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## 8. INDUSTRY OVERVIEW

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Date: 3 0 JUN 2023

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Johor, Malaysia.

## Leader Energy Holding Berhad

Unit 30-01, Level 30, Tower A, Vertical Business Suite, Avenue 3, Bangsar South, No.8, Jalan Kerinchi, 59200, Kuala Lumpur, W.P. Kuala Lumpur, Malaysia

Dear Sirs,

Independent Market Research ("IMR") on the Power Generation and Transmission Industry in the Kingdom of Cambodia ("Cambodia"), the Power Generation Industry in Vietnam, Malaysia and Taiwan, Republic of China ("Taiwan"), as well as the Rooftop Solar Photovoltaic ("PV") Market in Singapore, Vietnam, Malaysia, Indonesia, Taiwan, and in Thailand, for Leader Energy Holding Berhad ("Leader Energy")

We, Frost & Sullivan GIC Malaysia Sdn Bhd ("Frost & Sullivan"), have prepared this IMR report on the Power Generation and Transmission Industry in Cambodia, the Power Generation Industry in Vietnam, Malaysia, and Taiwan, as well as the Rooftop Solar PV Market in Singapore, Vietnam, Malaysia, Indonesia, Taiwan, and Thailand ("IMR Report") for inclusion in Leader Energy's prospectus in conjunction with the listing of and quotation for the entire enlarged issued share capital of Leader Energy on the Main Market of Bursa Malaysia Securities Berhad ("Prospectus").

We are aware that this IMR Report will be included in the Prospectus and we further confirm that we are aware of our responsibilities under Section 215 of the Capital Markets and Services Act, 2007.

We acknowledge that if we are aware of any significant changes affecting the content of this IMR Report between the date hereof and the issue date of the Prospectus, we have an ongoing obligation to either cause this IMR Report to be updated for the changes and, where applicable, cause Leader Energy to issue a supplementary prospectus or withdraw our consent to the inclusion of this IMR Report in the Prospectus.

Frost & Sullivan has prepared this IMR Report in an independent and objective manner and has taken adequate care to ensure the accuracy and completeness of this IMR Report. We believe that this IMR Report presents a true and fair view of the industry within the limitations of, among others, secondary statistics and primary research, and does not purport to be exhaustive. Our research has been conducted with an "overall industry" perspective and may not necessarily reflect the performance of individual companies in the industry. Frost & Sullivan do not take any responsibility for the decisions and/or actions of the readers of this IMR Report. This IMR Report should also not be considered as a recommendation to buy or not to buy the shares of any company or companies as mentioned in this IMR Report.

For and on behalf of Frost & Sullivan GIC Malaysia Sdn Bhd:

Hazmi Bin Mdhd Yusof Country Head, Malaysia

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## Methodology

For the purpose of preparing this report, Frost & Sullivan has conducted primary research encompassing interviews with industry experts and industry players, and secondary research, which included reviews of company reports, official websites/social media pages, independent research reports, information from industry associations/authorities/international organisations, and information from Frost & Sullivan research database. Unless being made available in the publicly available sources, projected data was derived by Frost & Sullivan using historical data analysis with the consideration of the social, economic, and political environments for the forecasted period.

Comparable energy companies identified in this report have been selected from a long list of companies developed by screening documents and information released by the energy authorities in each country.

#### Disclaimer

The list of key industry players and information provided in this report may not be exhaustive. The information provided may not be comprehensive, may be limited, and not available in a standardised form. It is on a best effort basis of publicly available information. The information is provided for reference only, and is indicative in nature. Accordingly, Frost & Sullivan makes no warranties, expressed or implied, on the accuracy and/or on the comprehensiveness of the information in this comparative table.

## Profile of Frost & Sullivan GIC Malaysia Sdn Bhd

Frost & Sullivan is a global independent industry research and consulting organisation headquartered in the United States of America with over 60 years of establishment. In Malaysia, Frost & Sullivan's subsidiary, Frost & Sullivan GIC Malaysia Sdn Bhd, operates two offices (Selangor and Iskandar Malaysia, Johor) with more than 200 employees offering market research, marketing and branding strategies and business advisory services across 12 industries. Frost & Sullivan is involved in the preparation of independent market research reports for capital market exercises, including initial public offerings, reverse takeovers, mergers and acquisitions, and other related fund-raising and corporate exercises.

## Profile of the IMR Report signee, Hazmi Bin Mohd Yusof

Hazmi Yusof is the Country Head for Frost & Sullivan GIC Malaysia Sdn Bhd. Hazmi possesses over 22 years of experience in market research and consulting, including over 15 years in independent market research and due diligence exercises for capital markets across Malaysia. Hazmi Yusof is in his 12th year helming the Malaysian operations.

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## 1 INTRODUCTION

Leader Energy and its subsidiaries ("Leader Energy Group" or "the Group") together with its jointly controlled entities are primarily engaged in the development, ownership, operation and maintenance of power generation and transmission assets, and in the installation, ownership, renting, operation and maintenance services for onsite solar PV systems for its customers in the commercial and industrial ("C&I") sectors, across various Southeast Asia ("SEA") countries such as Malaysia, Cambodia, Vietnam, Singapore, Indonesia and Thailand as well as Taiwan. This report describes the segments of the industry and the countries in which the Group operates.

### 2 MACROECONOMIC OVERVIEW

Across SEA countries and Taiwan, the demand for power and electricity is increasing rapidly, fuelled by rapid industrialisation, urbanisation and organic growth in population. Linked to this trend is a growth in ownership of household appliances and air conditioners, and the increasing consumption of goods and services. These market drivers serve as the catalyst for the robust growth in the power generation and transmission industry. Meanwhile, calls to decarbonise the world economy due to climate change risks are leading to intensified efforts towards the energy system transition from fossil fuel to renewable energy ("RE").

In terms of real gross domestic product ("GDP") per capita, nearly all SEA countries and Taiwan experienced a positive growth, with a compounded annual growth rate ("CAGR") ranging from 2.5% to 6.1% between 2015 and 2019. The exception was Brunei, with a decline of 1.6%.

In early 2020, the coronavirus disease ("COVID-19") pandemic caused widespread global impacts, affecting both economies and societies as countries imposed tight restrictions on physical movement in an attempt to contain the spread of the virus. The power sector has suffered following a slowdown in the development of power generation and transmission projects due to restrictions on workforce mobilisation and slowdown in procurement, and a reduction in power demand especially by services and industrial activities caused by movement control measures and only partially offset by the higher power demand by residential customers. Global supply chains were impacted by the COVID-19 pandemic where the import of key components for power projects especially rooftop solar PV panels, inverters and other components were disrupted. Nevertheless, economies benefitted following the upliftment of restrictions that allowed different sectors to resume on-site operations. More employees resumed work on-site, leading to subsequent increase in demand for power generation and transmission.

Between 2022 and 2027, the real GDP per capita of SEA countries and Taiwan is forecasted to grow, with Brunei, Cambodia, Indonesia, Malaysia, Philippines, Thailand and Vietnam expected to register a relatively higher growth rate as compared to other countries like Laos, Myanmar, Singapore and Taiwan.

Table 2-1: Real GDP Per Capita Growth (%), SEA Countries and Taiwan, 2015-2019, 2019-2022, & 2022-2027F

CAGR	Brunei	Cambodia	Indonesia	Laos	Malaysia	Myanmar	Philippines	Singapore	Taiwan	Thailand	Vietnam
2015 - 2019	-1.6%	6.1%	3.9%	4.6%	3.8%	5.5%	5.0%	2.5%	2.7%	3.1%	5.8%
2019 - 2022	0.0%	0.7%	1.3%	0.1%	1.4%	-5.4%	-0.3%	3.1%	4.5%	-0.9%	3.4%
2022 - 2027F	3.1%	5.2%	4.1%	2.8%	3.1%	2.1%	4.9%	1.8%	2.4%	3.2%	5.7%

Note:

i) Data based on GDP per capita at constant prices (obtained by expressing values of each year in terms of prices at a constant base period; the methodology is used to show a real change in output)

ii) All 2022 data are estimated, except for Indonesia, the Philippines and Singapore which are actual data

iii) "F" refers to forecasted data

Source: IMF WEO April 2023 database; Compiled by Frost & Sullivan

The population of SEA countries and Taiwan grew at an aggregated level in the period between 2015 and 2022, and is expected to continue to grow at a CAGR of 0.8% between 2022 and 2027.

Table 2-2: Population (millions), SEA Countries and Taiwan, 2022

In million	Brunei	Cambodia	Indonesia	Laos	Malaysia	Myanmar	Philippines	Singapore	Taiwan	Thailand	Vietnam
2022	0.4	16.0	274.9	7.5	33.0	53.9	111.6	5.6	23.3	70.1	99.5

Note: All 2022 data are estimated, except for Indonesia, the Philippines and Singapore which are actual data

Source: IMF WEO April 2023 database; Compiled by Frost & Sullivan

Table 2-3: Population Growth (%), SEA Countries and Taiwan, 2015-2022 and 2022-2027F

CAGR	Brunei	Cambodia	Indonesia	Laos	Malaysia	Myanmar	Philippines	Singapore	Taiwan	Thailand	Vietnam
2015 -2022	1.0%	0.9%	1.0%	1.4%	0.8%	0.7%	1.5%	0.3%	-0.1%	0.3%	1.2%
2022 -2027F	0.0%	1.0%	0.9%	1.3%	1.2%	0.5%	1.1%	0.4%	0.0%	0.1%	0.8%

Note: All 2022 data are estimated, except for Indonesia, the Philippines and Singapore which are actual data

Source: IMF WEO April 2023 database; Compiled by Frost & Sullivan

Urbanisation is expected to continue increasing between 2022 and 2027 in SEA countries and Taiwan, driven by the extensive relocation of citizens from rural to urban areas in pursuit of higher standard of living from improved job prospects and economic opportunities, among other reasons.

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### 3 OVERVIEW OF THE POWER GENERATION INDUSTRY IN SEA COUNTRIES AND TAIWAN

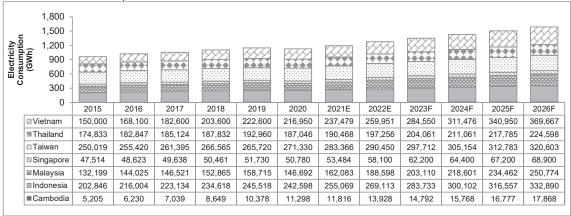
Robust economic development has accelerated the demand for power, especially in the developing economies of SEA. Access to continuous and reliable power sources has become indispensable for industrial, commercial and residential users.

The abundant availability of coal and natural gas reserves in SEA countries has enabled power generation companies to obtain fuel fossil resources either domestically or within the region. This has driven the high adoption rate of coal-fired and gas-fired power plants. Accordingly, many SEA countries continue to rely significantly on fossil fuels and, due to the availability of water resources, on hydroelectric power plants for their electricity requirements. However, to address the forecasted increase in demand for power, governments in SEA have emphasised energy diversification in their energy policies. In addition, in line with calls to decarbonise the world economy due to climate change risks, many countries in the region have introduced policies that establish specific targets for RE utilisation. Some countries have also evaluated their options for introducing nuclear power.

Key drivers of the energy industry in the SEA region and Taiwan include: (i) increasing urbanisation trend; (ii) liberalisation of the electricity market; (iii) improving regulatory and policy frameworks; (iv) investments in grid infrastructure backed by high penetration of RE; and (v) growing market of electric vehicles ("**EVs**") and related charging stations (with sales of EVs and number of charging stations in SEA growing at a CAGR of about 14% and 25% respectively from 2018 to 2022, and the number expected to continue to grow at double digits between 2022 and 2027).

Expected electricity market reforms and investment in power grid extensions are likely to fuel the growth in electricity access and electricity consumption in the SEA region and Taiwan. In addition to domestic private investment, the expected continuous flow of foreign direct investment ("FDI") into the region and the establishment of business operations by foreign companies are likely to spur industrial and commercial development.

Chart 3-1: Historical and Projected Electricity Consumption, Gigawatt hours ("GWh"), by Selected SEA Countries and Taiwan, 2015 to 2026F



Note: Data based on publicly available official information and estimates ("E") by Frost & Sullivan

Sources: Frost & Sullivan analysis

Table 3-1: Long-term Load/ Power Demand Forecast, Megawatt ("MW"), Selected SEA Countries and Taiwan. 2020 to 2030F

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Country	Power demand (peak	load) forecast (MW)	CAGR (2020-2030F)
Country	2020	2030F	CAGR (2020-2030F)
Cambodia	1,412	3,256	8.7%
Indonesia	41,761	77,300	6.4%
Malaysia (Peninsular)	18,808	20,755	1.0%
Singapore	7,376	10,600	3.7%
Taiwan	37,715	Not available (" <b>n/a</b> ")	n/a
Thailand	28,637	44,781	4.6%
Vietnam	38,706	86,493	8.4%

Note: Comparable data for Malaysia only available for "Peninsular" Malaysia. Forecast data for Taiwan is not available as at the end of April 2023

Source: Frost & Sullivan analysis

In the overall gross installed capacity ("GIC") projections, the demand for baseload¹ coal-fired power plants in SEA is projected to decline during the period 2021-2026 due to the lack of funding and environmental concerns.

<sup>&</sup>lt;sup>1</sup> Baseload refers to the permanent minimum load that a power supply system is required to deliver

## 8. INDUSTRY OVERVIEW

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Countries in the SEA region and Taiwan have been aggressively promoting RE technology with different initiatives such as the introduction of RE target, Feed-In-Tariff ("FiT") policy and financial incentives for developers and asset owners.

Table 3-2: Overview of RE Share Targets, Selected SEA Countries and Taiwan

	Cambodia	Indonesia	Malaysia	Singapore	Taiwan	Thailand	Vietnam
Latest RE Policy	Power Development Masterplan 2022-2040	Rencana Usaha Penyediaan Tenaga Listrik 2021-2030	Malaysia Renewable Energy Roadmap	Singapore's Energy Story	The Smart Grid Master Plan	Thailand Power Development Plan 2018- 2037	National Power Development Plan 2021-2030, with a vision of 2050
Overall RE Targets	About 47% of RE in the domestic installed capacity in 2030	RE at 31% of national primary energy supply in 2050)	31% RE GIC by 2025, 40% by 2035	Import low-carbon electricity, expected to account for about 30% of the electricity supply in 2035	Power grid stability with 20% RE in 2025	36% RE GIC by 2037	About 50% RE GIC by 2030, 74% by 2045

Note: Table updated as at the end of April 2023

Source: Frost & Sullivan analysis

The governments in the SEA region laid out an aspirational five-year sustainability plan under the second phase of the ASEAN Plan of Action Energy Cooperation ("APAEC") 2020-2025. Under the second phase of APAEC, the region's energy ministers agreed to set a target of 23% share of RE in total primary energy supply and of 35% in the installed power capacity by 2025.

The nuclear power market in the SEA countries is at a nascent phase and projects are not expected to become fully operational before 2025. Meanwhile, Taiwan plans to phase out nuclear power by 2025 and substitute the capacity through RE power plants.

Table 3-3: Market Size, GIC (in MW), Selected SEA Countries and Taiwan, 2015 to 2026F

Year	2015	2021	2026F	CAGR 2015 – 2021	CAGR 2021 – 2026F
Total GIC (in MW)	228,371	305,687	402,897	5.0%	5.7%
Total GIC (in MW) - RE	45,843	89,547	135,311	11.8%	8.6%

Source: Frost & Sullivan analysis

The role of independent power producers ("IPPs") is set to grow significantly in the SEA power market as countries are allowing a greater participation of private companies to secure a sustainable, competitive and efficient supply of energy. For the Utility-Scale Business, the Group primarily competes with local, regional and international power generation players.

Several SEA countries such as Thailand and Vietnam have introduced power development plans ("PDP"), master documents that integrate the development plans for the power generation, transmission, distribution, and supply sectors for the grid and off-grid areas, that cover the period of up to 2025 and beyond. The majority of these projects are likely to be developed by IPPs.

Table 3-4: Countries of operation of the Group compared with Key SEA-based publicly-listed power generation players<sup>(1)</sup> (excluding electric utility companies<sup>2</sup>), 2022

generation players (excluding electric utility companies-), 2022							
Company name	Country of	Total number of SEA countries where the	Geographical	Geographical distribution of the equity GIC (% of total)			
Company name	incorporation	power-generating assets are located	Country of incorporation	Other SEA countries	Rest of the world		
Leader Energy Holding Berhad	Malaysia	6	14%	85%	1%		
Malakoff Corporation Berhad	Malaysia	1	90%	0%	10%		
YTL Power International Berhad	Malaysia	2	0%	93%	7%		
Aboitiz Power Corporation	Philippines	1	100%	0%	0%		
First Gen Corporation	Philippines	1	100%	0%	0%		
Banpu Power Public Company Limited	Thailand	4	23%	26%	51%		
Electricity Generating Public Company Limited	Thailand	4	48%	25%	27%		
Global Power Synergy Public Company Limited	Thailand	2	64%	6%	30%		
Gulf Energy Development Public Company Limited	Thailand	2	94%	2%	4%		
Ratch Group Public Limited Company	Thailand	4	59%	21%	20%		

Note: (1) List of key SEA-based publicly-listed power generation players with an equity GIC above 3,000 MW; List of key players on a best-efforts basis; It may not be comprehensive; Key players sorted in alphabetical order based on the "country of incorporation", and subsequently based on the "company name".

Source: Companies' 2022 annual reports; Companies' websites accessed in April 2023

<sup>&</sup>lt;sup>2</sup> Electric utility companies refer to companies appointed to maintain the key public electricity infrastructure of a country: e.g. Electricite du Cambodge ("EDC") in Cambodia, Electricity of Vietnam ("EVN") in Vietnam, Tenaga Nasional Berhad ("TNB"), Sarawak Energy Berhad ("SEB"), and Sabah Electricity Sdn Bhd ("SESB") in Malaysia, Taiwan Power Company ("Taipower") in Taiwan.

Table 3-5: Revenue split and equity GIC of RE and non-RE assets of the Group as compared with key Malaysian publicly-listed players in the power industry (excluding electric utility companies), 2022

Company name	Focus of the	Revenue split by segment (FYE 2022) <sup>2</sup>	Equity GIC (MW) RE Non-RE		Countries where the assets are located	
Company name	company <sup>1</sup>	company <sup>1</sup>		Non-RE assets	SEA countries	Rest of the world
Leader Energy Holding Berhad	Power Generation	81.0% non-RE; 19.0% RE	260	270	6	1
Mega First Corporation Berhad	Power Generation	44.2% renewable energy; 29.5% packaging; 15.3% resources; 11.1% investment holding & others	219	-	3	-
Malakoff Corporation Berhad	Power Generation	79.4% power generation; 7.4% waste management and environmental services; 13.1% others	40	5,930	1	2
Eden Inc Berhad	Power Generation	74.5% energy; 23.9% F&B, rental and tourism; 0.1% manufacturing; 1.5% others	20	30	1	-
ILB Group Berhad	Power Generation	100% solar energy and related businesses	11	-	1	-
YTL Power International Berhad	Power Generation	71.4% multi utilities business (merchant); 23.1% water and sewerage; 3.1% telecommunications business; 1.7% investment holding activities	-	3,593	2	1
Cypark Resources Berhad	N/A	67.6% renewable energy; 26.0% waste management & waste-to-energy; 4.9% construction & engineering; 1.6% green tech & environmental services	96	-	1	-
Solarvest Holdings Berhad	EPC	96.4% EPCC of solar energy solution; 2.3% operations and maintenance of solar energy system; 1.0% sale of electricity through solar energy generation; 0.1% investment holding; 0.3% others	1	-	1	-
Pestech International Berhad	EPC	93.6% engineering, procurement, manufacturing, construction and commissioning; 5.2% product; 1.2% investment	-	-	-	-
Samaiden Group Berhad	EPC	99.5% EPCC services; 0.5% other services	-	-	-	-

Note: "Players in the power industry" are defined as companies that derive the majority of their revenue from activities related to the power industry. The players are sorted based on the "focus of the company", and subsequently based on the equity GIC of RE assets.

Source: Companies' 2022 annual reports; Companies' websites accessed in April 2023

## 4 ANALYSIS OF THE POWER GENERATION AND TRANSMISSION INDUSTRY IN CAMBODIA

Domestic generation of electricity in Cambodia comes from multiple generation sources, including hydropower plants, coal-fired power plants, diesel/heavy fuel oil ("**HFO**") power plants, solar PV power plants and biomass power plants. Cambodia is highly dependent on hydropower and coal-fired power generation. In 2021, hydropower generation accounted for 51.9% of the total electricity generated in Cambodia, followed by coal at 35.6%. The electricity generated from solar PV, diesel/HFO, and biomass accounted for 6.3%, 5.7%, and 0.5%, respectively. While hydropower is the primary electricity generation source of Cambodia, it is highly seasonal and power shortages can occur despite the high GIC, as drought can impact electricity generation from hydropower. Cambodia is now focused on other generation sources to reduce its dependency on hydropower generation.

Key market drivers of the energy industry in Cambodia include:

- (a) increasing rate of urbanisation as the urbanisation rate in Cambodia is expected to increase from 24.7% in 2021 to an estimated rate of 27.0% in 2026, there is a growing need to satisfy the electricity demand of the urban population; and
- (b) energy policy towards fossil fuels and non-hydro RE it is estimated that with the said policy in effect, investments will flow towards generation sources including coal-fired power plants and solar PV plants in order to generate sufficient power to meet the growing energy demand. Cambodia launched the "Cambodia Basic Energy Plan" in 2019, which sets out targets for the country's electricity supply, renewable energy, energy efficiency, energy security and the energy outlook. The RE sector is expected to grow with the push from initiatives and policy support in the medium to long-term, which can be directed to harness about 50 gigawatt ("GW") of potential solar and wind energy.

In 2021, around 35.9% of the electricity consumption was from big to medium industrial consumers, followed by 35.8% consumed by residential users<sup>3</sup>.

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<sup>1) &</sup>quot;Focus of the company" refers to the business activity from where each company derives most of its revenue. "Power generation" refers to companies that predominantly derive their revenue from power generation activities. "N/A" means that the information is not available. "EPC" stands for Engineering, procurement, and construction, and it refers to companies that predominantly derive their revenue from EPC activities for the power industry.

2) "Revenue split by segment" as reported by each publicly-listed company. "FYE" stands for financial year ended, except for Cypark Resources Berhad whose financial statement is for the 15 months ending 31 January 2023. The sum of the revenue split by segment may not add up to 100.0% due to rounding.

<sup>&</sup>lt;sup>3</sup> Salient Features of Power Development in Cambodia 2022, EAC

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Table 4-1: Historical Total Electricity Consumption (GWh), Cambodia, 2015 - 2021

	2015	2016	2017	2018	2019	2020	2021
Electricity Consumption (GWh)	5,205	6,230	7,039	8,649	10,378	11,298	11,816

Source: Electricity Authority of Cambodia ("EAC")

The country continues to import electricity from neighbouring countries such as Vietnam, Thailand and Laos to support its growing power demand, especially during drought seasons when hydropower generation declines due to shortages of water supply.

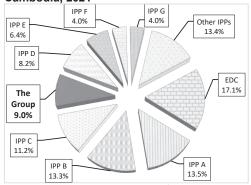
At the end of 2021, hydropower is estimated to have dominated the power generation mix representing 44.2% of the total GIC. By 2030, hydropower and solar are targeted to account for 33.2% or 4,727 MW and 12.6% or 1,800 MW respectively out of the total GIC of 14,259 MW.

Table 4-2: GIC Mix by Fuel Type (MW), Cambodia, 2020 to 2030F

	2020	2021	2025F	2030F
Hydropower	1,329.7	1,329.7	2,103.0	4,727.0
Diesel / HFO	659.1	619.6	583.0	583.0
Biomass	30.6	28.6	79.0	254.0
Coal	675.0	675.0	2,515.0	3,390.0
Solar PV	296.8	356.8	525.0	1,800.0
Wind	-	-	80.0	205.0
Natural gas	-	-	-	3,300.0
Total	2,991.2	3,009.7	5,885.0	14,259.0

Note: forecast data for 2025F and 2030F are based on the average between the BAU and APS scenarios4. Source: EAC Annual Report on Power Sector 2021; ERIA Cambodia Energy Statistic 2022; Frost & Sullivan

Market Share by GIC (%), Chart 4-1: Cambodia, 2021



Note: Total may not add up to 100% due to rounding: (i) The market share for the Group is calculated based on the consolidated GIC of the assets owned as at 31st December 2021 of 270 MW over Cambodia's total capacity of 3,009.7 MW Source: EAC Annual Report on Power Sector for the

year 2021; Frost & Sullivan

The private sector participates significantly in power generation in Cambodia. In 2021, out of the 3,009.7 MW of total GIC, 82.9% 5 was contributed by IPPs and other licensees in Cambodia.

The Group is one of the largest IPPs in Cambodia with a total capacity of 270 MW from two coal-fired power plants (of 120 MW and 150 MW respectively); the first of these plants was granted the concession in 2009, and it was one of the first coal-fired plants at that time. In 2021, the market share of the Group is estimated at 9.0% of the power generation industry in Cambodia. Some of the largest IPPs have each a market share estimated at 13.5%, 13.3%, and 11.2% respectively in 2021. The national utility company, EDC, is estimated to command a market share of 17.1% in the same year<sup>6</sup>. The remaining share of the market is fragmented, comprised other IPPs having each a market share below 9.0% as of 2021. The Group also benefits from a track record of about 29 years of experience in Cambodia by one of its key non-executive directors7, dating back to 1994, when Cambodia Utilities Pte Limited was awarded a power generation license and became the first IPP in the country.

The Group is also one of the pioneer foreign Independent Transmission Providers in Cambodia, as it was awarded a special purpose transmission licence<sup>8</sup> in 2010, only three years after the first special purpose transmission licence was issued.

Since 2010, the consumption of electricity in Cambodia has been growing rapidly. The consumption of electricity increased at a CAGR of 14.6% from 5,205 GWh in 2015 to 11,816 GWh in 2021, while the contribution of the consolidated expansion of the transmission grid increased by 19.9% during the same period. This resulted in a higher percentage of electrified villages at 97.5% in 2021 up from 66.5% in 2015. The demand for electricity is projected to grow and reach 17,868 GWh by 2026, at a CAGR of 4.7% from 11,816 GWh in 2021.

<sup>&</sup>lt;sup>4</sup> Economic Research Institute for ASEAN and East Asia ("ERIA"), Energy Outlook in East Asia 2020, Cambodia; The Alternative Policy Scenario ("APS") is a scenario of greater energy efficiency in power generation and greater development of RE in Cambodia, compared to the Business As Usual ("BAU") scenario

EAC Annual Report on Power Sector for the Year 2021
 Frost & Sullivan analysis based on data from the EDC. The total may not add up to 100% due to rounding.

<sup>&</sup>lt;sup>7</sup> Refers to Tan Sri Dato' Seri H'ng Bok San @ H'ng Ah Ba, a non-executive director of Leader Energy Holding Berhad, and was a director of Cambodia Utilities Pte Limited since its incorporation

<sup>&</sup>lt;sup>8</sup> The Special Purpose Transmission License is issued to companies other than the state power transmission company. It grants the right to construct, own, and operate only specified transmission facilities in Cambodia for the specified purpose

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### ANALYSIS OF THE POWER GENERATION INDUSTRY IN VIETNAM

Primary energy consumption grew at a CAGR of 6.3% from 2015 to 2021 in Vietnam. Coal and oil accounted for 71.4% of the total primary energy consumption, whilst gas accounted for only approximately 6.0% in 2021. The share of gas was stable in the country's energy mix between 2019 and 2021 due to the absence of imports (through pipelines of Liquefied Natural Gas ("LNG")). RE-based energy accounted for 22.6% of the total energy consumption in 2021.

Although gas and coal reserves exist in Vietnam, production has not kept up in pace with the demand. The government of Vietnam ("GoV") is attempting to decarbonise the power sector while ensuring sufficient electricity supplies continue to be available. This has resulted in over 8% of power demand shifting from fossil fuel power to wind and solar from 2019 to 20219. The availability of large solar resource is concentrated in the South of Vietnam. Wind resource is more dispersed. The ideal sites are located offshore as the power generated from the wind at sea (offshore) is much larger than from onshore wind 10.

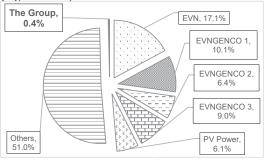
Vietnam has a large potential for offshore wind power with a coastline of 3,260 km and large onshore wind resource in the hills and highlands of the Northern and Central regions. In 2021, Vietnam had installed 4.118 MW in wind power, whereby 3,124 MW is generated from onshore plants and 994 MW from offshore plants 11. In 2021, Vietnam ranked third globally for offshore and fourth globally for onshore, in terms of newly-installed wind power capacity over the year 12. In the latest eighth national PDP approved in May 2023, the GoV has emphasised on raising the total capacity of onshore wind power from 21,880 MW by 2030 to 77,050 MW by 2050, and the total capacity of offshore wind power from 6,000 MW by 2030 to 91,500 MW by 2050. The capacity from onshore wind power is estimated to reach 14.5% of the electricity produced in Vietnam by 2030 and 13.4% of that produced in 2050. Similarly, the offshore wind power is estimated to account for 4.0% of total energy resources by 2030 and 16.0% by 2050<sup>13</sup>.

Table 5-1: GIC Mix by Fuel Type (GW), Vietnam, 2020-2030F

	2020	2025F	2030F
Hydropower	20.8	25.4	25.9
Coal	21.6	29.4	41.4
Oil & gas	8.9	14.3	30.2
Other RE	17.5	30.6	34.8
Import	0.6	4.3	4.9
Total	69.3	103.9	137.1

Note: "Other RE" includes small hydropower, wind, solar and biomass: Total may not add up to 100% due to rounding Source: Vietnam Electricity ("EVN") Annual Report 2021 and IRENA 2022; Frost & Sullivan

Chart 5-1: Market Share by Installed Capacity (%), Vietnam, 2020



Note: Total may not add up to 100% due to rounding; i) GIC data by ownership for 2021 is not available as at the end of April 2023;

ii) The market share for EVN, EVNGENCO 1, EVNGENCO 2, EVNGENCO 3, and PV Power is calculated based on the sum of the GIC of the assets in which they have an equity participation; "Others" refer to other industry investors; iii) The market share for the Group is calculated based on the consolidated GIC of the assets in which it has an equity participation as at 31st December 2020, equivalent to 267.7 MW over Vietnam's total capacity of 69,297 MW: Source: EVN Annual Report 2020; Frost & Sullivan

Power generation in Vietnam is dominated by the state-owned enterprise ("SOE") EVN and its wholly or majority-owned companies EVNGENCO 1, EVNGENCO 2 and EVNGENCO 3. Another large player is PetroVietnam Power Corporation ("PV Power"), which is majority owned by the SOE Vietnam Oil and Gas Group ("PVN"). EVN and its controlled entities, together with PV Power, collectively have equity participation in about 48.7% of the country's installed capacity in 2020. Private sector participation has grown steadily over the years and the remaining share of the market is fragmented. In 2020, the market share of the Group, based on all assets in which it has equity participation, is estimated at 0.4% of the power generation industry in Vietnam.

Key market drivers of the energy industry in Vietnam include:

Expected growth in industrialisation and infrastructure investments - robust exports, foreign investments and strained trade relations between the US and China have continuously positioned Vietnam as a desirable location for manufacturers from China

<sup>&</sup>lt;sup>9</sup> Nikkei Asia, "Japan's JERA to buy 35% stake in Vietnam renewables operator", August 2022

Vietnam Briefing, "How Can Investors Seize Vietnam's Wind Power Potential", January 2022
 Asia Perspective, "Vietnam's Wind Power Opportunities for Foreign Investors", June 2022

<sup>&</sup>lt;sup>12</sup> Asia Nikkei, "Offshore wind hits record capacity on China, Vietnam growth: study", April 2022

<sup>&</sup>lt;sup>13</sup> PDP 2021-2030 (Master Plan VIII), May 2023

#### 8. INDUSTRY OVERVIEW

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are either shifting facilities or opening additional facilities outside of China. Furthermore, Vietnam's Port Development Strategy is planning to construct or expand 39 ports across the country by 2030.

(b) Expected growth of the property market - similarly, the development of hotels, resorts and mixed-use buildings and residential units is also expanding rapidly nationwide.

As a result, peak power demand in Vietnam is projected to grow at a CAGR of 8.4% between 2020 and 2030, and is still one of the highest growth rates in Asia<sup>14</sup>. Such a strong projection in power demand is likely to be met with the expansion of gas and RE capacity.

### ANALYSIS OF THE POWER GENERATION INDUSTRY IN MALAYSIA

Natural gas production has been an essential part of Malaysia's economy. Historically, the fuel diversification strategy of the Government of Malaysia ("GoM") has also led to the emergence of coal as a key energy input for power generation 15. But in addressing Malaysia's medium-term electricity requirements and decarbonisation agenda, while aiming to achieve the sustainability targets set by the APAEC Phase 2 (2021-2025), the GoM, is focusing on developing alternative energy sources, such as hydroelectric power, solar and biomass, which create jobs and increase green opportunities for the private sector to invest and develop RE projects in Malaysia. To increase the contribution of RE in electricity generation, the GoM introduced numerous measures. Some of these measures include (i) the FiT scheme, which allows Feed-in Approval Holders ("FIAHs") to sell to the grid the electricity produced from renewable resources, (ii) the Net Energy Metering ("NEM") scheme, where an eligible consumer installs a solar PV system primarily for own use and receives credit to lower the electricity bill for any excess solar energy generated and exported back to the grid, (iii) the Large Scale Solar ("LSS") scheme, which allows approved companies to generate electricity to be sold to the grid via a large solar PV farm, and (iv) the Corporate Green Power Programme ("CGPP"), which allows approved solar power producers to develop, own and operate a solar power plant that can sell the electricity produced to consumers via a Virtual Purchase Power Agreement ("VPPA").

Historically, the demand for electricity consumption in Malaysia was driven by industrial demand in Peninsular Malaysia, particularly in the Klang Valley, Penang and Johor (Iskandar Malaysia)<sup>16</sup>. At the national level, electricity consumption in Malaysia is anticipated to grow at a CAGR of 9.1%17, from an estimate of 162,083 GWh in 2021 to 250,774 GWh in 2026, in line with the increase of GDP18. The future demand for electricity consumption in Malaysia is expected to be driven by on-going development in the Sarawak Corridor of Renewable Energy ("SCORE")<sup>19</sup> initiative, growing urbanisation in the Klang Valley and Penang and continued development in the Johor State.

Key market drivers of the Malaysian energy industry include:

- (a) the GoM's initiatives to foster economic growth peak power demand in Peninsular Malaysia is expected to grow by 2.0% per annum between 2020 to 2030, after considering the impact of the COVID-19 pandemic<sup>20</sup>; and
- (b) increasing usage of electrical and electronic consumer products the increase in Malaysia's GDP per capita is expected to increase the disposable income of the population, which will subsequently drive the sale of electrical and electronic products<sup>21</sup>.

The total GIC in 2020, including from self-generation and co-generation<sup>22</sup>, among others, was estimated at 34,998 MW. It is estimated to grow at a CAGR of 1.6% to 44,285 MW by 2035.

Table 6-1: GIC Mix by Fuel Type (MW) Malaysia, 2020 to 2035F

Year	2020	2025F	2035F
RE	8,450	12,330	15,871
Other fuel types	26,548	29,331	28,415
Total	34,998	41,661	44,285

Note: GIC for 2021 not available as at end of April 2023; Total may not add up to 100% due to rounding; Forecast for 2025F and 2030F based on the average of the BAU and the New Capacity Target ("NCT") scenario.

Source: Suruhanjaya Tenaga ("ST") Malaysia Energy Information Hub ("MEIH"); IRENA; Frost & Sullivan

<sup>&</sup>lt;sup>14</sup> PDP 2021-2030 (Master Plan VIII), May 2023

<sup>&</sup>lt;sup>15</sup> NEP, December 2012

<sup>&</sup>lt;sup>16</sup> Iskandar Development Region in South Johor, Malaysia

<sup>&</sup>lt;sup>17</sup> Estimates by Frost & Sullivan

<sup>&</sup>lt;sup>18</sup> Bernama, "Power sector boosted by better demand for electricity", December 2021

<sup>19</sup> SCORE is a development corridor in central Sarawak targeting ten high impact priority industries to transform Sarawak's economic landscape from one that is commodity-based to one that is industrial and digital-based. Source: Regional Corridor Development Authority (RECODA)

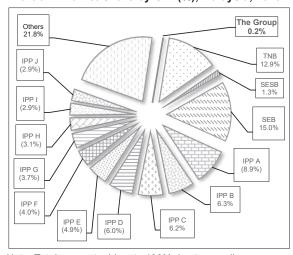
ST, Report on Peninsular Malaysia Generation Development Plan 2020 (2021-2039), March 2021

<sup>&</sup>lt;sup>21</sup> Frost & Sullivan analysis

<sup>22</sup> Self-generation refers to the generation of electricity for one's own use, while co-generation refers to a power system that simultaneously produces both electrical and thermal energy from the same source

In 2020, around 8,450 MW or 24.1% of the total GIC was contributed by RE as its fuel source with hydro and solar dominating the power mix<sup>23</sup>. Peninsular Malaysia had the highest RE GIC at 4,516 MW, while Sabah and Sarawak's GIC stood at 342 MW and 3,592 MW respectively. The RE capacity in Malaysia is forecasted to reach 12,330 MW and 15,871 MW by 2025 and 2035 respectively.

Chart 6-1: Market Share by GIC (%), Malaysia, 2020



Note: Total may not add up to 100% due to rounding; i) GIC data by ownership for 2021 is not available as at the end of April 2023;

ii) The market share for the Group is calculated based on the consolidated GIC of the assets owned as at 31st December 2020 of 67.4 MW over Malaysia's total capacity of 34,998 MW; iii) "Others" include other IPPs and other types of GIC (e.g. cogeneration, FiT, etc.);

iv) Market share of key players in no particular order Source: ST MEIH; Frost & Sullivan In developing its green energy industry, Malaysia offers tax incentives to promote the active participation of the private sector and develop the country's green technology. The tax incentives cover three types of categories namely infrastructure, service and the procurement of green technology assets. The GoM has developed a Green Technology Master Plan Malaysia 2017-2030 to promote green technology in key economic sectors. The privatisation programme<sup>24</sup> of the energy industry will continue as it has made significant contributions to Malaysia's economic growth.

In 2020, the market share of the Group is estimated at 0.2% of the power generation industry in Malaysia. Malaysia's SOEs, SEB, TNB, and SESB have a market share of 15.0%, 12.9% and 1.3% respectively in 2020. The remaining share of the market is fragmented, comprised of other IPPs of various sizes.<sup>25</sup>

Solar is a key part of the country's energy strategy for the future. Malaysia has significant potential to build large scale solar PV power plants due to its favourable location near to the equator. The silent operation and low maintenance costs, as well as its relatively environmentally friendly features, make solar PV energy a preferred alternative source of energy.

## 7 ANALYSIS OF THE POWER GENERATION INDUSTRY IN TAIWAN

Taiwan's gross power industry is heavily reliant on imports, accounting for 97.7% of its energy supply in 2021<sup>26</sup>. Coal is currently the major source of energy, with coal-fired power plants accounting to 35.4% of the total GIC in the country in 2021. The aim of the Taiwanese policies is to reduce the reliance on coal while increasing the use of LNG and renewables<sup>27</sup>. As a result, Taiwan is building new LNG terminals, expanding the natural gas power generation fleets, developing RE plants focusing on solar and offshore wind power generation, and gradually decommissioning nuclear power plants<sup>28</sup>. Taiwan officially published the "Taiwan's Pathway to Net-Zero Emissions in 2050", which provides the action pathway to achieve "2050 Net-Zero Emissions", and the pathway includes a green transition of the power industry. Among other initiatives, the amendment to the Electricity Business Act in 2017 allowed for renewable energy power generation companies to enter into a Corporate Purchase Power Agreement ("CPPA") with private end-users for the purchase of the electricity generated.

Key market drivers of the energy industry in Taiwan include: (a) Taiwan's economic growth driving the electricity sector; (b) high import reliance for fuel and opportunities for the RE market; and (c) Taiwan's isolated grid design and opportunities for the RE market.

Taiwan's installed power capacity grew at a CAGR of 3.4% from 48,665.5 MW in 2015 to 59,375.4 MW in 2021. The GIC for RE has posted the fastest growth in the same period. Within the RE industry in Taiwan, solar PV experienced the fastest growth rate at a CAGR of 43.4%, followed by wind power which grew at a CAGR of 8.6% within the same period. The GIC of major hydropower plants remained nearly constant throughout the years since 2015.

<sup>&</sup>lt;sup>23</sup> Sustainable Energy Development Authority ("**SEDA**"), MyRER

<sup>&</sup>lt;sup>24</sup> Ministry of Energy, Green Technology and Water Malaysia: Green Technology Master Plan 2017-2030

<sup>&</sup>lt;sup>25</sup> ST, Electricity Statistics, 2020

<sup>&</sup>lt;sup>26</sup> Taiwan Bureau of Energy, MOEA, Energy Statistics Handbook 2021

<sup>&</sup>lt;sup>27</sup> Taiwan Renewable Energy Market via https://www.trade.gov/market-intelligence/taiwan-renewable-energy-market

<sup>&</sup>lt;sup>28</sup> Electric Power Equipment and Energy via https://www.export.gov/apex/article2?id=Taiwan-electric-power-equipment

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Table 7-1: GIC Mix by Fuel Type (MW), Taiwan, 2020-2028F

	2020	2021	2025F	2028F
Coal	21,008.2	20,994.5	17,644.5	15,994.5
Oil	2,095.1	2,091.6	1,091.6	811.6
LNG	18,678.7	19,215.7	28,483.9	36,183.9
Nuclear	3,872.0	2,887.0	0.0	0.0
Solar PV	5,817.2	7,700.2	20,000.2	27,000.2
Wind	937.1	1,062.2	6,453.2	10,977.2
Other RE	2,809.2	2,822.2	2,920.2	3,457.2
Pumped storage	2,602.0	2,602.0	3,602.0	3,602.0
Total	57,819.5	59,375.4	80,195.6	98,026.6

Note: "Other RE" includes hydro, biomass, waste, and geothermal GIC; Total may not add up to 100% due to rounding; Updated official forecast not available as at April 2023.

Source: Taiwan Bureau of Energy, Ministry of Economic Affairs ("MOEA"), Energy Statistics Handbook 2021; Taipower

Power generation in Taiwan is dominated by Taipower, the government-owned utility company. As at 2021, 58.2% of the total GIC in Taiwan is owned by Taipower, 17.2% by IPPs, 24.6% by co-generation<sup>29</sup>. As at 2021, IPPs owned 759.2 MW of solar PV, while Taipower owned 283.8 MW of solar PV 30. Moving forward, Taiwan aims to transform its energy sector, denuclearising it and increasing its LNG and RE power generation portfolio.

## ROOFTOP SOLAR PV MARKET IN SINGAPORE, VIETNAM, MALAYSIA, INDONESIA, TAIWAN, AND THAILAND (PRIMARILY FOR CORPORATE ENTITIES IN THE C&I SECTORS)

Favourable economic conditions, favourable RE energy policies, greater demand for RE, and lower cost for the technology, have augmented the installations in rooftop solar PV systems among corporate entities in the C&I sectors in many key SEA countries and Taiwan. In many cases, corporate entities in the C&I sectors are highly receptive to this technology as a mean or strategy to reduce their carbon footprint and to enhance sustainability practices in their operations. Distributed power generation based on rooftop solar PV systems is easier to install and operate as compared to other forms of RE technology. Corporate entities in the C&I sectors can engage solar PV system providers and invest in developing their own solar PV systems to generate electricity to meet their power requirements; where applicable, they can sell any excess electricity to the local utility companies. Alternatively, corporate entities in the C&I sectors may engage solar PV system providers to provide the solar PV systems (without owning them) and enter into an agreement to either pay a rent to use it, or purchase the electricity generated.

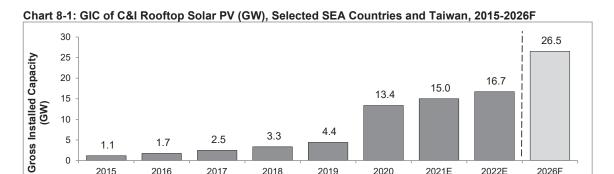
The greater demand by corporate entities in the C&I sectors for renewable energy from solar PV sources, together with the growing options available to access to it, are contributing to the growing market opportunities for solar PV players in SEA countries and Taiwan. Key market drivers supporting the adoption of solar PV system installations and solar power purchase agreements by corporate entities in the C&I sectors include: (a) favourable condition for solar PV technology adoption i.e. high global horizontal irradiation<sup>31</sup> ("GHI") levels in SEA countries and Taiwan, with most areas exhibiting GHI levels of more than 1,600 kWh/m2; (b) Net Zero greenhouse gas ("GHG") emissions targets set by corporate entities in the C&I sectors in support of climate goals set under the Paris Agreement, and (c) favourable local regulations, such as via tax benefits that support the adoption of solar PV system.

In this fast-growing market, the Group has made a strategic move by acquiring Singapore-based LYS Energy Group<sup>32</sup> that is operating since 2013 in designing, building and operating rooftop solar PV systems mainly for corporate entities in the C&I sectors in the SEA region. The opportunities offered by this market have attracted investments and the establishment of many solar PV players. Accordingly, the rooftop solar PV market in Singapore, Vietnam, Malaysia, Indonesia, Taiwan, and Thailand is very fragmented and comprises hundreds of industry players. Overall, each market consists of local and regional players of different capabilities which participate in multiple rooftop solar PV projects. Some of the GICs are not integrated into the national electricity grids. Hence, it is not feasible to provide a market share of the Group in the rooftop solar PV market in Singapore, Vietnam, Malaysia, Indonesia, Taiwan, and Thailand. For the C&I solar business, the Group primarily competes with companies which design, install, operate and/or maintain solar PV systems for customers, including (i) companies specialised in this area and (ii) companies with a wide business scope and at the same time conducting business in the aforementioned area.

The rooftop solar PV market has yet to achieve its full potential in Singapore, Vietnam, Malaysia, Indonesia, Thailand and Taiwan. Strong government policy supports and incentives, and investors' growing pressure on corporates to reduce their carbon footprint, provide ample opportunities for solar PV players to target corporate entities in the C&I sectors.

 <sup>&</sup>lt;sup>29</sup> Taiwan Bureau of Energy, MOEA, Energy Statistics Handbook 2021
 <sup>30</sup> Taiwan Bureau of Energy, MOEA, Energy Statistics Handbook 2021
 <sup>31</sup> Global Horizontal Irradiation/Irradiance (GHI) is the sum of direct and diffuse radiation received on a horizontal surface

<sup>32</sup> Collectively, LYS Energy Solutions Pte Ltd and its subsidiaries, that was acquired in September 2021



Note: selected SEA countries include Indonesia, Malaysia, Singapore, Thailand, and Vietnam. Data on a best-efforts basis of available information, refer to grid-connected rooftop solar PV installations for corporate entities in the C&I sectors.

Source: Frost & Sullivan analysis

# SUMMARY PROSPECTS AND OUTLOOK FOR THE GROUP

The demand for additional power generation capacity is evident in SEA economies such as Cambodia, Vietnam, Malaysia, Singapore, Indonesia and Thailand, as well as Taiwan. These countries are experiencing fast economic growth. The growth of economic activities and income per capita, the greater use of electronic appliances and the transition to EVs, are key factors contributing to the greater demand of electricity for industrial and commercial activities, as well as to serve households.

These fast-growing SEA countries and Taiwan present opportunities for power producers to grow their businesses. For example, governments in less developed countries such as Cambodia are expanding their rural electrification policies, to promote and encourage private sector participation in sustainable rural electrification services. While governments in more developed countries such as Taiwan and Singapore are increasing their development efforts on RE to be less reliant on fossil fuels for power generation, focussing on sustainable policies for the environment driven by a greater participation of the private sector into the power industry.

Climate change, sustainability and "Net Zero GHG emissions" are getting increasing attention globally due to the impact of climate change risks on the Earth. Accordingly, the power industry has responded by transitioning from existing fossil fuels energy system to a RE-centric energy system as part of the global drive to decarbonise. This is in support of the climate goals set under the Paris Agreement. There are over 194 signatories<sup>33</sup> to the Paris Agreement and the urgent call to decarbonise the world economy presents opportunities for the Group. These opportunities have been incorporated into the Group's future plans and business strategies.

The growing demand for electricity, particularly generated from RE sources, and the increasing pace of the power sector liberalisation, present a business expansion opportunity for power producers in the SEA countries and Taiwan. The Group has a strong footprint and focus across SEA countries, with investments made in a larger number of SEA markets than most key SEA-based publicly listed power generation players. In addition, the Group has one of the largest and most geographically diversified RE-focused portfolio of power assets amongst key Malaysian publicly-listed power generation players. The Group also has projects in markets where peak power demand exceeds supply, which will in turn provide opportunities to grow in the long-term via relevant RE projects. The Group has proven capabilities and expertise to identify potential RE projects (e.g. solar power plants, hydropower plants), to secure the required government approvals, to complete acquisitions and/or construction, to operate and maintain completed projects and to integrate these acquisitions successfully.

The expansion of policies to accelerate the generation and use of RE provide the Group with the opportunity to expand its RE assets to serve a larger customer-base, other than electric utility companies. For example, CPPAs and VPPAs allow the Group to sell the electricity generated to private end-users.

The imposition of a carbon tax in countries such as Singapore, and the discussion for its implementation in other countries such as Malaysia, is also estimated to further drive RE and EV adoption. This is on top of other EV-friendly policies introduced across SEA and Taiwan, such as the import and excise duty exemption in Malaysia on EVs, and tax benefits for the installation of EV charging station. These policies present further growth opportunities for the Group to support corporate entities in the C&I sectors with the installation of solar PV systems and relevant EV infrastructure such as EV charging stations.

Its track record, its diverse portfolio of RE power assets and projects, and its present geographical footprints in the SEA region and Taiwan, provide the Group a competitive edge to further expand its presence in undertaking new RE projects (whether greenfield or brownfield) in its target markets.

<sup>33</sup> United Nations Framework Convention on Climate Change: Paris Agreement – Status of Ratification, December 2022