

Solar in ASEAN; plugging the gap

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ASEAN has traditionally lagged in the adoption of and transition to renewable energy. However, solar power has recently emerged as a bright spot and investors are increasingly recognising the opportunity.

While addressing the 27th World Economic Forum on ASEAN in Hanoi in 2018, Singapore's Prime Minister Lee Hsien Loong stated, "**ASEAN will become the fourth-largest economy in the world by 2030**, after the US, China, and the European Union". With most ASEAN countries having doubled in size since 2000⁽¹⁾, and with annual real GDP growth forecast at c.5% until 2030⁽¹⁾, the region is well on track to achieving this major milestone.

This step change means the associated evolution in energy demand in ASEAN has global implications. Indeed, from 2012 to 2021, **the region's growth in power demand actually outpaced that of GDP by a factor of 1.2x**, highlighting the influence of power-intensive sectors as rising income levels boosted the economy. This trend is set to continue, with regional electricity demand growth expected to surpass global average power growth by 1.5x from 2022 to 2031⁽²⁾.

To meet this growing demand, **ASEAN countries, on average, poured US\$70bn per annum into the energy sector from 2016 to 2020⁽¹⁾**. Although these investments contributed to greater energy access and affordability, the missing piece of the energy trilemma – environmental sustainability – was largely sidelined, which is primarily manifested in the continued (and ever growing) prevalence of coal as the primary fuel source. Belying its image of beautiful scenery and nature, fossil fuels made up c.90% of the growth in ASEAN's energy demand from 2000 to 2020⁽¹⁾, making it **one of the few global regions where coal-fired generation has continued to proliferate**, both in terms of absolute generation as well as a share of total generation, to account for over 40% of total power generation⁽³⁾.







Meanwhile, the pace of development of renewables in ASEAN has been slow. Renewable energy supply has more than doubled over the past two decades, but this still mostly consists of (modern) bioenergy, geothermal (mostly in Indonesia and the Philippines), and hydropower (mainly in Cambodia, Laos, and Myanmar) (which still constitute c.98% of renewable energy power generation in the region⁽¹⁾), rather than wind and solar power. However, signs indicate the region is now hitting an inflexion point for renewables, in particular solar.

Renewables as an investment priority for ASEAN

In 2020, ASEAN countries contributed to 5% of global CO₂ emissions⁽⁴⁾, almost half of Europe. Given that close to 45% of the region’s CO₂ emissions are generated by the electricity sector⁽⁵⁾, any shift towards renewables would significantly contribute to the region’s decarbonisation.

Individual countries have recognised this and have laid out clear renewable energy capacity targets to reach the goals set out in the Paris Agreement and the associated Nationally Determined Contributions (“NDCs”). By 2025, ASEAN countries aim to have **23% of their primary energy supplied by renewable energy**, requiring annual investments in the sector to more than double⁽⁶⁾ the current level.

ASEAN countries have set clear renewable energy (“RE”) capacity targets to decarbonize the region

(7) Country	Emissions reduction targets						RE capacity targets			
	Target type	Base year	Target year	Unconditional reduction	Conditional reduction	Carbon neutrality / net zero targets	Total current capacity (GW)	Current share from RE (%)	Target year	Target share from RE (%)
	% of BAU	2014	2030	(16%)	(44%)	• Net zero by 2050	77	24%	2045	50%
	% of BAU	2010	2030	(3%)	(72%)	• n.a.	27	16%	2030/2040	35%/50%
	% of BAU	2005	2030	(30%)	(40%)	• Carbon neutrality by 2050; net zero by 2065	52	16%	2050	50%
	% relative to GDP	2005	2030	(45%)	n.a.	• Carbon neutrality by 2050	34	8%	2030	30%
	% of BAU	2010	2030	(32%)	(43%)	• Net zero by 2060 or sooner	74	6%	2030	25%
	n.a.	2021	2030	60Mt CO ₂ e	n.a.	• Net zero by 2050	17	4%	2030	7%

However, a lot more is actually required to reach net-zero emission levels by 2050. By taking into account current policies and targets, coal and natural gas are still expected to constitute over 50% of ASEAN’s power capacity by 2030⁽⁸⁾. To limit global warming to 1.5°C, IRENA, the International Renewable Energy Agency, believes that the region should be yet more ambitious and ensure that renewables are the leading source of energy by the same point⁽⁹⁾. This would require materially more investment⁽¹⁰⁾, **estimated at c.US\$300bn or 45% higher than the quantum needed to meet current renewable energy targets**.

Significant policy efforts are essential to boost renewable energy penetration in ASEAN. Despite an overall positive evolution in the region’s expansion plans and regulatory framework, issues and uncertainties remain in many countries, largely attributable to evolving remuneration mechanisms and tariff levels, and a nascent grid infrastructure. For instance, **Vietnam** previously stimulated investment in its solar infrastructure through relatively generous feed-in tariffs (“FIT”). However, these tariffs were abruptly cut to reduce the pressure on grid and transmission systems caused by a boom in installed capacity, in turn severely curtailing further investment in renewables capacity.

And with the country’s eighth power development plan delayed for about two years, investors are understandably holding back.

A similar but more positive picture can be found in the **Philippines**. The country initially adopted a FIT scheme in 2012 but, following delays and costly procedures, the scheme was discontinued in 2017. However, the new government has already taken some key steps to foster renewable energy development, recently allowing full foreign ownership of renewable projects, including the exploration, development, and utilisation of solar projects. The development of more long-term, sustainable policies will ultimately reduce risk perceptions and the cost of capital for renewable projects, driving investment in the sector.

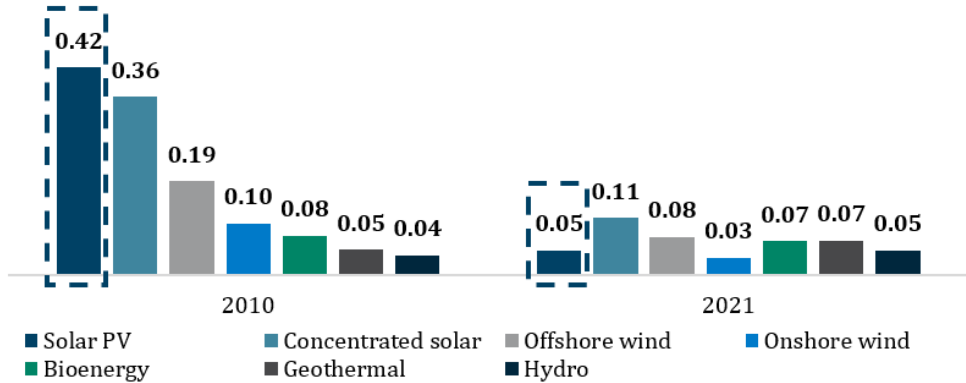
Solar emerging as the predominant renewable technology

As part of the region’s renewable energy push, it is solar power emerging as the leading technology. **Installed solar capacity in ASEAN more than doubled in a year from 2019’s 10 GW to hit 22 GW in 2020⁽¹¹⁾**. Over the 2018 to 2021 period, solar projects comprised nearly three-quarters of renewable energy capacity additions in the region⁽¹²⁾, and now account for over half of all installed renewable capacity⁽¹²⁾.

Rather than topography, which has always favoured solar over wind energy in the region, the main driver for the increased deployment of solar power has been technological progress, specifically the rapidly falling relative Levelized Cost of Energy (“LCOE”). **Over the 2010 to 2021 period, the global LCOE for solar decreased by a dramatic 88%**, compared to a 60%-70% decline for onshore and offshore wind⁽¹³⁾, mainly driven by greater solar module efficiency, reduced installation and labour costs. As a result, the LCOE for solar in ASEAN currently ranges between US\$0.045/kWh to US\$0.075/kWh (with Vietnam recording the lowest cost)⁽¹³⁾. By placing the competitiveness of solar on par with thermal power projects⁽¹⁴⁾, the rapid decline in LCOE is now helping to channel increasing investment in solar projects in ASEAN.

Evolution in the global LCOE for renewable technologies

US\$/kWh



Private equity and corporates at work

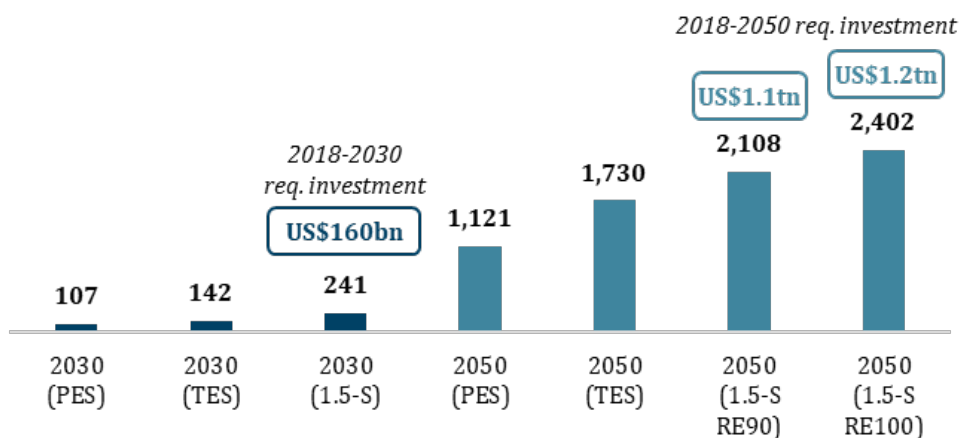
The recent changes and future prospects have encouraged private sector investment in ASEAN renewables, including solar, from both financial and strategic players. **Actis** acquired a majority stake in the Southeast Asian platform **Levanta Renewables** in Aug-22, stating that “**it is the right time to invest in the Southeast Asia energy transition**”⁽¹⁴⁾. With Vietnam as the anchor market, Actis will help Levanta expand its current 300 MW capacity to 1.5 GW through a buy-and-build strategy. **SUSI Partners** is another sponsor committing considerable capital to the region’s renewable energy development. In Jan-23, it launched a platform for the development of utility-scale renewable energy assets in Southeast Asia, in collaboration with the developer Pacific Impact Development. Its core focus will be greenfield development of solar PV, wind, and hydro assets in the region. Recent success stories also include **Denham Capital**’s divestment of a portfolio of regional renewable and storage assets to Thailand’s **RATCH Group**. In 2015, Denham Capital and Nexif established **Nexif Energy** to acquire, develop, and operate clean power generation assets across Southeast Asia and Australia. By 2022, the platform’s total capacity amounted to 2.7 GW, including 500 MW of operational and secured assets. Partly due to the **alignment** with its strategic plan⁽¹⁵⁾, RATCH Group disbursed an impressive c.US\$600m for the portfolio, valuing it in excess of US\$1bn.

Corporate activity is accelerating in parallel. Japan-based **ENEOS** established a 50/50 joint venture (“JV”) with France’s **TotalEnergies** in 2022 to carry out solar distributed generation projects in Asia, including Thailand, Vietnam, Indonesia, the Philippines, Cambodia, Singapore, and Malaysia. The companies’ objective is to develop 2 GW of decentralized solar capacity over the next five years. Similarly, **EDP Renewables** expanded its geographical and technological reach through the acquisition of **Sunseap**. The world’s fourth largest renewable energy player plans to leverage Sunseap’s distributed solar expertise in Southeast Asia to invest c.US\$7bn in the APAC region by 2030.

BDA Partners view

Projected installed solar capacity in ASEAN by scenario

GW⁽¹⁶⁾



We believe that solar capacity growth, and the associated ecosystem, presents a compelling investment opportunity. This is a result of the recent (and potentially continuing) advances in technology and LCOE, and the expected regulatory developments, which will catalyse investments. The outlook for solar in ASEAN is bright.

Notes: (1) Southeast Asia Energy Outlook 2022, IEA, May-22; (2) S&P Global; (3) c.30% for gas, c.15% for hydropower, and c.7% for other renewables, Southeast Asia Energy Outlook 2022, IEA, May-22; (4) Statista; (5) ASEAN State of Climate Change Report, ASEAN, Oct-21; (6) SUSI Partners sets up Southeast Asian renewables platform, Jan-23; (7) Notes for the table: (i) Country: select ASEAN countries based on CO2 emissions and renewable energy potential, (ii) Unconditional / conditional reduction: unconditional refers to policies and measures which can be undertaken using nationally mobilized resources. Conditional refers to policies and measures which require support or the means of implementation under the Paris Agreement, (iii) Carbon neutrality / net zero targets: carbon neutrality typically only accounts for CO2 emissions. Net zero covers all greenhouse gas emissions across the supply chain, (iv) Target current capacity: 2022 installed capacity; (8) Planned Energy Scenario in the Renewable Energy Outlook for Asean, IRENA, 2022; (9) 1.5°C Scenario in the Renewable Energy Outlook for Asean, IRENA, 2022; (10) Cumulative investment from 2018 to 2030 in the Renewable Energy Outlook for Asean, IRENA, 2022; (11) IRENA and broker notes; (12) 71% and 54% respectively according to broker notes; (13) Energy Transition Investment Opportunities in Southeast Asia, IRENA, 2022; (14) Actis says it's right time to invest in SE Asia energy transition, PEI Media, Aug-22; (15) RATCH Group's 2023-2027 strategic plan: increase renewable capacity to 25% of the portfolio by 2025; (16) Notes for the chart: Planned Energy Scenario ("PES") is a scenario that considers current and planned policies, 1.5C Scenario ("1.5-S") is a scenario that targets net-zero by 2050 (RE90 is 90% renewable power generation, RE100 is 100% renewable power generation), Transforming Energy Scenario ("TES") is a less ambitious scenario than 1.5-S taking into account technologies and resources

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Contact us

BDA team



Mark Webster
Partner, Head of Singapore,
Head of Services
+65 6958 1202
mwebster@bdapartners.com



Lars Freitag
Partner, Head of Sustainability
(Infrastructure & Services)
+65 6958 1213
lfreitag@bdapartners.com



Artur Dumont
Associate
+65 6958 1212
adumont@bdapartners.com



NEW YORK

1270 Avenue of the Americas
Suite 2901
New York, NY 10020,
United States
Tel +1 (212) 265 5300

HO CHI MINH CITY

Level 19, Deutsches Haus
33 Le Duan Street, Ben Nghe Ward
District 1, Ho Chi Minh City,
Vietnam
Tel +84 (28) 3620 8806

SHANGHAI

HKRI Centre Two, Units 1704-1706
288 Shimen Road (No.1)
Shanghai, 200031
China
Tel +86 (21) 3217 8222

LONDON

2nd Floor, 17 Waterloo Place
St James's
London SW1Y 4AR
United Kingdom
Tel +44 (0) 20 3327 3360

SINGAPORE

50 Collyer Quay
OUE Bayfront, #08-01
Singapore 049321
Singapore
Tel +65 6958 1200

SEOUL

2F, Youngpoong Building
41, Cheonggyecheon-ro, Jongno-gu
Seoul, 03188
Republic of Korea
Tel +82 (2) 735 4220

MUMBAI

B-902, One BKC, G Block,
Bandra Kurla Complex,
Mumbai, Maharashtra 400051
India
Tel +91 (22) 6140 3800

HONG KONG

Suite 2002 20/F, 100QRC
100 Queen's Road, Central
Hong Kong SAR
Tel +852 3698 1700

TOKYO

27F Atago Green Hills Mori Tower
2-5-1 Atago, Minato-ku
Tokyo, 105-6201
Japan
Tel +81 (3) 3433 5800

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