ASEAN Energy Statistics Leaflet

2025

ASEAN Energy Statistics Leaflet (AESL) 2025 provides a comprehensive overview of the energy landscape in ASEAN, covering key areas such as energy consumption, energy supply, electricity, renewable energy, fossil fuels, gender, energy investment, and energy-related socio-economic indicators, with historical data ranging from 2005 to 2023.

The statistics serve as the standardised and visualised representation of ASEAN energy data, supporting regional reporting efforts. This updated dataset contributes to the enhancement of the ASEAN Energy Database System (AEDS), a central repository of reliable and comprehensive energy data and information for the region. Through AEDS, the ASEAN Centre for Energy (ACE), in its role as a regional energy knowledge hub and think tank, curates regional energy data to inform recommendations for ASEAN Member States (AMS).

AEDS sources its data primarily from official submissions by AMS, complemented by reports from national government agencies and international organisations. Recognition is given to the AMS focal points, especially those in the Regional Energy Policy and Planning Sub-Sector Network (REPP-SSN), whose expertise, data contributions, and reviews have been instrumental in shaping the content and direction of this publication.

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July 2025

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Energy Statistics Highlights

Overview of key indicators of the energy landscape and APAEC target monitoring

Primary Energy Supply (Mtoe)

2005	2015	2021	2022	2023
443.5	653.6	653.6	713.5	741.1
	+47%	-0.01%	+9%	+4%

Final Energy Consumption (Mtoe)

2005	2015	2021	2022	2023
259.3	354.5	375.1	437.2	455.8
	+37%	+6%	+17%	+4%

Power Installed Capacity (GW)

2005	2015	2021	2022	2023
109.7	207.5	303.4	322.2	336.2
	+89%	+46%	+6%	+4%

Electricity Generation (TWh)

2005	2015	2021	2022	2023
513.1	896.4	1195.8	1267.5	1322.2
	+75%	+33%	+6%	+4%

Growth in 2023 compared to 2022

+4.6% Electricity consumption
Equivalent 4.3 Mtoe

+18.8% Natural gas consumption
Equivalent 6.6 Mtoe

+25.1% Wind electricity generation
Equivalent 3.4 TWh

+10.7% Solar primary energy supply
Equivalent 0.4 Mtoe

+9.6% Bioenergy primary energy supply
With industrial & municipal solid waste supply growing by 3.4x

+5.9% Solar power capacity
Equivalent 1.5 GW

Notes:
Bioenergy includes biofuel, biomass, biogas, waste

ASEAN Energy Progress

Monitoring 2023 APAEC Target

25.5%
Energy Intensity (EI) Reduction based on 2005 level

14.0%
RE Share in ASEAN Total Primary Energy Supply (TPES)

33.5%
RE Share in Installed Power Capacity

APAEC Target by 2025

Energy Efficiency and Conservation: To **reduce Energy Intensity (TPES/GDP)** by **32%** based on 2005 level

Renewable Energy: To increase the **share of renewable energy (RE)** to **23% in TPES** and **35% in installed power capacity**

Selected Energy Indicators

Overview of energy indicators related to demographic trends and tracking the energy intensity reduction

Electricity demand per capita grew by 3.7% ↑ from 2022

2005	2021	2022	2023	Unit
780.4	1,523.5	1,601.6	1,661.6	kWh/person

Electricity consumption increased by 4.6% ↑ from 2022

2005	2021	2022	2023	Unit
14.6%	23.7%	21.5%	21.6%	electricity/TFEC

Primary energy supply per capita increased by 3.1% ↑ from 2022

2005	2021	2022	2023	Unit
787.4	963.2	1,043.9	1,075.8	ktoe/person

Final energy consumption per capita increased by 3.2% ↑ from 2022

2005	2021	2022	2023	Unit
460.5	552.8	639.6	661.7	ktoe/person

Primary energy intensity reduced by 25.5% ↓ from 2005

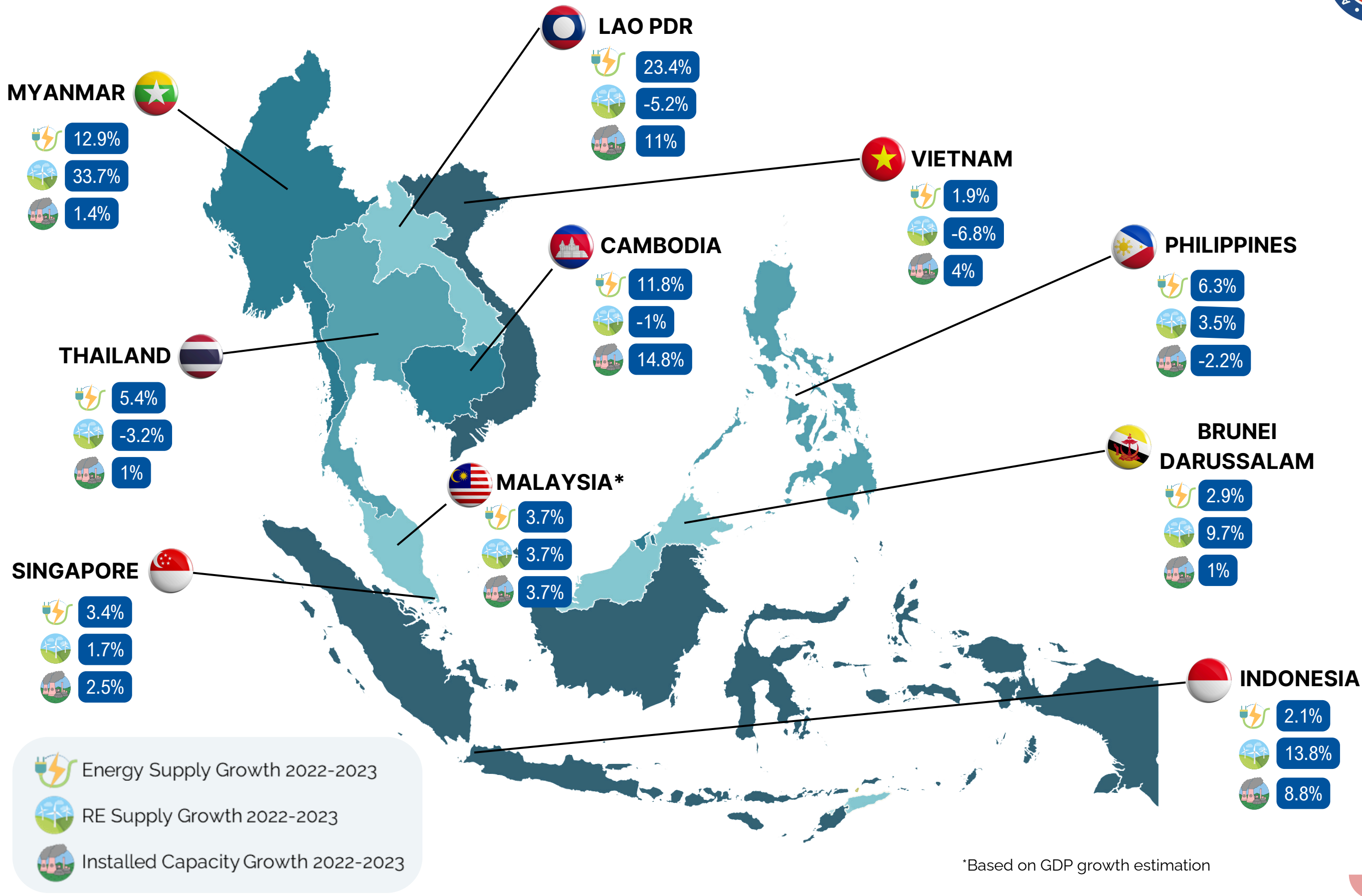
2005	2021	2022	2023	Unit
125.3	90.2	93.6	93.4	mtoe/GDP(million USD)

Final energy intensity reduced by 21.6% ↓ from 2005

2005	2021	2022	2023	Unit
73.3	51.8	57.3	57.5	mtoe/GDP(million USD)

Notes:
GDP 2005 PPP

Country Energy Highlights 2023



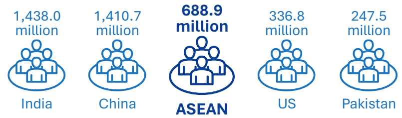
*Based on GDP growth estimation

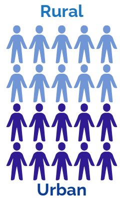
Socio-Economic

Population and GDP

Between 2022 and 2023, the region's collective population increased by 5.35 million, with a GDP growth rate of around 3.2%. Nearly all ASEAN Member States experienced GDP growth in 2023, except for Brunei Darussalam, Malaysia, and Singapore. Nonetheless, these countries continued to record the highest GDP per capita in the region.

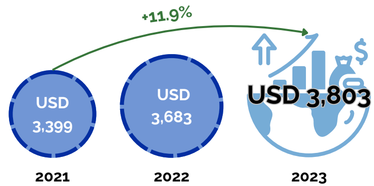
ASEAN is the 3rd highest population in the world in 2023, a home for **8.5%** of the world's total population.



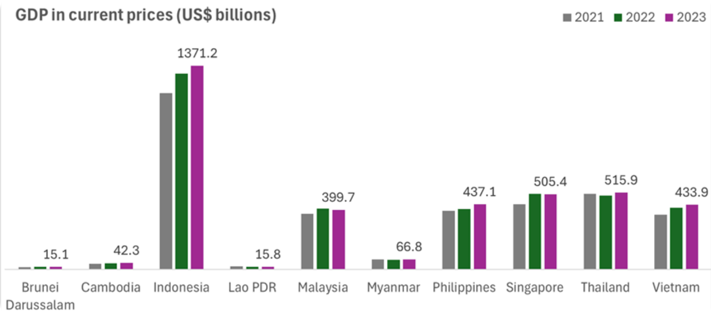


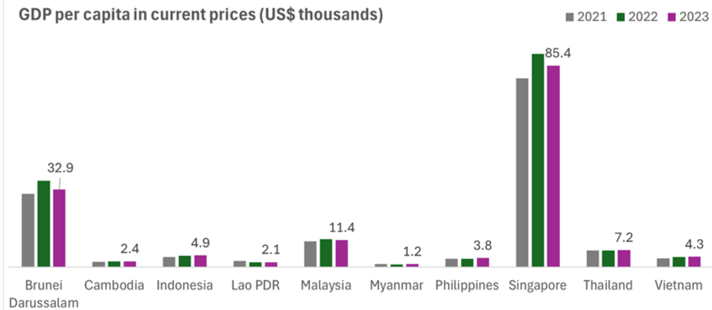
51.8%

of ASEAN population lives in the city, increased by **0.6%** as compared to the urbanisation rate in 2022 (51.2%).



ASEAN's GDP shows an increasing trend. Collectively, the region accounts for **3.6%** of the total world GDP in 2023.

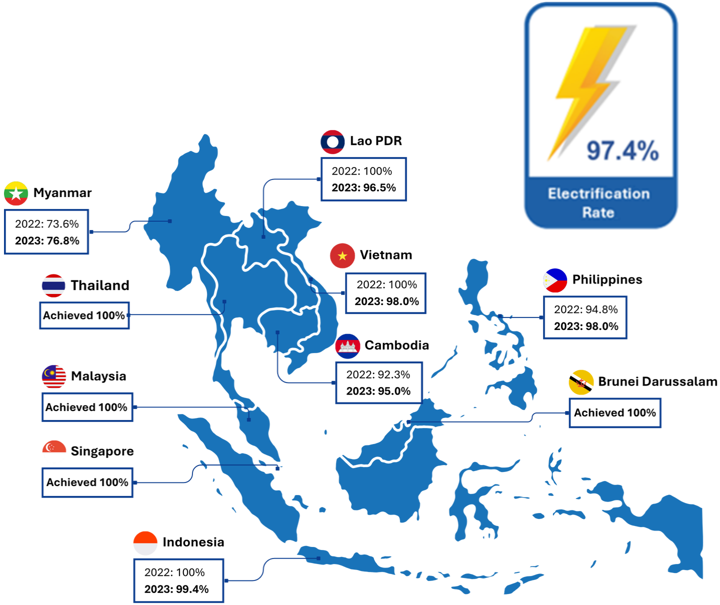




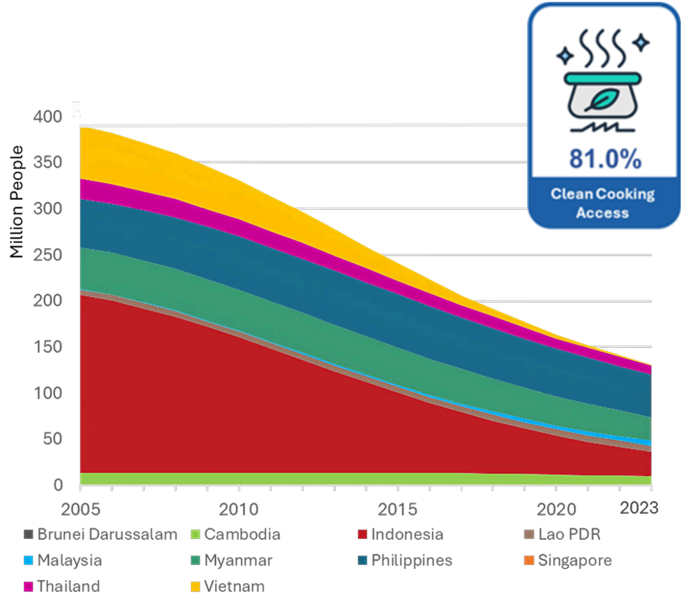
Energy Access

Four ASEAN Member States have achieved 100% universal electrification rate. Clean cooking rate of the region is at 81%, leaving 131.1 million people without clean cooking access in 2023.

Electrification rate in AMS (% of population)



Population without clean cooking access

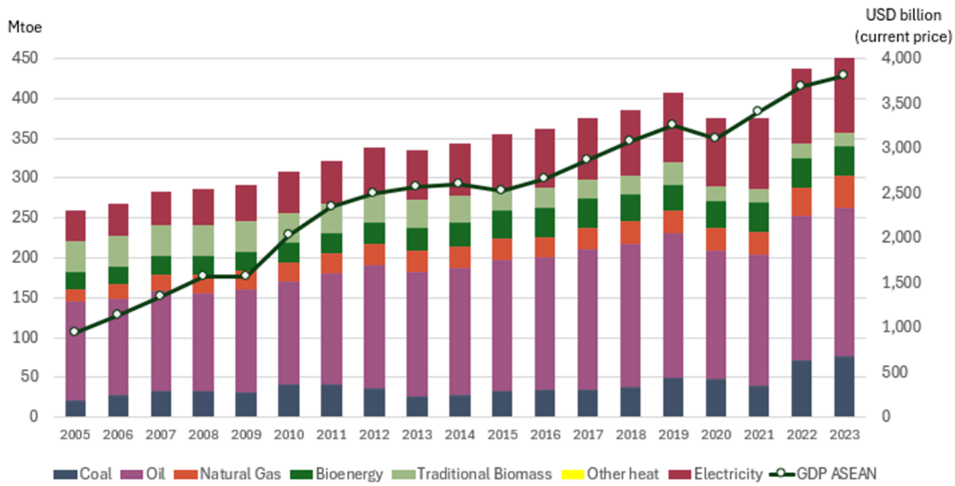


Demand and Supply

Total Final Energy Consumption (TFEC)

While the GDP increased by 4 times in 2023, compared to 2005 level, the TFEC grew slightly less by 1.8 times

Energy Consumption by Fuel and GDP in ASEAN, 2005-2023



Demand for fossil fuels is rising, particularly coal, which nearly doubled from 2021 to 2022, and continued to increase by 16 Mtoe from 2022 to 2023.

Oil remains the largest contributor to overall energy demand.

Compared to 2005, coal, natural gas, and electricity had the biggest increase in 2023, while traditional biomass decreased sharply by 56%.

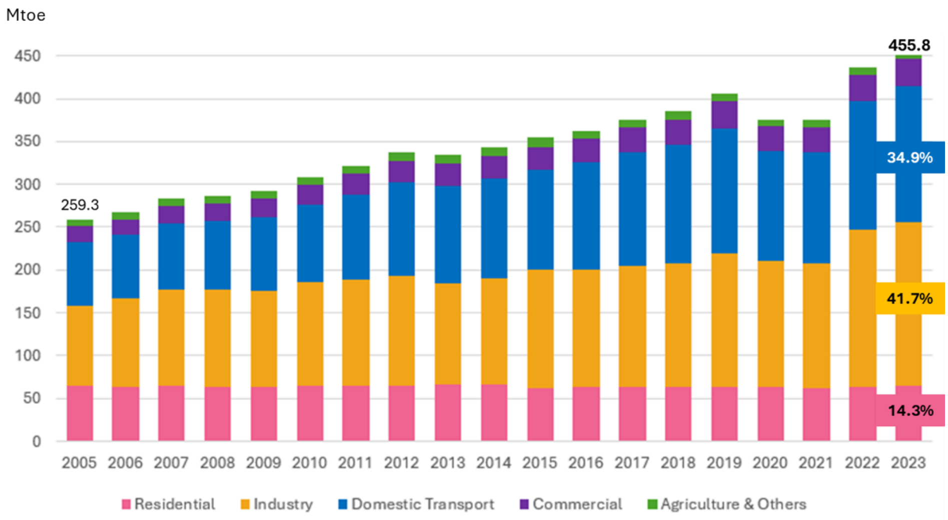
Year	Fossil Fuel	Bioenergy	Electricity
2005	160.5	21.2	37.8
2023	304.1	35.5	98.4
Increase	89.5%	67.5%	2.6 times

Total Final Energy Consumption (TFEC): The sum of energy consumption by end-use sectors, excluding non-energy use and international transportation. The end-use sectors include industrial, residential, transportation, commercial, and agriculture.

Sectoral Energy Consumption

In 2023, energy consumption in ASEAN increased by 4.3% from 2022, with an average annual growth of 3.3% since 2005.

Energy Consumption by Sector



Industry and transport continued to be the largest energy-consuming sectors in the region.

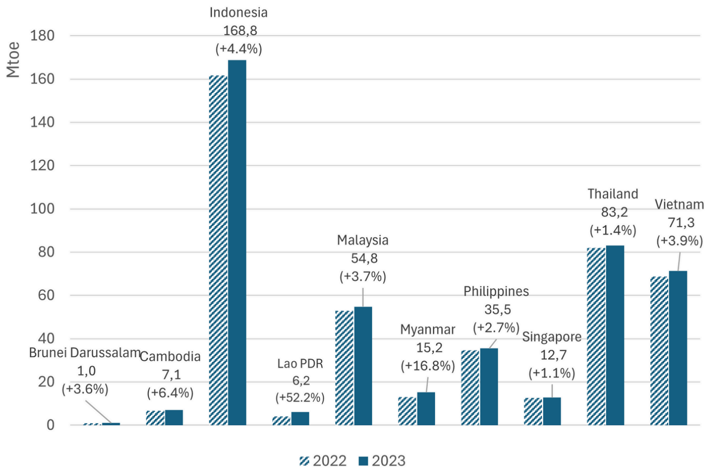
Compared to 2022, commercial is the sector that experienced the largest increase energy consumption in 2023, amounting to 7.8%.

Year	Industry	Transport	Residential
2005	93.9	74.2	64.5
2023	190	158.9	65.3
Increase	2 times	2.1 times	1.3%

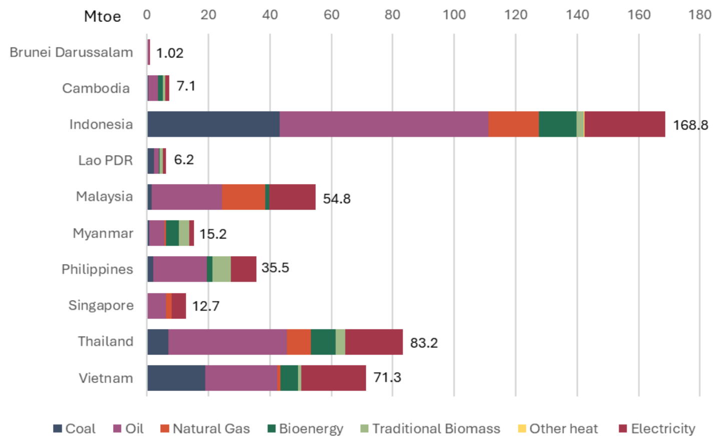
Energy Consumption by Country

Indonesia had the biggest energy consumption accounting for 168.7 Mtoe. Lao PDR experienced the highest consumption growth compared to 2022

AMS Energy Consumption in 2023, compared to 2022 level



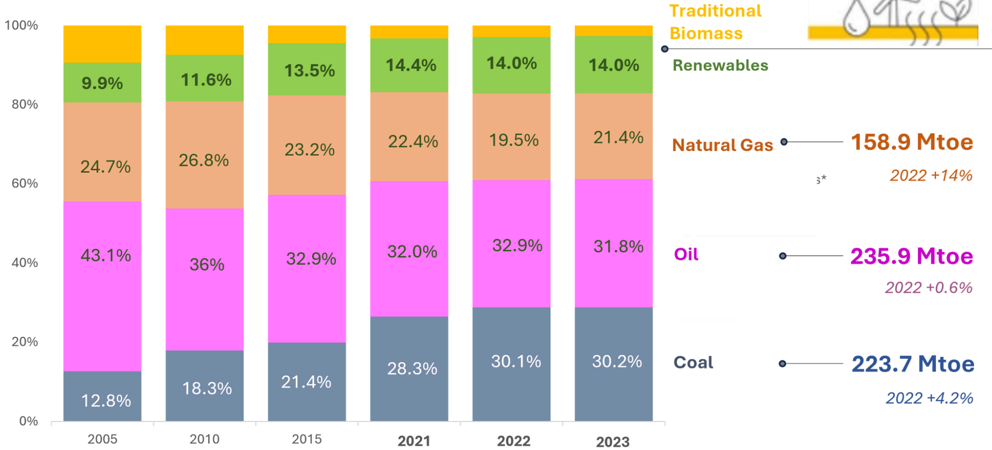
Energy Consumption by fuel in ASEAN Countries 2023



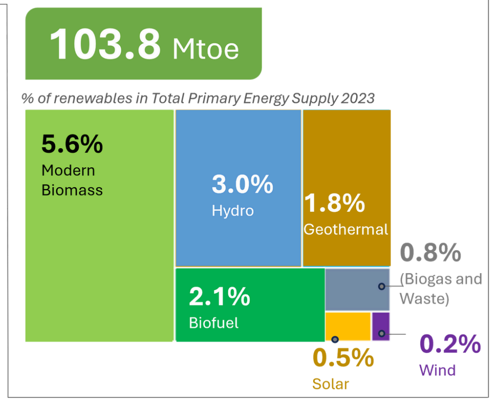
Total Primary Energy Supply (TPES)

In 2023, energy supply in ASEAN increased by 3.9% from 2022. Fossil fuels still dominate the region's energy mix, which accounted for about 83.5%

ASEAN Primary Energy Mix



Renewable Energy in Energy Supply 2023

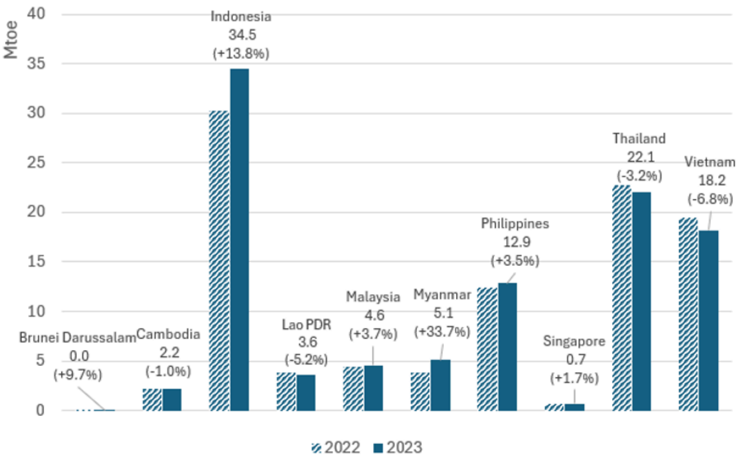


Total Primary Energy Supply (TPES): The sum of energy production and imports, subtracting exports. It includes non-energy uses and storage changes but excludes international transport.

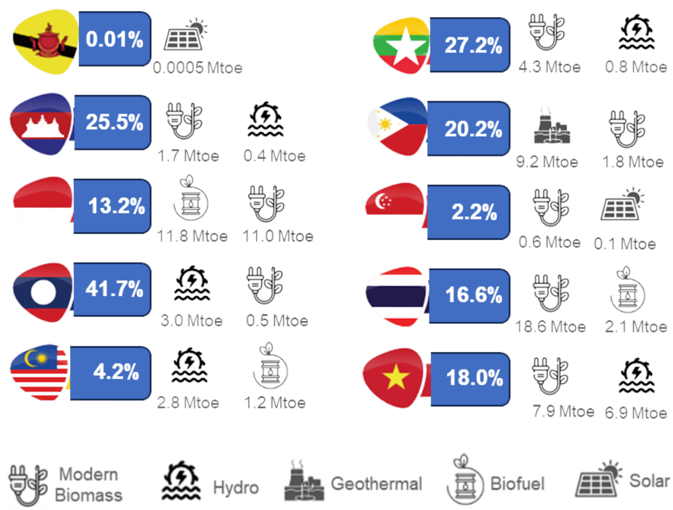
Renewables in Energy Supply by Country

Bioenergy (modern biomass and biofuel) took the largest portion in 2023 energy supply in the region. Thailand has the largest contribution of modern biomass at 18.6 Mtoe, followed by Indonesia with biofuel supply of 11.8 Mtoe.

AMS Renewables in Energy Supply in 2023, compared to 2022 level



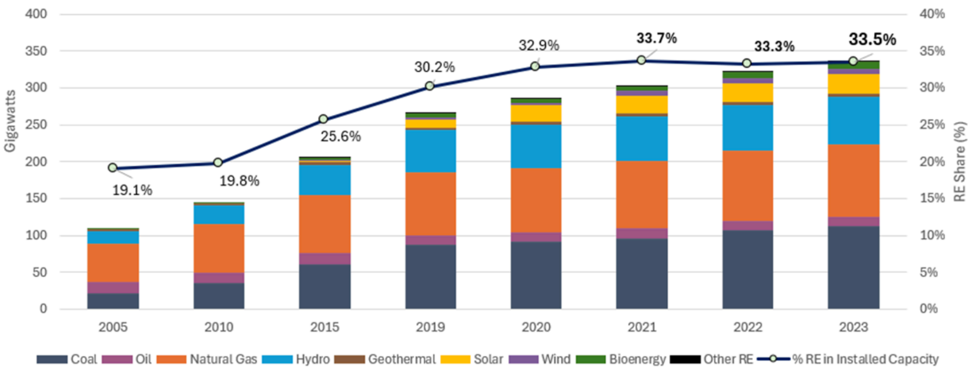
RE Share in Energy Supply and Highest RE Supply in ASEAN Countries 2023

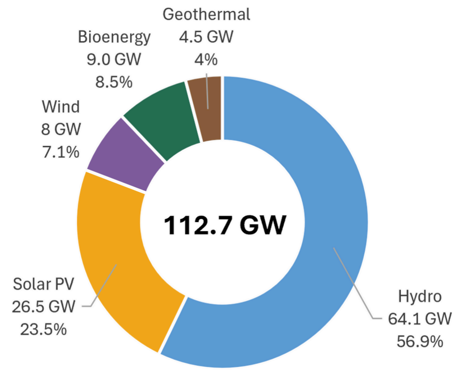


Electricity

Installed Capacity

Installed capacity across all fuel sources gradually keeps surging, with an average growth of 6.2%. In 2023, coal and natural gas still take large portion with the highest installed capacity of 113.1 GW and 98.6 GW.





Renewable capacity exhibits its improvement with bioenergy and wind take a lead position. Those installed capacity grew by 16.7% and 11.1% respectively compared to 2022

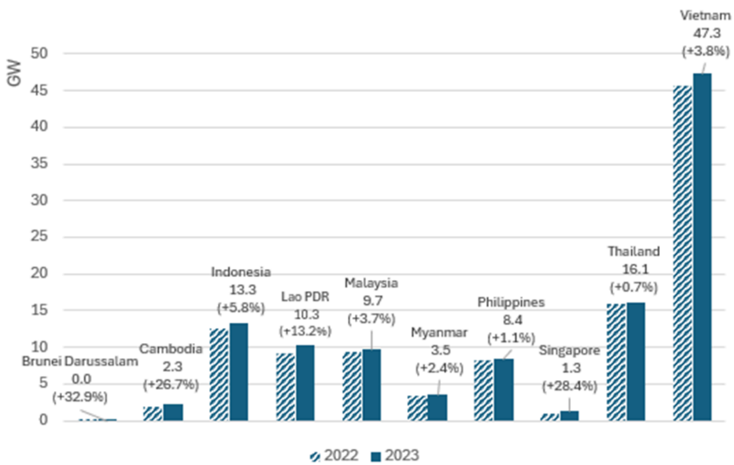
Solar and hydro accounted for the largest share of renewable capacity in 2023, with solar capacity growing by 4.2%.

Installed Capacity: The maximum electricity output a power generation can produce electricity under ideal condition

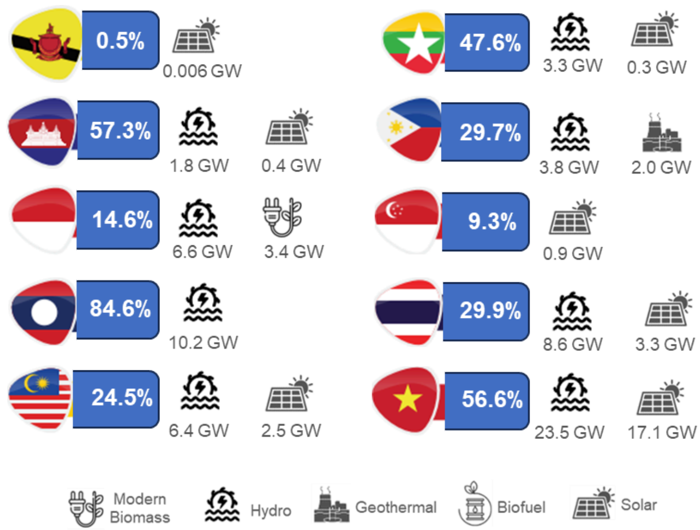
Renewables in Installed Capacity by Country

Hydropower remained the backbone of ASEAN's renewable power capacity, followed by solar. Lao PDR had the highest share of renewables in its national power mix, largely due to hydropower, while Vietnam held the largest share of solar power capacity in the region.

AMS Renewables in Installed Capacity in 2023, compared to 2022 level

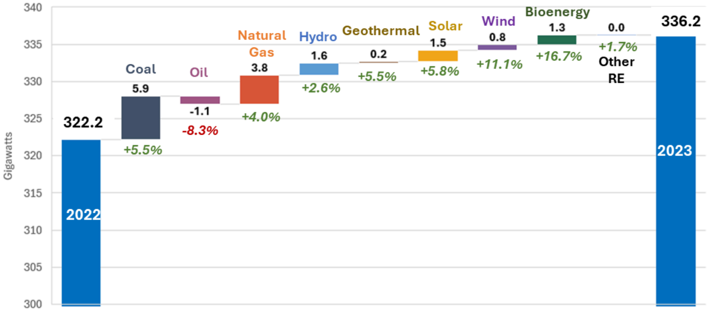


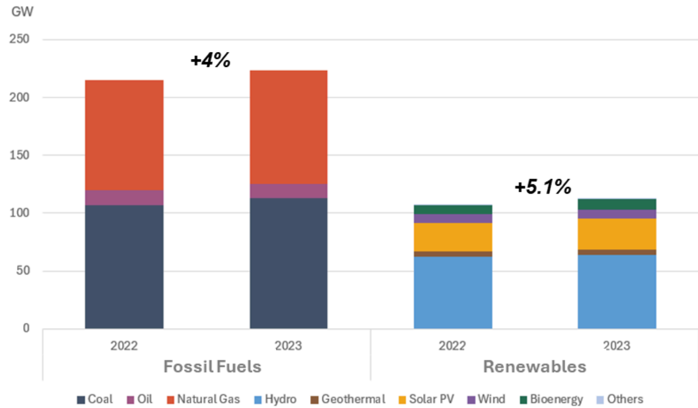
RE Share in Installed Capacity and Highest RE Capacity in ASEAN Countries 2023



Additional Capacity 2022-2023

In 2023, additional installed capacity was about 14.1 GW. Coal power plants contributed a significant portion of 5.9 GW capacity addition.



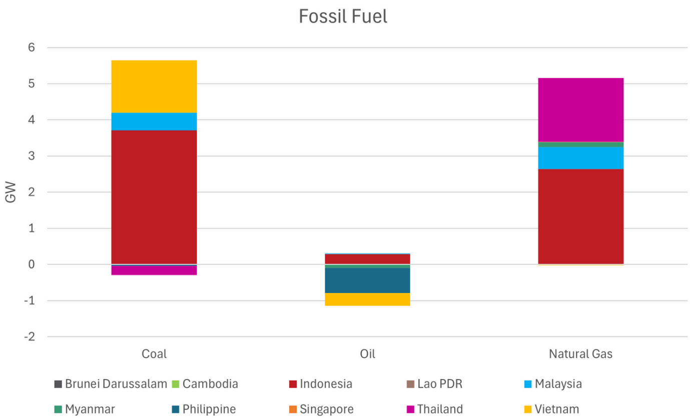


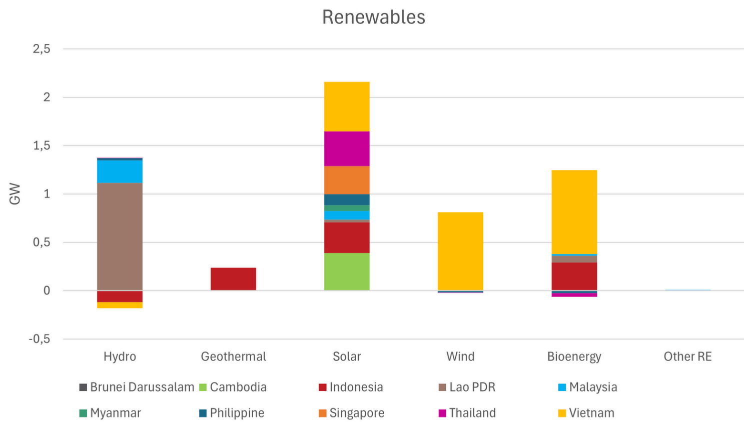
Bioenergy power plants (biomass, biogas, waste) recorded the highest year-on-year increase of 16.7% compared to 2022, followed by wind. In contrast, natural gas saw a decline by 8.3%.

Overall, fossil fuel contributed 61% in the additional installed capacity share in 2023, growing by 8.6 GW from 2022. Meanwhile, the region added merely 5.4 GW of capacity from renewable sources over the same period.

Additional Capacity 2022-2023 by Country

Between 2022 and 2023, several AMS saw a decline in fossil fuel capacity additions, while renewables gained momentum, especially solar and bioenergy.



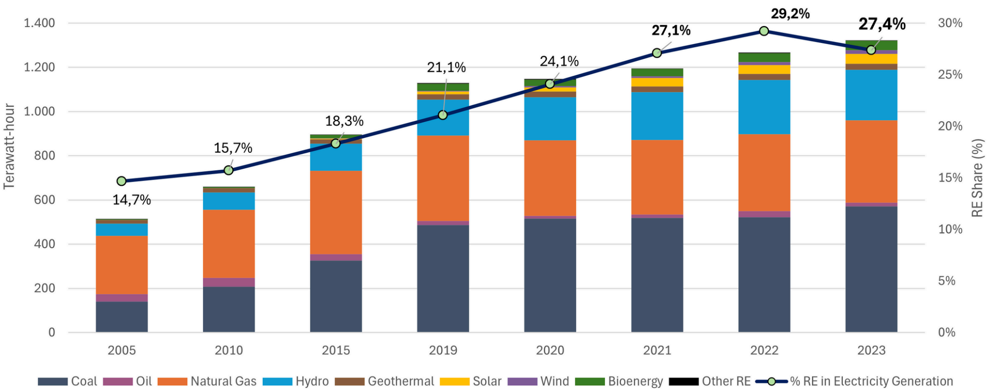


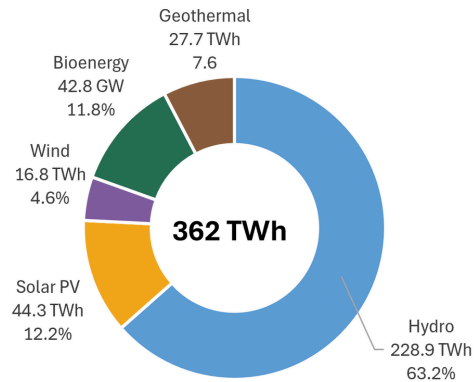
With an additional 5.6 GW of installed capacity from renewable sources, solar accounted for the largest share, followed by bioenergy power plants.

Vietnam led renewable capacity additions in the region, while Indonesia reduced a portion of its hydropower capacity.

Electricity Generation

In 2023, electricity generation increased by 4.3% compared to the previous year, accounting for 1,322.2 TWh. Renewables generation increased with the average of 26% within the last 5 years.





In 2023, coal remained the biggest source of electricity generation, increasing by 9.3% from the previous year, while natural gas generation continued its gradual decline, reaching 372.1 TWh in 2023.

Hydropower maintained the largest share among renewables, despite a downward trend over the past decade.

Wind and coal recorded the highest year-on-year growth rates, at 25.1% and 9.3% respectively, compared to 2022.

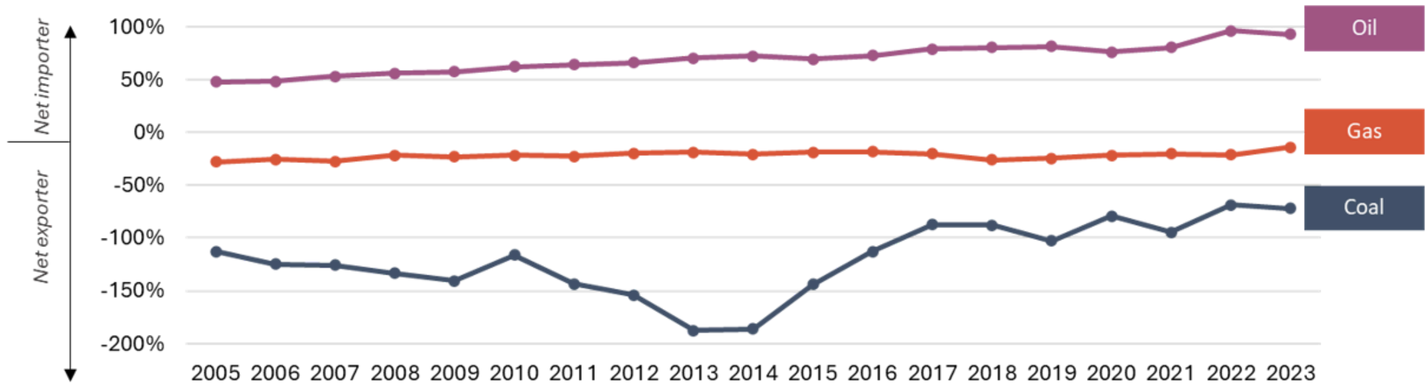
Electricity Generation: Amount of electricity produced annually

Fossil Fuels

Fossil Fuels Dependency

While ASEAN had remained a net oil importer since 2005, the region continued to be a steady exporter of natural gas and coal throughout the same period. However, coal exports have shown a gradual decline since peaking in 2014.

% of net imports in the fuel supply based on Mtoe



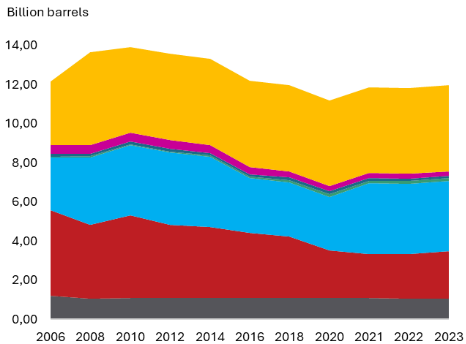
2023 Fossil Fuel Trade Highlights

	Oil	Gas	Coal
Import (Mtoe)	337.5	40.1	90.3
Export (Mtoe)	126.8	62.8	249.2

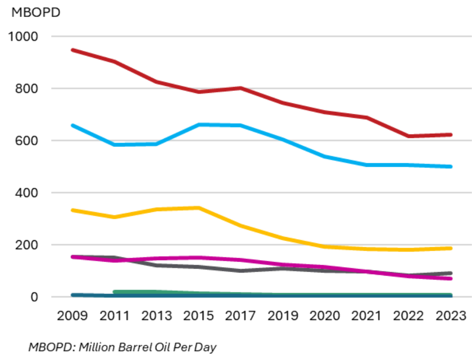
Oil Trend

Overview of oil trend reserve, production, and export import in 2023

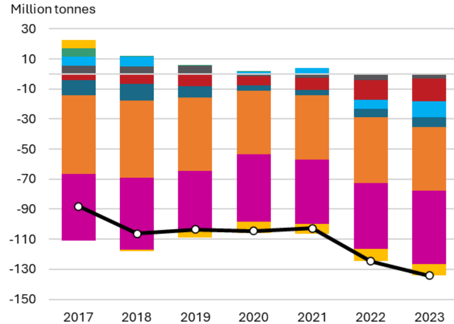
Crude Oil Reserve



Oil Production



Oil Net Export



Brunei Darussalam | Cambodia | Indonesia | Lao PDR | Malaysia | Myanmar | Philippines | Singapore | Thailand | Vietnam | ASEAN

Crude oil reserve in the region had been relatively stable at just below 12 thousand million barrels between 2021 and 2023, led by Vietnam and Malaysia.

Meanwhile, regional oil production continued to drop, predominantly driven by a steady production decrease in Indonesia and Malaysia

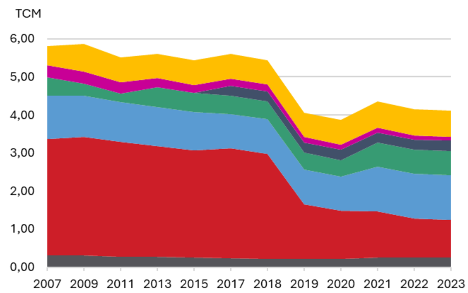
With growing demand and declining domestic production, none of the AMS remained net oil exporters. ASEAN's oiltrade deficit grew by 7% compared to the previous year.

Source: ASEAN Oil and Gas Updates 2024

Gas Trend

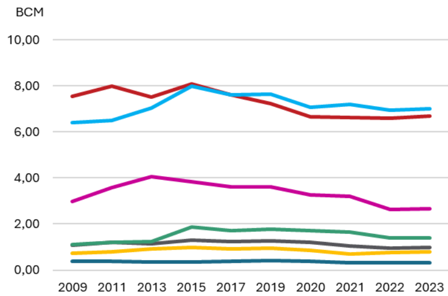
Overview of gas trend reserve, production, and export import in 2023

Gas Reserve



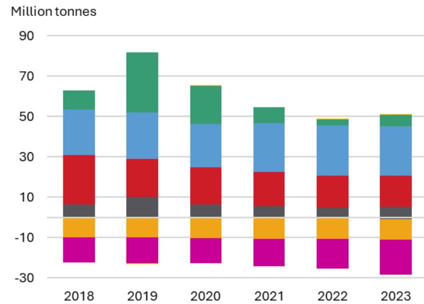
TCM: Trillion Cubic Metres

Gas Production



BCM: Billion Cubic Metres

Gas Net Export



Brunei Darussalam | Cambodia | Indonesia | Lao PDR | Malaysia | Myanmar | Philippines | Singapore | Thailand | Vietnam

Indonesia experienced a noticeable decline in its gas reserves, while other AMS maintained relatively stable levels. By 2023, Malaysia emerged as the country with the largest gas reserve in the region.

Since 2015, Malaysia has surpassed Indonesia to become ASEAN's top gas producer, reaching 7 BCM in 2023. Thailand, Myanmar, and Brunei Darussalam also ranked among the region's top five producers.

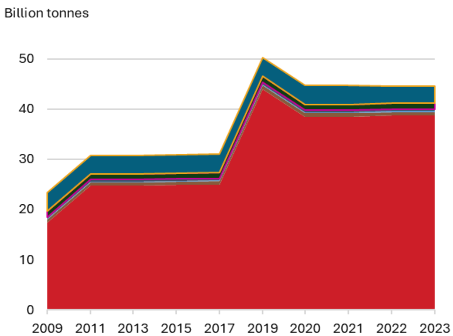
ASEAN continue their declining trend of natural gas export from the region in 2023. The region's net exports declined by 13% compared to 2022.

Source: ASEAN Oil and Gas Updates 2024

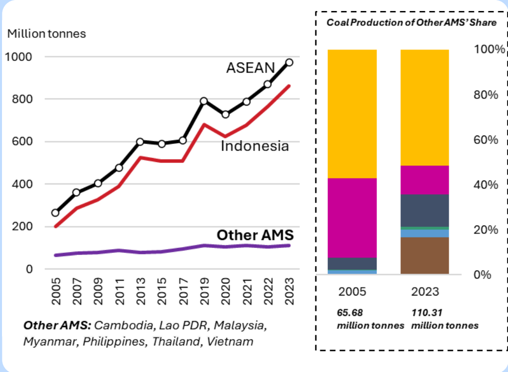
Coal Trend

Overview of coal trend reserve, production, and export import in 2023

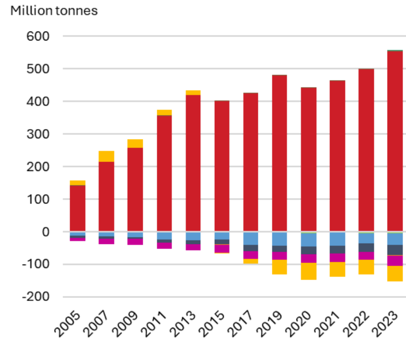
Coal Reserve



Coal Production



Coal Net Export



Brunei Darussalam | Cambodia | Indonesia | Lao PDR | Malaysia | Myanmar | Philippines | Singapore | Thailand | Vietnam

Indonesia continued to dominate ASEAN's coal reserves since a significant spike in 2019, steadily holding over 85% total regional reserves in from 2020 to 2023.

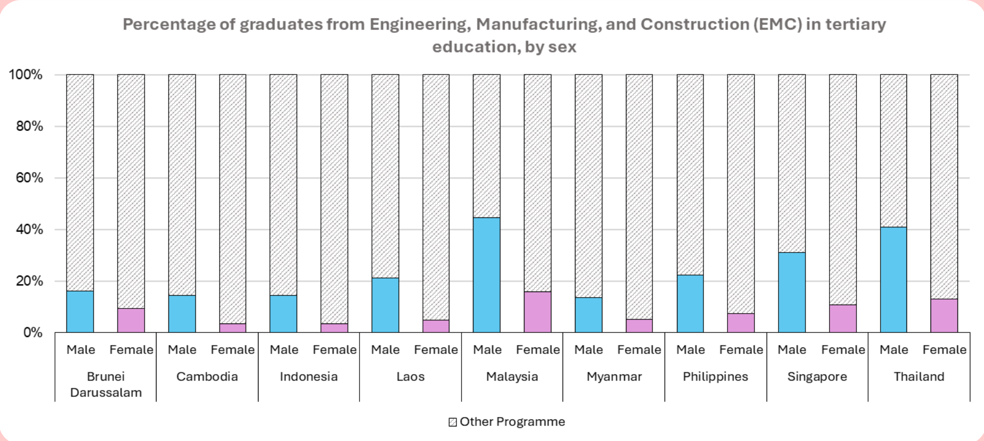
ASEAN's coal production reached a record almost 1,000 million tonnes in 2023, with other AMS growing by 44.63 million tonnes within eighteen years.

In 2023, ASEAN's coal net exports continued to rise, reaching over 400 million tonnes, with Thailand, Malaysia, and Vietnam were major importers.

Gender on Energy

Gender on Energy

Women in Engineering and Technical Education



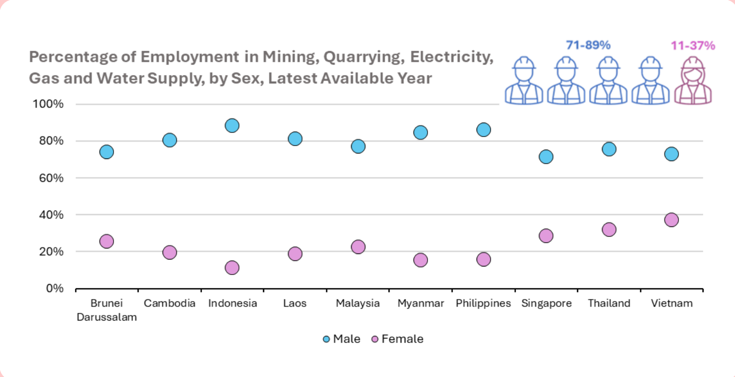
ASEAN is experiencing a shortage of tertiary-level graduates in the fields of Engineering, Manufacturing, and Construction (EMC). This gap is further compounded by a significant gender disparity, with **women representing less than 20% of EMC graduates across all Member States,** ranging from just 3% to 15%.

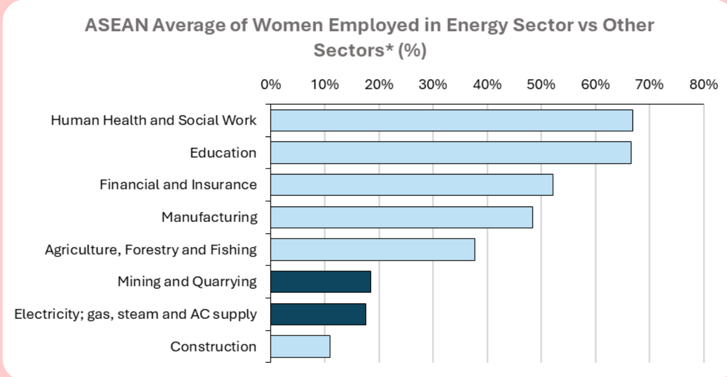
Among ASEAN Member States, **Malaysia (15.7%), Thailand (13.1%),** and **Singapore (10.8%)** report the highest shares of women graduates in EMC fields. These countries also produce the largest overall number of EMC graduates in the region.

Source: UNESCO Institute for Statistics (UIS). 2025. Percentage of Graduates From Engineering, Manufacturing, and Construction in Tertiary Education. [Latest available data, 2020-2024]. Retrieved from UIS Data Browser. Data for Vietnam is unavailable

Gender on Energy

Proportion of Women in Energy Workforce





Women's participation in ASEAN's energy workforce ranges widely from **11% to 37%**, highlighting a significant gender gap across the region.

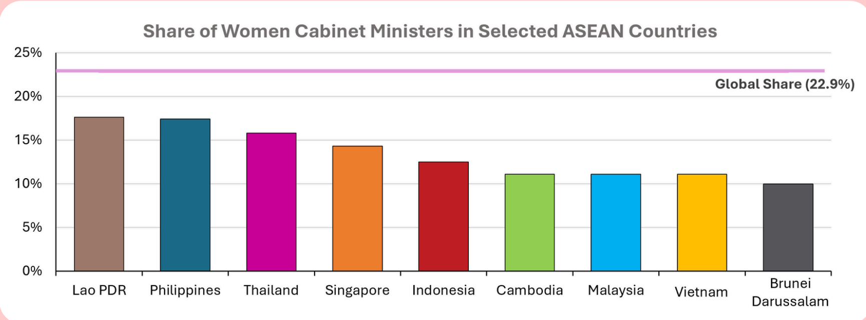
Indonesia records the lowest share of women in the energy workforce at just 11.4%, despite having the largest total energy workforce in ASEAN, with over 2.6 million people. This is partly due to the male-dominated mining sector and entrenched gender stereotypes.

Women remain significantly underrepresented in ASEAN's energy sector, **accounting for less than 20% of the workforce.** Their concentration in roles perceived as less physically demanding shaped by gender norms and socio-cultural barriers that continue to limit women's full and equal participation. Addressing these biases is essential to building an inclusive and resilient energy future for the region.

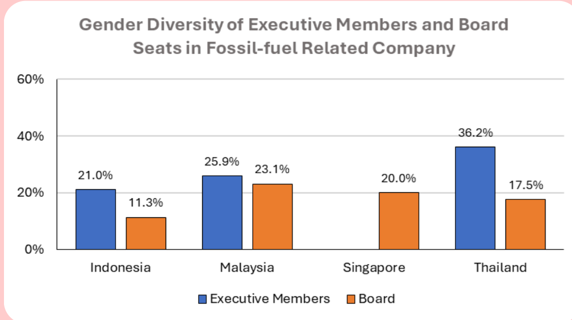
Source: ILOSTAT Data Explorer. Latest available year (2021-2024)

Gender on Energy

Women in Leadership



Source: UN Women, 2025. Women in Politics.



Source: LSEG, 2023. Executive Members Gender Diversity, Percentage & Board Gender Diversity, Percentage.

Women continue to be underrepresented in decision-making roles across ASEAN, **with only 10–17% of cabinet minister positions held by women as of 2025,** below the global average of **22.9%**. However, there is **growing momentum in recognising and advancing women's leadership in the energy and political spheres** in ASEAN, offering promising opportunities for more inclusive and effective governance.

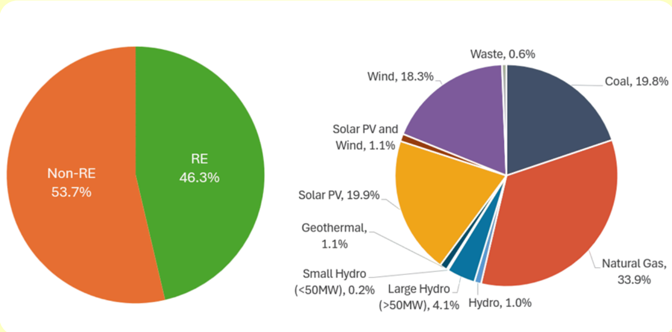
In the private sector, **fewer than 40% of leadership roles in fossil fuel-related firms across 27 listed companies in ASEAN are held by women.** While women are often associated in non-technical roles such as administration, finance, or human resources, partly due to persistent gender stereotypes, a growing body of research shows that **gender-diverse boards are more likely to improve profitability**. This highlights the value of promoting women's participation in leadership, especially in technical and strategic roles.

Energy Investment

Energy Investment

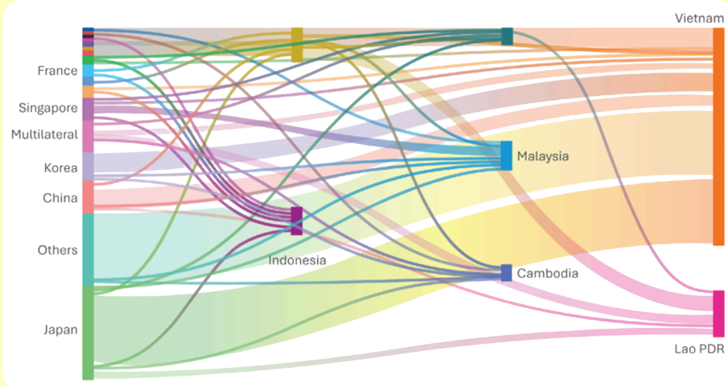
Overview of investment in energy by technology and investment flows across regions

Investment Share by Energy Technology



More than USD 11 billion have been invested in the AMS in the period 2021-2023. By its value, 46.3% of investment in energy infrastructure was towards renewable energy projects.

Investment Flows to ASEAN



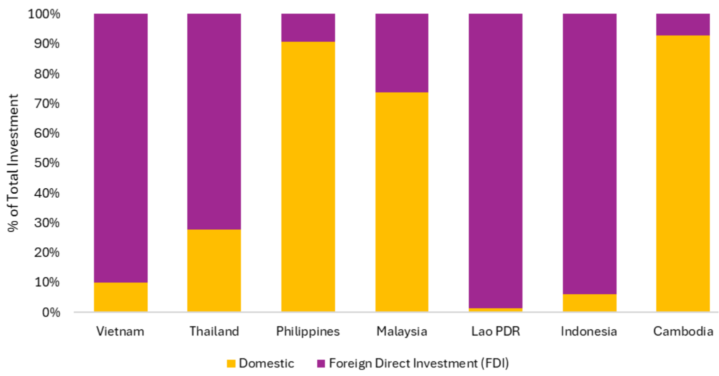
Japan is the largest source of investment for AMS, followed by China. Multilaterals, including Asian Development Bank, Asian Infrastructure Investment Bank, and International Finance Corporation, are active in the region, providing blended financing solutions for renewable energy projects.

Source: ASEAN Energy Investment 2024

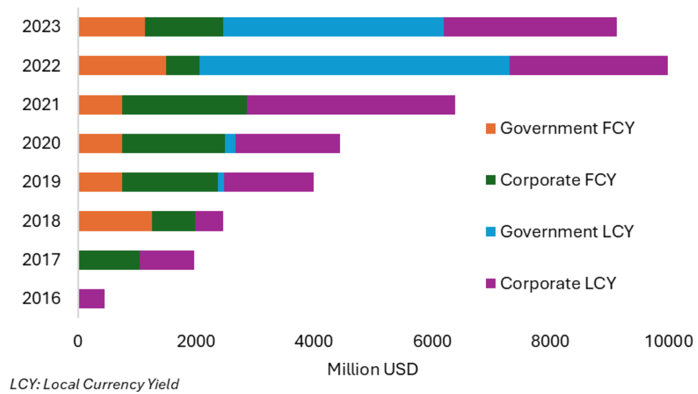
Energy Investment

Overview of investment flows by type, including green bonds issuance

Investment Flows by Type (2021-2023)



Green Bonds Issuance in ASEAN



LCY: Local Currency Yield
FCY: Foreign Currency Yield

Four out of ten AMS relied on foreign direct investment to support their energy infrastructure development between 2021 and 2023. Meanwhile, Philippines and Cambodia were more dependent on their domestic investment.

As a rapidly growing new financial instrument, "green bonds" has gained more attention in ASEAN, with Corporate LCY firstly introduced in 2016. Government LCY made a significant contribution in 2023 despite entering the market in 2019.

Source: ASEAN Energy Investment 2024

Annex

ASEAN Key Indicators in 2023: Social, Economic, and Energy

ASEAN Member States	GDP Current* (billion USD)	Population* (million)	Primary Energy (Mtoe)	Energy Consumption (Mtoe)	Installed Power Capacity (GW)	Electricity Generation (TWh)
Brunei Darussalam	15.10	0.46	5.49	1.02	1.32	5.82
Cambodia	42.34	17.42	8.54	7.12	3.98	15.92
Indonesia	1371.17	281.19	261.79	168.78	91.15	350.54
Lao PDR	15.84	7.66	8.75	6.16	12.23	51.21
Malaysia**	399.71	35.13	108.23	54.79	41.27	199.58
Myanmar	66.76	54.13	18.77	15.25	7.41	20.95
Philippines	437.06	114.89	63.66	35.50	28.29	118.0
Singapore	505.44	5.92	32.27	12.74	12.76	57.38
Thailand	515.91	71.70	132.89	83.15	53.90	220.48
Vietnam	433.86	100.35	100.72	71.29	83.94	282.33
ASEAN	3,803.17	688.86	741.10	455.80	336.26	1,322.21

*World Development Indicators | DataBank (worldbank.org)
**use GDP growth estimation due to incomplete data submission

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