce energy exchange to support renewable energy exports](#)" (20 July 2023).

to be seen. To recap, the 4th LSS programme was only open to locally-incorporated companies which are 100% owned by Malaysians or a company listed on Bursa Malaysia which has at least 75% local shareholding, while the 3rd LSS programme allowed participation of bidders with foreign shareholding of up to 49%.

- **Low Carbon Energy Generation Programme ("LCEGP")**

The Government announced the LCEGP with a total quota of 400MW, under the new enhanced dispatch arrangement mechanism.

The LCEGP opens up opportunities for other low-carbon power generation, such as small hydro, biogas, biomass, hydrogen and the likes. Participation in the LCEGP will be on a "first come, first serve" basis and application is open from 5 February 2024 on the official website of the Single Buyer.

- **Refreshed NEM Quota**

The Government announced an additional quota of 400MW under the NEM programme for the period from 5 February 2024 to 31 December 2024, with 100MW additional quota allocated to the NEM Rakyat (for household) and 300MW allocated to the NEM Nova (for commercial and industrial).

- **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. As of April 2023, 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: ¹

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).

¹ This is the most updated data published by the International Trade Association in "[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.

The Myanmar Oil and Gas Enterprise ("**MOGE**") is also a state-owned enterprise that is engaged in the oil and gas exploration and production. In October 2023, the MOGE was jointly sanctioned by the United States of America, Canada and the United Kingdom, as it reportedly has been the largest foreign currency source for the military regime.

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 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.

For completeness, on the consumer side of the energy consumption, the Myanmar Government has recently piloted various programmes to incentivise the use of Electric Vehicles ("EVs"). Over the course of 2023, the Government had issued a series of incentives which included tax exemptions and identifying the importation of EVs as a priority and promoted sector although no specific legislation has been enacted to regulate the import and distribution of EVs.

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. 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 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.

- **Power Purchase Agreements ("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 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 not yet been publicly published.

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 2022, RE accounted for 22.1% (24,684 GWh) of the total power generated in the Philippines, of which 42.2% was geothermal, 40.9% hydropower, 7.4% solar, 5.4% biomass, and 4.2% wind.¹ As of 31 December 2023,² there was a total of 1,273 RE projects in the Philippines.

2. KEY REGULATORS AND STAKEHOLDERS

Key regulators

- The Department of Energy ("**DOE**") is the 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**") is 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**") is 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**") is 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

¹ Department of Energy 2022 Power Statistics, available [here](#).

² Summary of REProjects under the RE Act of 2008 as of 31 December 2023, available [here](#).

Act of 2001 ("**EPIRA**"), RCOA refers to the mechanism that gives the end-users with a certain minimum monthly average peak 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 the four main sectors of the industry 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.³
- **Transmission sector:** The National Transmission Corporation ("**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 Company (Meralco) is the largest private electric distribution utility company in the Philippines covering 39 cities and 72 municipalities.⁴
- **Supply sector:** To date, there are 76 licensed retail electricity suppliers ("**RES**") (47 RES⁵ and 29 local RES⁶), 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 under the Section on 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. As of December 2023, there have been 84 RE projects with a Certificate of Endorsement ("**COE**") to the ERC for FIT eligibility, comprised of 24 solar projects, 7 wind

³ 40th EPIRA Implementation Status Report, pp. 50-52, available [here](#).

⁴ Meralco's company profile, available [here](#).

⁵ List of Licensed RES, available [here](#).

⁶ List of Authorized Local RES, available [here](#).

projects, 22 hydropower projects, and 31 biomass projects.⁷

- **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 minimum annual RPS requirements which must be complied with by on-grid and off-grid electric power industry participants. As of 31 December 2023, there have been 170 eligible RE power plants for RPS compliance for on-grid and off-grid areas, comprising 37 biomass projects, 7 geothermal projects, 74 solar projects, 45 hydropower projects, and 7 wind projects.⁸

- **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. As of February 2023, there have been 19 RE suppliers under GEOP.⁹

- **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 2021.¹⁰ 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

RE developers are entitled to various incentives under the RE Act including:

- an income tax holiday for seven years from the start of commercial operations;
- duty-free importation of machinery and equipment, and materials and parts thereof, including control and communication equipment within the first 10 years upon the issuance of a certification of an RE developer;
- 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.

⁷ List of RE Plants with COE to ERC for FIT Eligibility, available [here](#).

⁸ Eligible RE Power Plants for Renewable Portfolio Standards (RPS) Compliance for On-Grid And Off-Grid Areas, available [here](#).

⁹ List of RE Suppliers Under the Green Energy Option Program as of February 2023, available [here](#).

¹⁰ DOE Advisory dated 18 August 2020, available [here](#).

6. KEY ISSUES IN RE SECTOR

A key 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

On 15 November 2022, the DOE issued DOE Department Circular No. DC2022-11-0034 which amended the Implementing Rules and Regulations of the RE Act ("**Amendment**"). The Amendment removed the 40% foreign equity limitation imposed on businesses engaged in the exploration, development and utilisation of solar, wind, hydropower, and ocean energy and allowed the State to "*enter into RE Service or Operating Contracts with Filipino and/or foreign citizens or Filipino and/or foreign-owned corporations or associations.*"¹¹

The Amendment stemmed from an Opinion by the Department of Justice dated 29 September 2022¹² which held that the exploration, development and utilisation of solar, wind, hydro, and ocean or tidal energy should not be subject to the 40% foreign equity limitation on exploration, development and utilisation of natural resources, since these resources are (i) inexhaustible and hence beyond the ambit of the term "natural resources" in Section 2, Article XII of the Philippine Constitution, and (ii) considered as kinetic energy and therefore excluded from the term "all forces of potential energy."

¹¹ Amendment to the RE Act IRR, Section 2.

¹² Addressed to DOE Secretary Raphael P.M. Lotilla.

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.¹

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,² 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 7,698 installations as at end Q2 2023.³ In April 2023, the Housing & Development Board ("HDB") launched the largest solar leasing tender to date covering the installation of solar panels across 1,075 HDB blocks and 104 government sites.⁴ With a solar capacity of 113 megawatt-peak (MWp), this tender is equivalent to powering 28,250 four-room HDB flats. 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 Tengeh Reservoir.⁵ 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.⁶

Today, Singapore continues to support research and development ("R&D") for low-carbon alternatives in key areas such as hydrogen and carbon capture, utilisation and storage. In October 2022, Singapore announced its national strategy

¹ Energy Market Authority (EMA) website on [Natural Gas](#).

² Union Power article titled [The Potential of Solar Energy in Singapore](#).

³ EMA website on [Installed Capacity & Number Of Grid-Connected Solar PV Systems](#).

⁴ HDB press release titled ["HDB Launches Largest Solar Leasing Tender Under SolarNova Programme"](#) (6 April 2023).

⁵ The Straits Times article titled ["How Singapore built one of the world's biggest floating solar farms"](#) (18 May 2021).

⁶ EMA media release titled ["New Study to Assess Geothermal Potential Across Whole of Singapore"](#) (4 September 2023).

to develop hydrogen as a major decarbonisation pathway to meet our net zero commitments by 2050.⁷ As part of such strategy, the Singapore government has earmarked an additional S\$129 million to support projects on low-carbon energy technology solutions,⁸ on top of the S\$55 million which was previously awarded to 12 projects in October 2023.⁹ To further explore the use of low or zero-carbon fuels (such as hydrogen and ammonia) for power generation, in October 2023, six firms were shortlisted to provide low or zero-carbon ammonia solutions for power generation and bunkering on Jurong Island. This project positions Singapore as one of the first countries in the world to test and deploy a direct ammonia combustion power plant.¹⁰

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** is the transmission agent licensee which operates, on behalf of SP PowerAssets, 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.¹¹

- **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, govern 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.¹²

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

⁷ Ministry of Trade and Industry Singapore press release on [Singapore's National Hydrogen Strategy](#) (25 October 2022).

⁸ [Low Carbon Energy Research Programme Information Sheet](#) at page 2.

⁹ Channel News Asia article titled "[Singapore intends to import 30% of its electricity supply from low-carbon sources by 2035](#)" (25 October 2021).

¹⁰ Maritime and Port Authority of Singapore and EMA press release titled "[Singapore Launches Next Stage of Selection of Low- or Zero-Carbon Ammonia Power Generation and Bunkering Project Developer](#)" (23 October 2023).

¹¹ Open Electricity Market website on [Market Overview - Singapore's Electricity Market](#).

¹² EMA website on [Electricity Policies and Regulations](#).

target of 350MWp in 2020, Singapore is currently more than halfway to achieving its new goal of 2 GWp of solar capacity by 2030¹³ – 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 has achieved its Energy Storage Systems (ESS) target of at least 200 MWh by 2025 ahead of time, with the launch of Sembcorp ESS which is Southeast Asia's largest ESS with a capacity of 285 MWh – which can meet the daily electricity needs of around 24,000 four-room HDB households, in a single discharge.¹⁴ Additionally, Singapore is on track to achieving its target of tapping 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), with EMA granting Conditional Approvals to import 1 GW, 2GW and 1.2 GW of low-carbon electricity from Cambodia, Indonesia and Vietnam respectively.¹⁵

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 the 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 for their solar energy excess.¹⁶ 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.¹⁷

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.¹⁸ In 2014, Singapore also launched SolarNova, a government-led programme to promote and aggregate solar demand across government agencies.¹⁹

To pave the way for large-scale imports of low-carbon electricity, EMA has issued two Requests for Proposal ("**RFP**") to import electricity into Singapore on a competitive bid basis. The first RFP (RFP1) was issued in November 2021 for the import of up to 1.2 GW of low-carbon electricity, and the second RFP (RFP2) was issued in July 2022 to import up to 4 GW of low-carbon electricity.²⁰ In March 2023, Keppel Infrastructure Holdings Pte Ltd was the first entity to receive Conditional Approval by EMA for the long-term import of 1GW of hydropower, solar and potentially wind power from Cambodia via new subsea cables that would transmit the electricity over more than 1,000km.²¹ Subsequently, EMA granted Conditional Approval in September 2023 to five projects (managed by Pacific Medco Solar Pte Ltd, Adaro Solar International Pte Ltd, EDP Renewables Asia-Pacific, Vanda RE Pte Ltd and Keppel Energy Pte Ltd) to import 2 GW of low-carbon energy from Indonesia transmitted through a shared subsea transmission cable system.²² These projects aim to commence operations from the end of 2027. The Conditional Approvals for the five projects build on several Memoranda of Understandings ("**MOUs**") between Indonesia and Singapore, including the MOU on Low-Carbon Energy and Cross Border Electricity Interconnection signed in September 2023, the

¹³ Straits Times article titled "[Singapore more than halfway to its 2030 solar power deployment target](#)" (10 January 2024).

¹⁴ [Annual Report 2022/23: "Our Clean Energy Future"](#) ("**EMA Annual Report**") at page 13.

¹⁵ EMA website on [Regional Power Grids](#).

¹⁶ EMA website on [Guide to Solar PV](#).

¹⁷ EMA website on [Upcoming Enhancements](#).

¹⁸ Economic Development Board website, "[Microsoft and Sunseap sign agreement on largest-ever solar project in Singapore](#)" (1 March 2018).

¹⁹ Housing Development Board website on [SolarNova](#).

²⁰ EMA website on [Calls for Proposals](#).

²¹ EMA media release titled "[EMA Grants Conditional Approval for 1 Gigawatt \(GW\) of Electricity Imports from Cambodia](#)" (16 March 2023).

²² EMA media release titled "[EMA Grants Conditional Approvals for 2 Gigawatt of Electricity Imports from Indonesia](#)" (8 September 2023).

MOU on Renewable Energy Cooperation signed in March 2023 and the MOU on Energy Cooperation signed in January 2022. Most recently, in October 2023, EMA granted Condition Approval to Sembcorp Utilities to work with its partner, Vietnam's PetroVietnam Technical Services Corporation, to import 1.2 GW of low-carbon electricity (primarily generated from wind power) from Vietnam via new subsea cables that will cover approximately 1,000 km.²³

In preparation for large-scale imports, EMA also works with various partners on small-scale trials to assess and refine the technical and regulatory frameworks for importing electricity into Singapore. June 2022 marked a historical milestone with the commencement of Singapore's first cross-border import of up to 100 MW of renewable hydropower from Lao PDR via Thailand and Malaysia using existing interconnections, under the Lao PDR-Thailand-Malaysia-Singapore Power Integration Project. This was also the first multilateral cross-border electricity trade involving four ASEAN countries.²⁴ In March 2021, EMA appointed YTL PowerSeraya Pte Ltd for a trial to import 100MW of electricity from Peninsula Malaysia.²⁵ Additionally, in September 2023, Pacific Medco Solar Energy Pte Ltd was granted Conditional Approval by the EMA for a 600 MW solar project to import price-competitive and reliable renewable energy from Bulan Island, Indonesia to Singapore via a dedicated high-voltage subsea cable.²⁶ This project serves as a model of cooperation between Indonesia and Singapore, generating valuable investment opportunities and propelling both countries towards a more sustainable and prosperous future.

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 initial 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.²⁷

Businesses can also purchase Renewable Energy Certificates ("RECs")²⁸ 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.²⁹

The Singapore government has primarily focused its financial support for renewables on improving energy or resource efficiency. The Energy Efficiency Fund (E2F), for instance, which has been further enhanced in March 2023 now subsidises up to 70% of qualifying costs for businesses' resource-efficient design or adoption of energy-efficient equipment technologies, with simplified measurement and verification requirements.³⁰ 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.³¹

To incentivise R&D in renewables, the Singapore government has actively supported initiatives such as the joint award of R&D funding to three projects under the S\$6 million grant to test-bed and accelerate new clean energy innovations on Jurong Island. These projects, piloted for the first time on Jurong Island, include innovative floating solar deployment and the development of a virtual ledger system to support green hydrogen production. The Singapore government has further awarded grants to two startups, to enhance and testbed their sustainable solutions in underwater

²³ EMA media release titled "[EMA Grants Conditional Approval for 1.2 Gigawatt \(GW\) of Electricity Imports from Vietnam](#)" (24 October 2023).

²⁴ EMA media release titled "[Singapore commences first renewable energy electricity import via regional multilateral power trade](#)" (23 June 2022).

²⁵ EMA website on [EMA to Seek Proposals for Electricity Imports](#).

²⁶ Pacific Light article titled "[Pacific Medco Solar Energy Granted Conditional Approval By EMA for 600mw Solar Import Project from Indonesia](#)" (11 September 2023).

²⁷ NEA website on [Carbon Tax](#).

²⁸ One REC is the equivalent of 1MWh of electricity produced by solar panels.

²⁹ Solar AI Technologies website, "[Switching to Solar in Singapore: Top 3 Financial Incentives](#)" (13 May 2021).

³⁰ National Environment Agency website, "[Enhancements To The Energy Efficiency Fund \(E2F\) To Support Investment In Energy Efficient Technologies](#)" (2 March 2023).

³¹ EMA website, "[Energy Efficiency Grant Call for Power Generation Companies](#)".

infrastructure inspection and low-carbon hydrogen production, under the S\$8 million joint commitment to nurture local startups.³²

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 R&D 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 2001.³³

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.³⁴

There is also a new legislation - the Significant Investments Review Act 2023 ("**SIRA**") – that has been passed in Parliament but has yet to come into force in Singapore. The SIRA is intended to regulate significant investments (regardless of local or foreign investments) in certain designated entities that are critical to Singapore's national security interests. Under the SIRA, generally speaking, a person acquiring more than 12% of the total equity interest or voting power in such designated entities will need to obtain the prior written approval of the Ministry of Trade and Industry of Singapore.

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.³⁵

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 2025.³⁶

November 2023 saw Senoko Energy launch Singapore's first peer-to-peer trading platform of RE, building on the success of the initial pilot

³² [EMA Annual Report](#) at page 28.

³³ 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.

³⁴ EMA website, "[Review of Vesting Contract Regime](#)".

³⁵ EMA media release titled "[New Singapore Standard launch to support management and use of Renewable Energy Certificates](#)" (26 October 2021).

³⁶ National Environmental Agency website, "[Integrated Waste Management Facility \(IWMF\)](#)".

project launched in 2020. On the platform, owners of landed properties and business who have solar panels on their roofs can sell their excess electricity directly to local consumers across the electricity network at their preferred prices.³⁷ Beyond local trading, Singapore hopes to facilitate regional trading of clean electricity – as mentioned, Conditional Approvals have been issued for clean electricity imports from Vietnam, Indonesia, Cambodia and Lao PDR so far.

In line with Singapore's plans for reduced carbon footprint in the longer term, the Singapore government is exploring the potential of harnessing geothermal energy for power generation. In September 2023, EMA issued a RFP for a Singapore-wide non-invasive geophysical study to assess Singapore's deep geothermal resource potential, at depths up to 10 km, for the purpose of power generation.³⁸

Singapore also ventured further 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 CIX intends to utilise satellite monitoring, machine learning and blockchain technologies to provide transparent impact and pricing data to all its users.³⁹

In addition, the Singapore government announced at Budget 2022 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.⁴⁰ The Land Transport Authority of Singapore has also awarded a tender to five tenderers for the deployment of 12,000 electric vehicle 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 2025.⁴¹

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.

³⁷ Senoko website, "[Senoko Energy launches SolarShare 2.0, accelerating Singapore's green energy journey to net zero](#)" (18 October 2023).

³⁸ EMA media release titled "[New Study to Assess Geothermal Potential Across Whole of Singapore](#)" (4 September 2023).

³⁹ [Climate Impact X website](#).

⁴⁰ The Business Times article titled "[Budget 2022: Quick Takes on carbon taxes and other green initiatives](#)" (18 February 2022).

⁴¹ Land Transport Authority news release titled "[More Electric Vehicle Charging Points to be Deployed in HDB Carparks](#)" (2 November 2022).

THAILAND



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

As of 30 June 2023, the RE sources for the electricity generation in Thailand include biomass (5,011 MW), solar (8,831 MW), wind (3,032 MW), bio-energy (540 MW), waste energy (496 MW), hydropower (155 MW) and other types of RE (354 MW).¹

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

¹ Operating Plan, Expenditure Budget and Revenue Estimate for Fiscal Year 2023 prepared by the Energy Regulatory Commission, Page 17.

compliance with the policy framework. ERC is empowered to issue regulations, rules and announcements to regulate issues in the 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, coordinating, 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**"),² 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.

- **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, 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.

² 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 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") UNDER ACTIVE DEVELOPMENT

As at the end of 2023, Vietnam has increased its total installed power capacity from all sources to 80,555 megawatts ("MW"). The total installed power capacity from wind power and solar power RE sources is 21.664 MW, accounting for 26.9% of the entire system. Additionally, hydropower accounts for 28.4%. Biomass and waste energy only account for a small percentage. Thus, the proportion of RE sources, encompassing wind power, solar energy, and hydropower, constitutes 55.3% of the overall installed power capacity within the system.

As of 20 October 2023, the number of projects that have submitted documentation for electricity price negotiation and power purchase agreements ("PPAs") remains at 81 out of 85 projects, with a cumulative capacity of 4,597.86MW. Of these, 69 projects, totaling 3,927.41MW, proposed a provisional price equivalent to 50% of the ceiling price outlined in Decision No. 21/QD-BCT issued by the Ministry of Industry and Trade ("MOIT").

As of 19 October 2023, a cumulative total of 21 RE power plants or part thereof (with a total capacity of 1,201.42MW) have successfully reached their commercial operation date ("COD") and commenced commercial electricity generation, contributing a cumulative output of 709.5 million kWh to the grid, as measured from their respective COD.

2. KEY REGULATORS AND STAKEHOLDERS

The Government of Vietnam undertakes unified state management over electricity activities and usage nationwide through the 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 in the RE area.

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 interested 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 for the purchase of electricity produced. Vietnam Electricity Group ("EVN") is authorised to purchase all power generated 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 relevant to RE projects. For example, the Law on Electricity (No. 28/2004/QH11, No. 24/2012/QH12 and No. 03/2022/QH15) regulates the electricity sector. The Law on Investment (No. 61/2020/QH14) regulates investment policies and procedures for a project. The Law on Construction (No. 50/2014/QH13 and No. 62/2020/QH14) regulates construction activities.

Notably, the Government has issued numerous separate legal documents, resolutions, and policies to specially promote development of the RE sector. Resolution 55-NQ/TW dated 11/02/2020 of the 12th Politburo emphasised 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 30% of nationwide energy production by 2030 and 40% by 2045.

The above targets are generally consistent with the development strategy through 2030 and vision for 2050 for RE under Decision 2068/QĐ-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 application of Feed-in-Tariff ("FIT") price (Decision 37/2011/QĐ-TTg; Decision 39/2018/QĐ-TTg).
- Adopting a mechanism to encourage the development of solar power projects in Vietnam (Decision 11/2017/QĐ-TTg, Document No. 5087/BTC-TCNL).
- Stipulating project development and sample power purchase agreements applicable to wind power projects (Circular 02/2019/TT-BCT).
- Adopting a mechanism to support the development of biomass power projects (Decision 24/2014/QĐ-TTg; Decision 08/2020/QĐ-TTg).
- Adopting a mechanism to support the development of solar power projects (Decision 13/2020/QĐ-TTg).
- Stipulating project development and sample PPAs applicable to solar power projects (Circular 18/2020/TT-BCT).
- Stipulating electricity generation price frames for solar power plants and transitional wind power plants (Circular 15/2020/TT-BCT).
- Stipulating transitional framework for electricity prices of solar power plants, wind power plants (Decision 21/QĐ-BCT dated 07 January 2023).
- Adopting a method for determination of solar power and wind power generation pricing framework (Circular 19/2023/TT-BCT).

4. RE PROGRAMMES AVAILABLE

The Government has numerous incentives for each RE source, for instance, the table below shows the purchase price incentives for various RE sources.

RE type	Technology type	Incentive mechanism and term of effect	Sale price (exclusive of value added tax (VAT))	Legal basis
Minor hydro power (below 30MW)	Power production	Avoidable cost tariff	Announced yearly by MOIT	The MOIT has not issued the latest Decision on Avoided Cost Tariff for 2024
Wind energy (for projects having COD from 1 Nov 2018 to 31 Oct 2021)	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 (for projects in operation from 25 Apr 2020 to date)	Co-generation of heat-electricity	FiT for 20 years	7.03 UScents/kWh	Decision 08/2020/QD-TTg dated 5 Mar 2020 of the Prime Minister
	Non Co-generation of heat-electricity	FiT for 20 years	8.47 UScents/kWh	
Waste energy (for all projects to date)	Incinerate	FiT for 20 years	10.05 UScents/kWh	Circular 32/2015/TT-BCT dated 8 Oct 2015 of the MOIT
	Bury	FiT for 20 years	7.28 UScents/kWh	
Solar energy (for projects that have acquired in-principle approvals before 23 Nov 2019 with COD from 1 Jul 2019 to 31 Dec 2020)	Floating solar	FiT for 20 years	7.69 UScents/kWh	Decision 13/2020/QD-TTg dated 6 Apr 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, namely competitive power generation market, wholesale electricity market, and 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. MOIT issued Decision 2093/QD-BCT dated 7 August 2020 approving the plan for implementing a competitive electricity retail market.

According to Decision 2093/QD-BCT, a clear roadmap is delineated across three distinct phases:

- preparatory phase (period leading up to the conclusion of the year 2021);
- customers are granted the ability to procure electricity from the spot market (from 2022 to 2024); and
- customers are afforded the option to select their electricity retail provider (from 2024).

5. GOVERNMENT INCENTIVES

In addition to incentives on electricity purchase prices, RE projects in Vietnam also enjoy other support mechanisms such as corporate income tax incentives, waiver of certain equipment import tax and land use incentives.

The current general corporate income tax ("CIT") 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 the general CIT of 20% for the remaining years of the project.

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 on foreign investment in the electricity generation/production sector, i.e., a foreign investor can invest and own a 100% foreign-invested company to conduct RE projects in Vietnam.

A number of well-known international corporates have made large foreign direct investments (FDI) in RE in Vietnam. However, the Vietnamese authorities retain the sole discretion to appraise and grant approvals for foreign investors for an 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 sectors are still not yet open to foreign investors. EVN and its subsidiaries maintain a monopolistic role in these areas. Foreign investors have not yet been allowed to provide services on transmission and distribution of electricity in Vietnam.

• Complex legal procedures to implement an RE project

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

- **Stage 1 (Preparation):** The investor needs to first survey and select a potential project and site, conduct a pre-

feasibility study, apply for approval to include the project into the State's Power Plan (if not yet included), and apply for in-principle approval and 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 then conduct a feasibility study, issue technical designs for the power plant, sign key agreements (such as a land lease agreement, PPA, facility agreement, construction agreement etc.), obtaining 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 the connectivity licence and electricity generation licence.
- **Stage 5:** End of operation/suspension of operation of the project.

Complicated legal procedures is also one of the main barriers for foreign investors to conduct a new RE project in Vietnam. The stage of preparing and applying for investment licences for a project is challenging and time-consuming. If a project is not yet included in the State's Power Plan, it would take a long time to adjust and include the proposed new RE project into the State's Power Plan. Therefore, foreign investors tend to acquire existing projects that have already been licensed rather than going through the entire process to apply for a new 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 concerning land use for an RE project relate 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")**

The MOIT has issued 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 amend the main content of the model contracts to address any issues of the bankability of these PPAs through limited recourse project finance. Some necessary adjustments that are specific to each project can be made through

signing the appendixes to the model contract on a case-by-case basis.

7. UPDATES AND DEVELOPMENTS

- **Transitional framework for electricity prices of solar power plants, wind power plants**

Decision No. 21/QD-BCT dated 7 January 2023 establishes the maximum electricity prices (exclusive of VAT) for various types of transitional solar and wind power plants.

The framework outlines maximum prices per kilowatt-hour for ground-mounted and floating solar power plants, as well as onshore and offshore wind power plants.

Maximum electricity prices (exclusive of VAT) applied to transitional solar power plants and wind power plants are specified below:

No.	Type	Maximum price (VND/kWh)
1.	Ground-mounted solar power plant	1.184,90
2.	Floating solar power plant	1.508,27
3.	Onshore wind power plant	1.587,12
4.	Offshore wind power plant	1.815,95

The new price framework will apply to approximately 16 solar power projects and 62 wind power projects in the transitional category, referring to projects that have been invested and implemented but have not been completed before the FIT deadline.

- **Methods for determination of solar power and wind power generation pricing framework**

Circular No. 19/2023/TT-BCT governs the process of establishing the annual electricity generation price framework for ground-mounted solar power plants, floating solar power plants, inland wind power plants, and offshore wind power plants. It also outlines the procedure for constructing and

disseminating the annual electricity generation price framework.

The electricity generation price range for ground-mounted solar power plants, floating solar power plants, inland wind power plants, and offshore wind power plants is determined annually, ranging from the minimum value of 0 VND/kWh to a stated maximum value. This range is established and released on an annual basis.

The Circular is applicable to EVN, as well as organisations and individuals involved in the investments of solar power plants, wind electricity, and other relevant entities.

- **National power development plan for 2021 to 2030 and the vision for 2050**

Decision No. 500/QD-TTg sets out and approves the national power development plan for 2021 to 2030 and the vision for 2050 ("PDP VIII").

Power Transmission Projects: PDP VIII approval facilitates power transmission initiatives, focusing on Central and Southern Vietnam for renewable power project support. It includes increasing 500 kV transmission lines to achieve regional balance. The development plans encompass syncing transmission progress with power source advancements, utilising modern technology for local load requirements, integrating smart grids for large-scale renewables, and creating redundant grids with multi-circuit poles.

Incentive for RE Development: PDP VIII aims to ensure national energy security and prioritises the robust development of RE, targeting 30.9 to 39.2% by 2030. Additionally, it aspires for a 47% RE share by 2030 under the Just Energy Transition Partnership (JETP) and a long-term goal of 67.5 - 71.5% by 2050.

Incentive for Private Investment in Power Projects: PDP VIII proposes various capital solutions for sector development, emphasising the diversification of capital

sources to attract domestic and foreign investment. It calls for strengthening international support, green financing, and fostering public-private partnerships, state-owned enterprise involvement, and transparent environments. The plan also suggests gradually increasing financial mobilisation capacity.

Legal Framework: PDP VIII outlines amendments to the Law on Electricity and envisions a separate law on RE. The government prioritises RE development, creating investment opportunities for both domestic and foreign sectors. The enactment of PDP VIII signifies Vietnam's recognition of the global trend towards RE utilisation, prompting companies to consider new investment strategies aligned with evolving governmental policies.

- **Carbon trading schemes**

Article 139 of the Law on Environmental Protection 2020 in Vietnam provides general requirements on the organisation and development of the domestic carbon market in compliance with both domestic and international laws. Facilities emitting greenhouse gases are required to take inventory of their emissions. Emission quotas are determined based on national climate change and development strategies. The Ministry of Natural Resources and Environment approves the total emission quotas, and the Ministry of Finance collaborates with relevant agencies to establish the domestic carbon market.

Decree 06/2022/ND-CP that is issued by the Government provides detailed regulations dealing with emission reduction, the establishment of carbon credit trading platform, exchanging and trading emission quotas and carbon credits, and government rules on quota allocation, etc.. It is expected that the carbon credit trading platform will be operational from 2028.

Decree 06/2022/ND-CP also covers the exchange of greenhouse gas emission

quotas and carbon credits on the domestic market. Trading occurs on the carbon credit platform, and the Decree provides details on trading units, options for auctions, transfers, loans, and using carbon credits for emission offsetting. The Ministry of Finance is tasked with establishing the trading platform and financial mechanisms, while the Ministry of Natural Resources and Environment oversees the trial and official operation of the platform, coordinates with relevant ministries, and promotes market development. Local authorities are expected to collaborate on promotion and public awareness campaigns.

- **RE certificates**

Decision 947/QD-BCT of the year 2023 approves the Annual Implementation Plan (Phase 10/2022-9/2023) - Low Emission Energy Program Vietnam II (V-LEEP II) outlining support activities for establishing Vietnam's Renewable Energy Certificate ("REC") system in accordance with international standards. Vietnam currently aims to complete research on: (i) REC design principles and carbon markets; and (ii) global practices and experiences in the REC market.

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