ASEAN Coal Conundrum:
Bridging Energy Demand and Net-Zero Ambitions

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Introduction to ASEAN Centre for Energy (ACE)

Established on 1 January 1999, the **ASEAN Centre for Energy (ACE)** is an **intergovernmental organisation** within the ASEAN structure that represents the 10 ASEAN Member States' interests in the energy sector.

What we do?

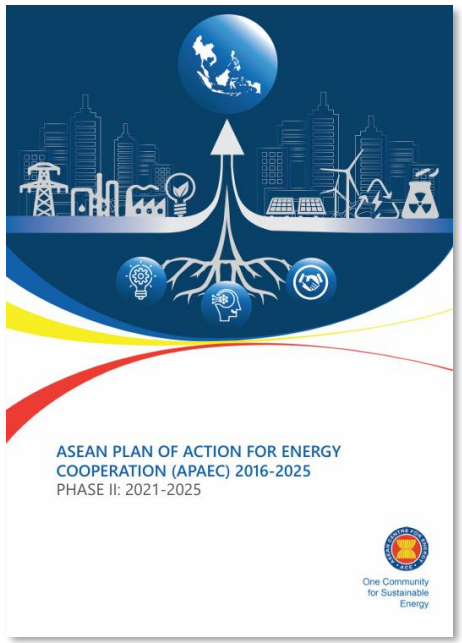
Catalyst

Knowledge Hub

Think Tank

Our regional energy cooperation blueprint, **APAEC**

The ASEAN Plan of Action for Energy Cooperation (APAEC) is a series of guiding policy documents serve as the platform for cooperation within ASEAN as well as with dialogue partners and international organisations.



What does APAEC do?

Promoting multilateral cooperation and integration in the energy sector.

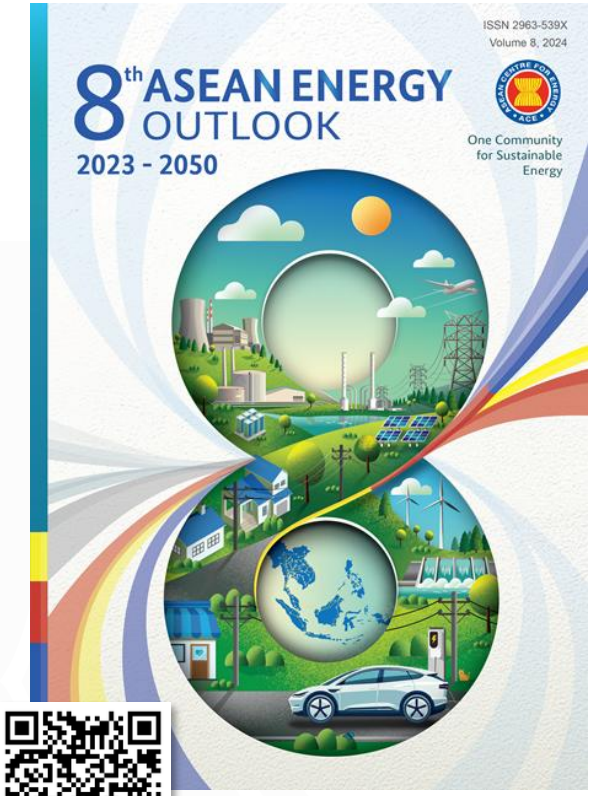
What is APAEC trying to achieve?

To attain the goals of the ASEAN Economic Community (AEC) by enhancing security, accessibility, affordability, and sustainability in the energy sector.

Coal Programme Area

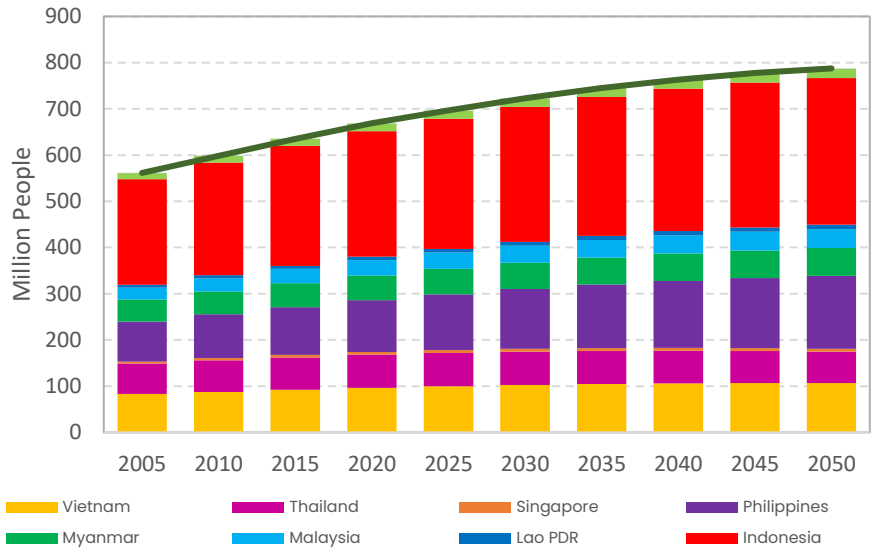
Coal is covered under PA 3: Clean Coal Technology

ASEAN's population and GDP growth lead to increasing energy demand

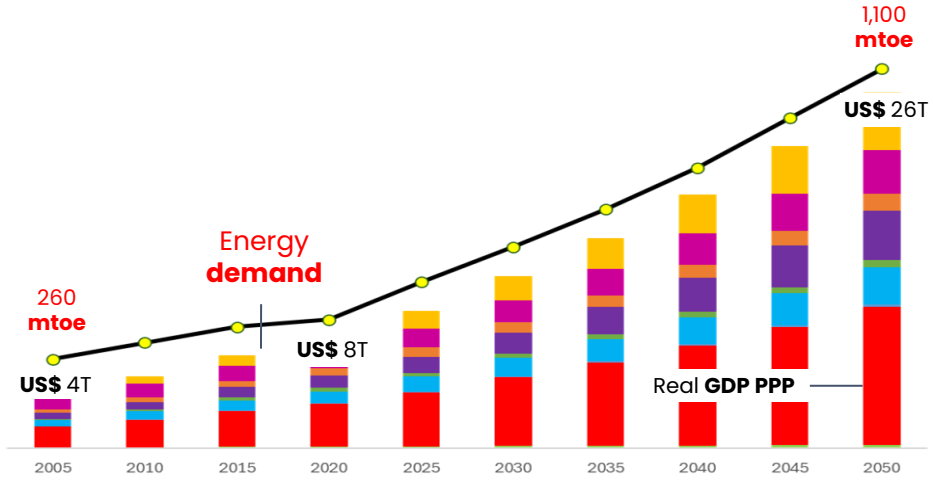


Scan to read full report

Historical and projected ASEAN population



Total GDP and energy demand



Data source: 8th ASEAN Energy Outlook (AEO8)

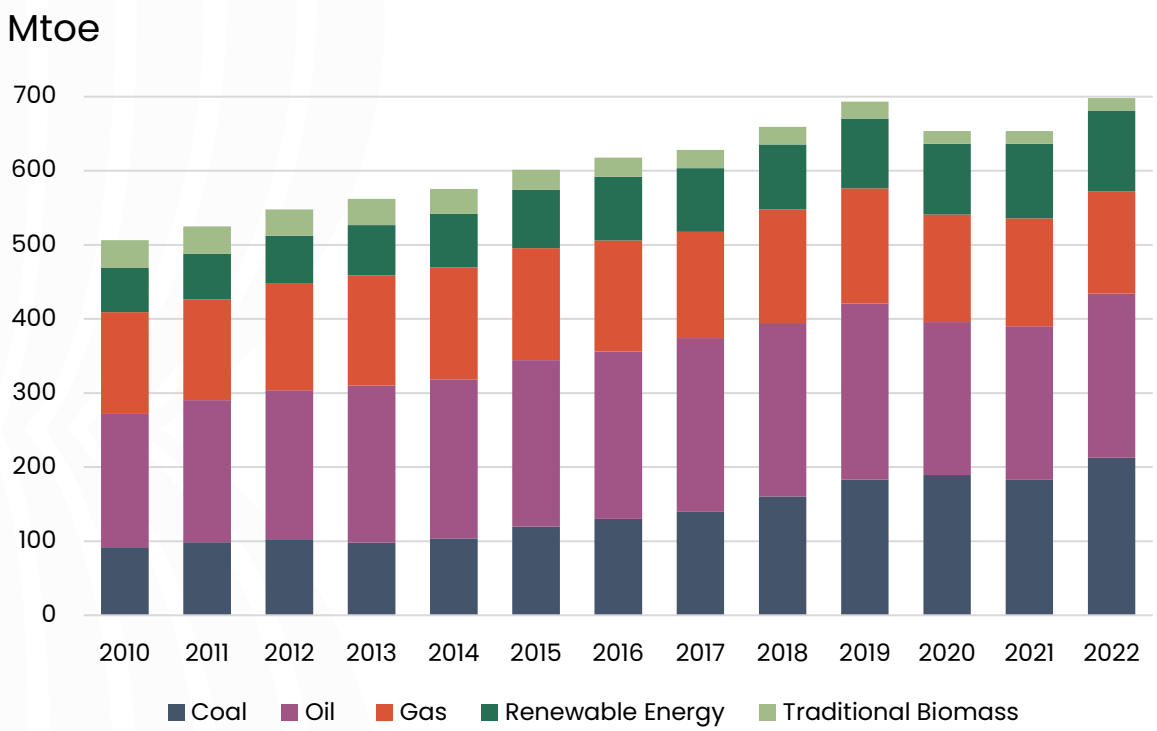
The total ASEAN population increased **1.2 times** in 2022 compared to the 2005 level, reaching almost **680 million.**

ASEAN economy is expected to **grow faster** compared to the world average, with an expected average growth rate of **4%** between 2023 and 2050.

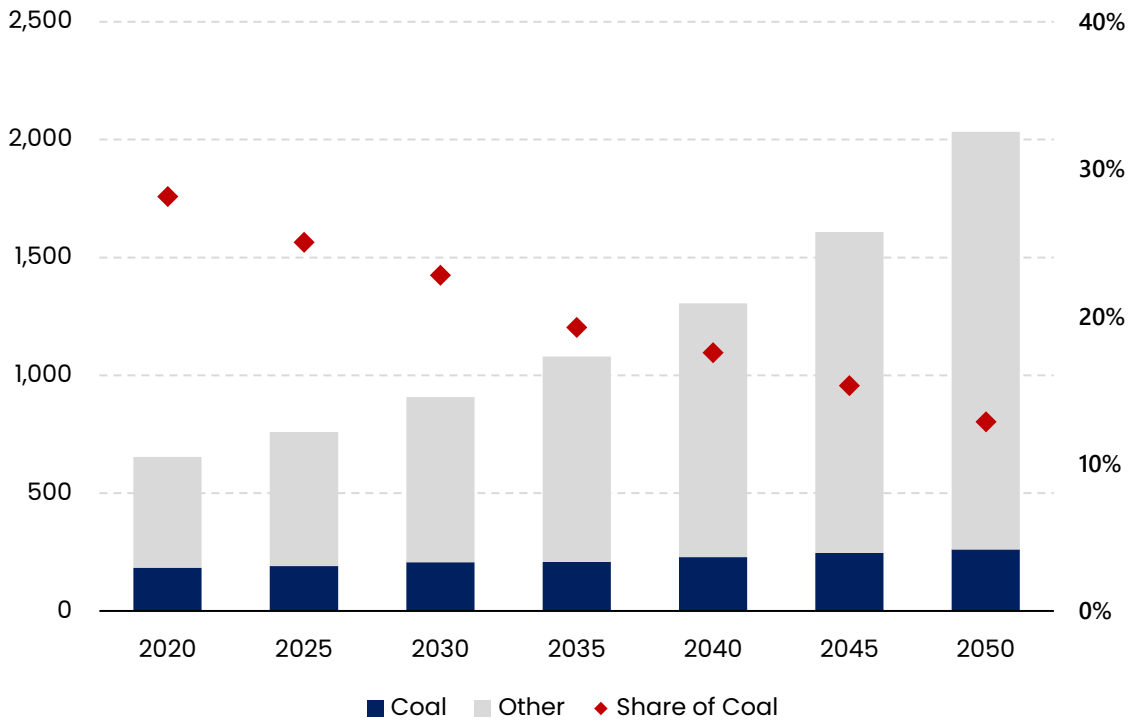
Fossil fuels historically dominated the primary energy supply in ASEAN, and will remain critical in the future amidst the global energy transition aspiration

Fossil fuels, especially **coal, oil, and gas,** have historically **dominated** ASEAN's energy supply, with coal's share **increasing significantly** from 2010 to 2022. However, **coal's role is projected to decline** by 2050 as ASEAN transitions to cleaner energy sources, even as overall energy demand continues to grow rapidly.

Historical primary energy supply by fuel (Mtoe)



Outlook of coal in the primary energy supply mix (Mtoe)

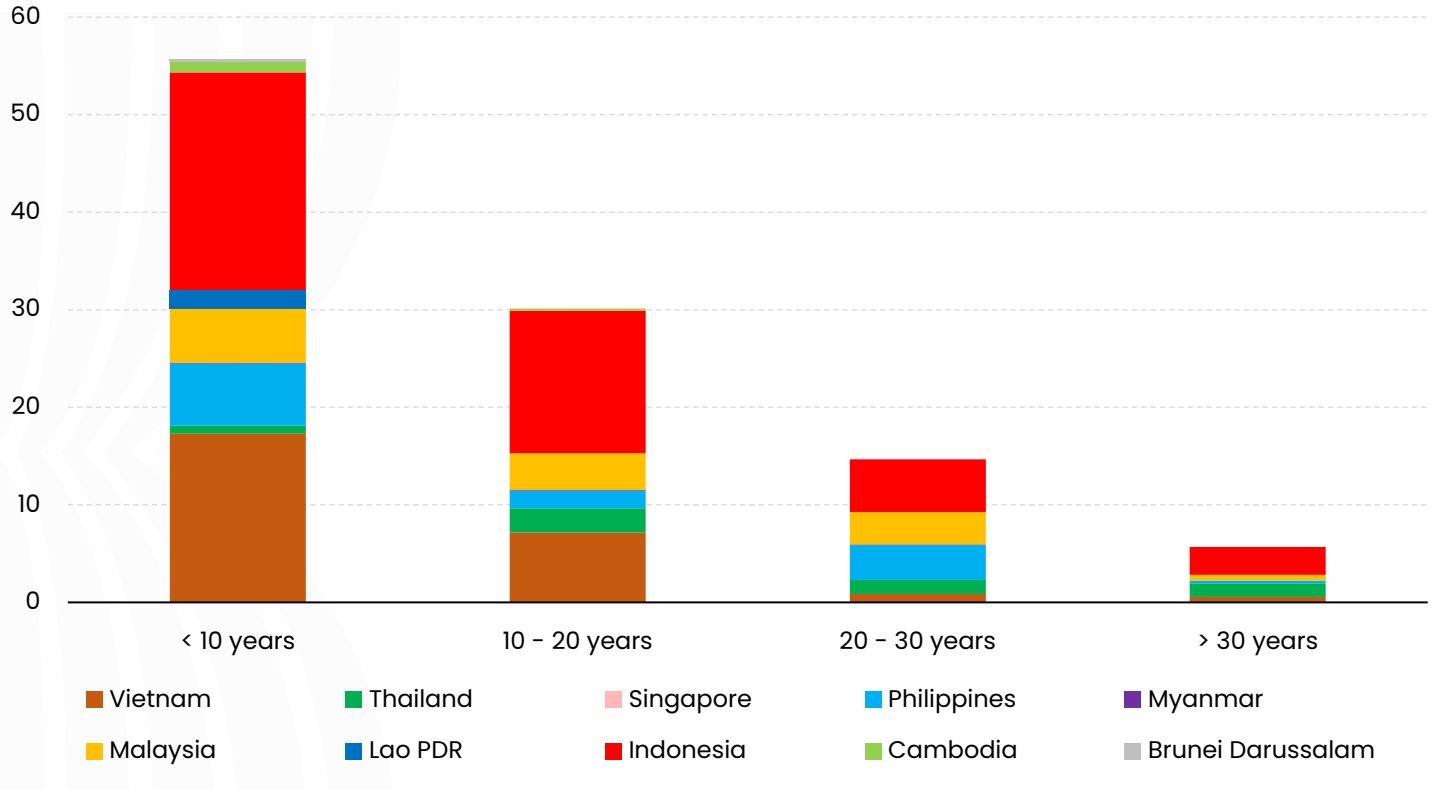


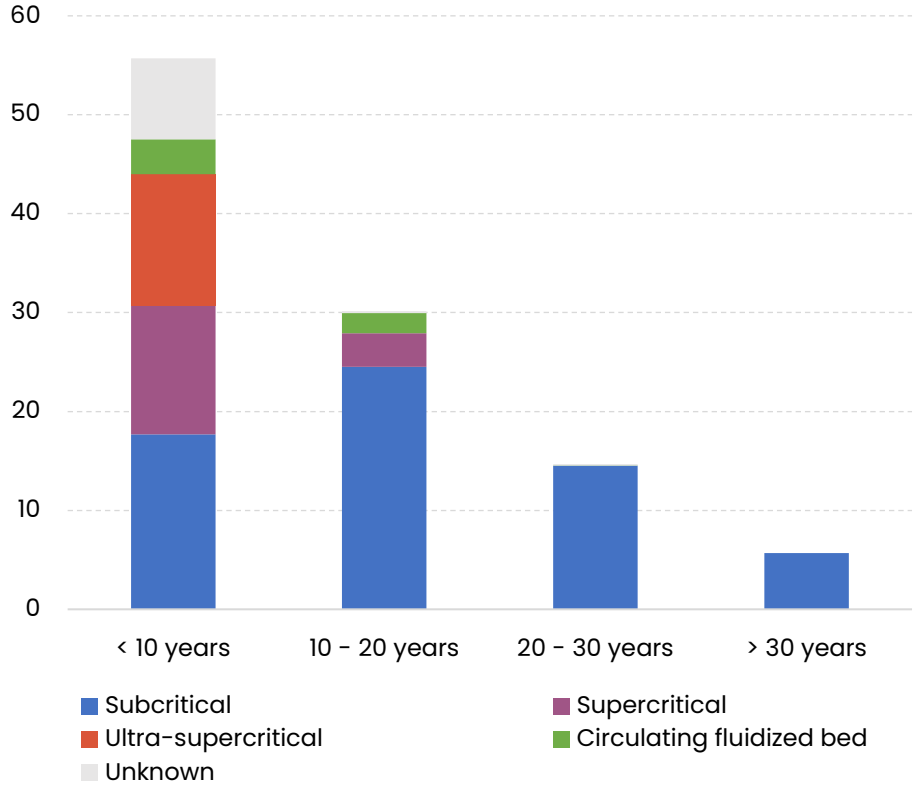
Data source: 8th ASEAN Energy Outlook (AEO8)

Most coal-fired power plants in Southeast Asia are relatively young and use less efficient technologies, making CO_2 emission abatement efforts critical

Coal-fired power plants (CFPPs) in Southeast Asia are relatively young, averaging **14.3 years**, with most located in **Indonesia** and **Vietnam** using less efficient **subcritical technology** (59% of total capacity), and over **55.7 GW** of plants operating for **10 years or less**.

Age distribution of currently operating CFPPs by 2023 by country and technology



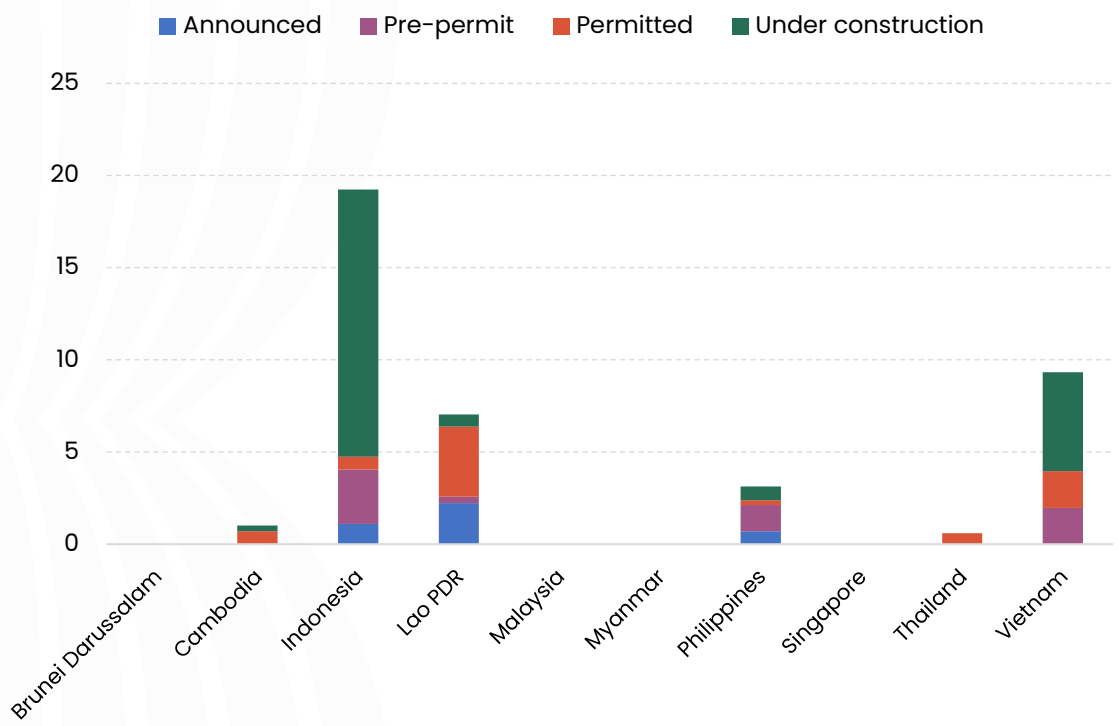


Data source: Global Energy Monitor (GEM) as of 2023 data

New coal-fired power plants are expected to be built and come online within this decade as they continue to be competitive against renewables up to 2040

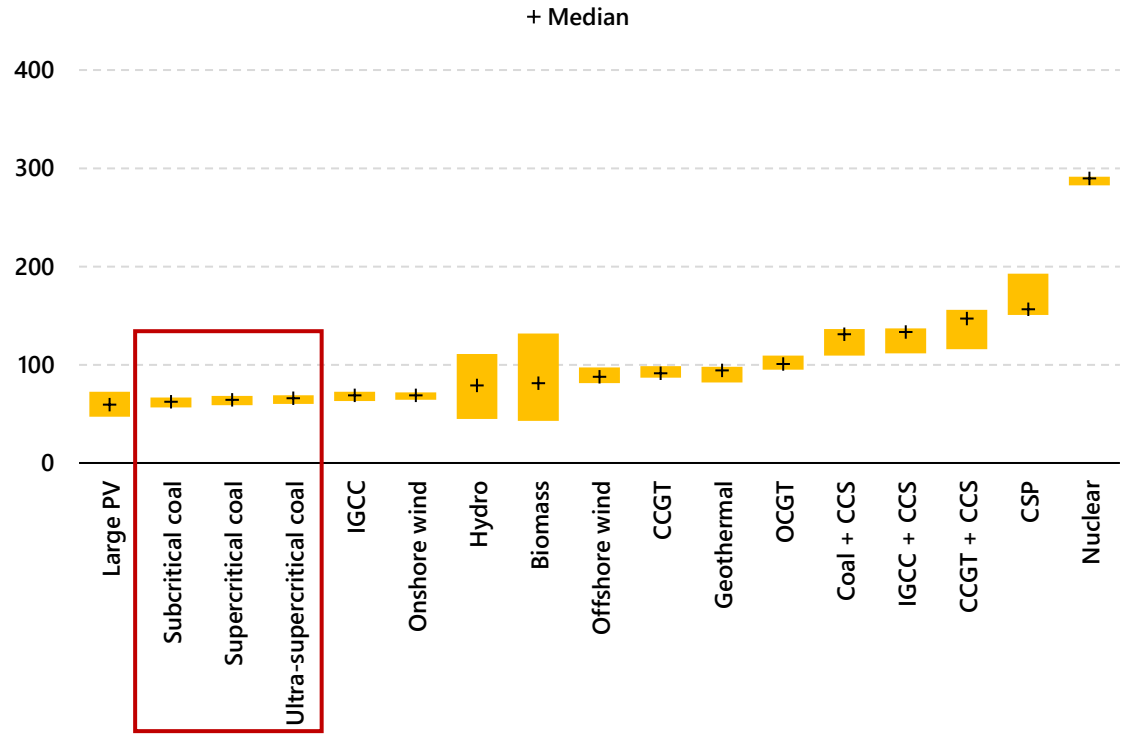
The region is set to expand coal power capacity with **40.3 GW** of prospective projects, including **84 new plants** coming online by 2027, as advanced technologies ensure coal remains competitive against renewables like hydro and solar PV through 2040.

Capacity of prospective CFPP projects (GW)



Data source: Global Energy Monitor (GEM)

VALCOE of power generation in 2040

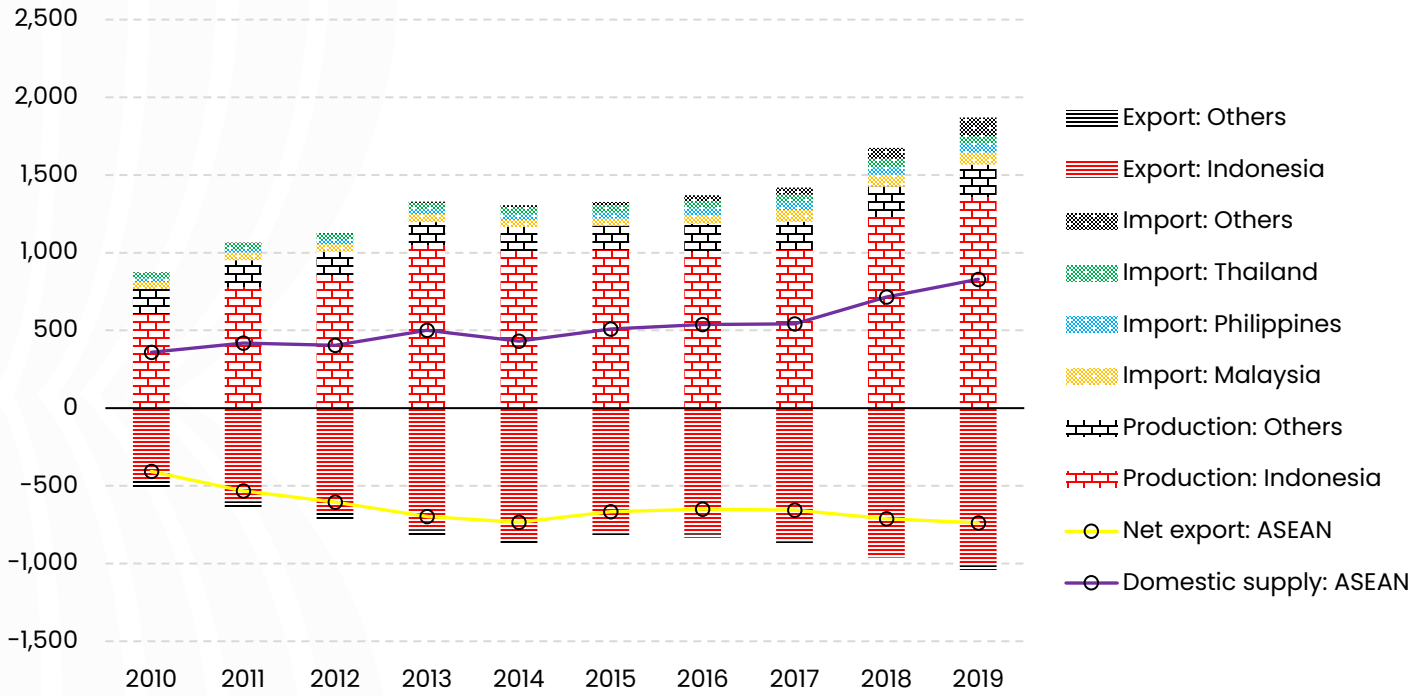


Data source: World Coal Association (WCA) and ASEAN Centre for Energy (ACE)

Coal has become an integral part of some Southeast Asian economies in addition to its primary role in supplying reliable energy

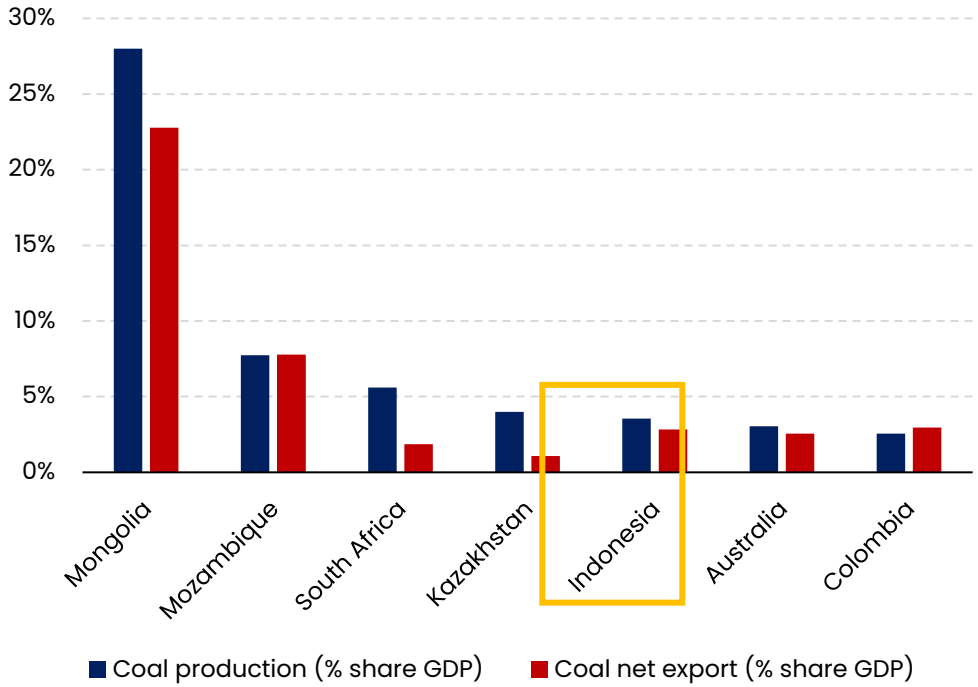
Indonesia is the largest coal producer in Southeast Asia, accounting for **87%** of the region's coal production and nearly **100%** of its exports in 2019, it is playing a crucial role in its economy by **contributing significantly** to GDP, while countries like Malaysia, the Philippines, and Thailand rely on coal imports to meet domestic energy needs.

Coal supply balance in Southeast Asia (million short tons)



Data source: US Energy Information Agency (EIA)

The macroeconomic contribution of coal



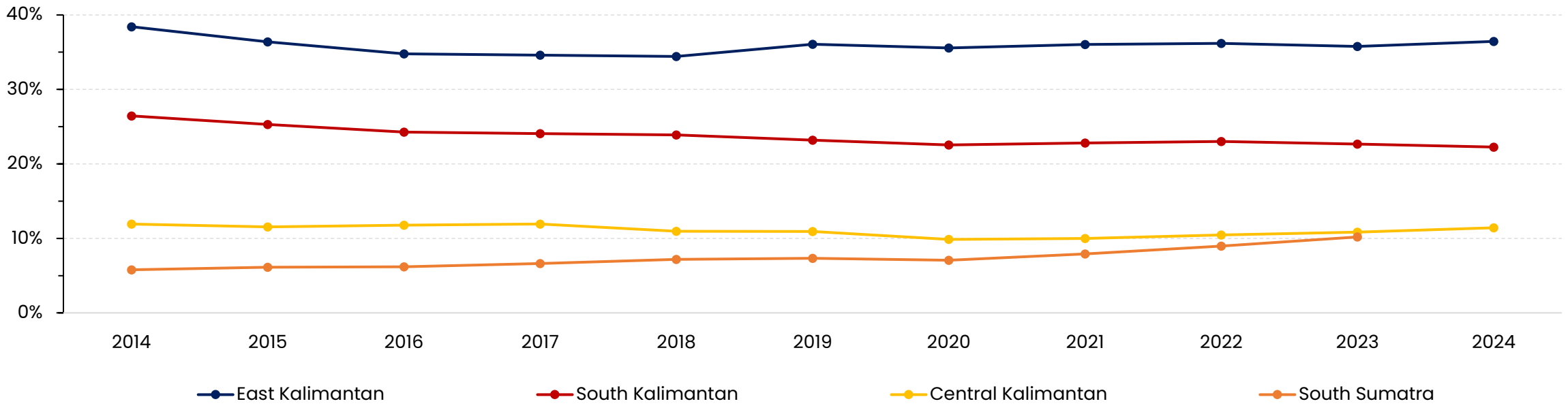
Data source: International Monetary Fund (IMF)

Coal creates jobs with decent pay and bring impacts to regional economy

In 2024, the coal sector supported nearly **390,740 workers** across the region, with **Indonesia** accounting for over **74% (around 290,590 workers)** involved in mining, processing, and power generation—especially in **Kalimantan and Sumatera**, where coal's economic impact is **up to 12 times the national average.**

In Viet Nam, coal provided livelihoods for **nearly 100,000 individuals**, with about **77,000 stable** jobs in Quang Ninh offering monthly incomes between **VND14.9 million and VND15.4 million**—**well above the regional minimum wage** of VND3.2–4.6 million in 2023. Coal also contributed approximately **40%** of Quang Ninh's fiscal revenue.

Regional GDP contribution of coal in Indonesia's provinces



Data source: Statistics Indonesia (BPS)

Individual ASEAN Member States (AMS) have set their emission reduction targets as part of their Nationally Determined Contributions (NDCs)

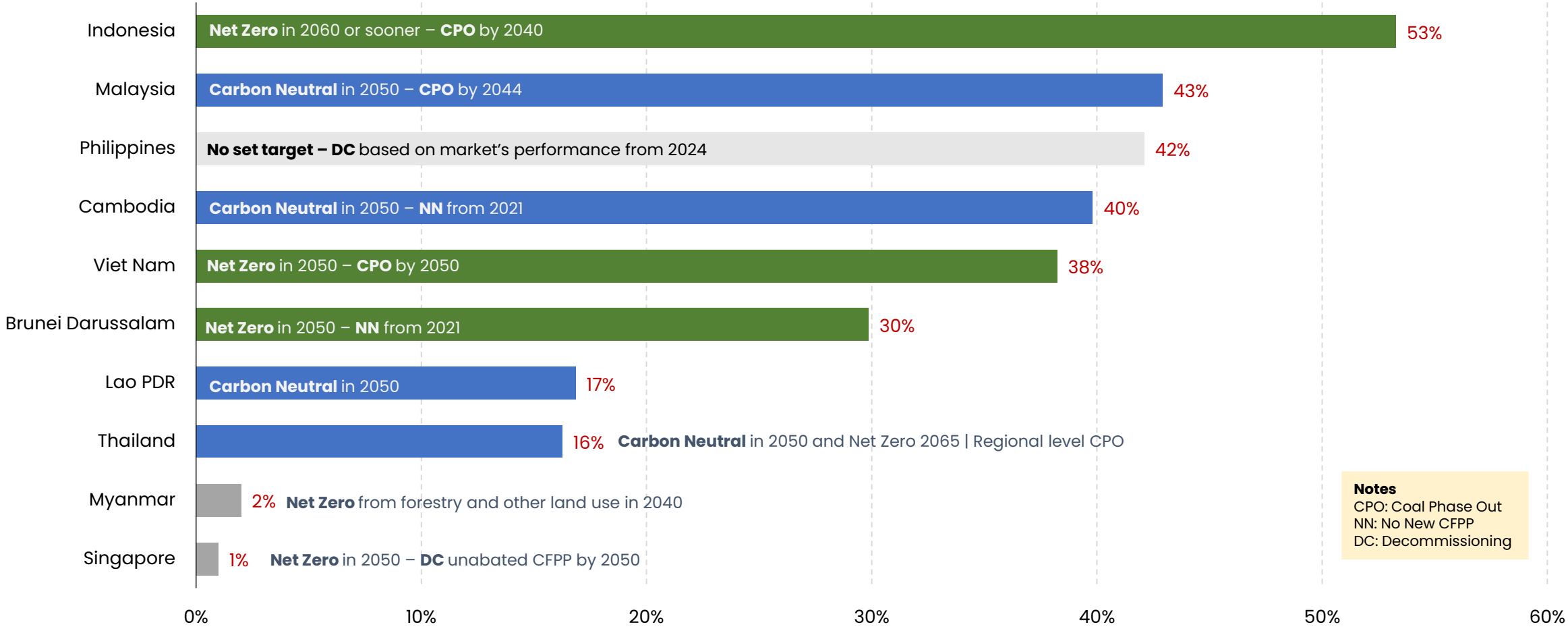
The latest emission reduction targets announced by ASEAN member states and submitted to the UNFCCC

Country	Official emission reduction target	Carbon neutrality or NZE target
Brunei Darussalam	Reduce GHG emissions by 20% by 2030 from the BAU scenario	NZE by 2050
Cambodia	Reduce GHG emissions by 42% by 2030 from the BAU scenario	Carbon neutrality by 2050
Indonesia	Reduce GHG emissions by 31.89% by 2030 (unconditionally) and 43.2% by 2030 (conditionally) from BAU scenario	NZE by 2060 or sooner
Lao PDR	Reduce GHG emissions by 60% by 2030 (unconditionally) from the BAU scenario	Carbon Neutral by 2050
Malaysia	Reduce carbon intensity by 45% from 2005 level by 2030 against GDP	Carbon Neutral by 2050
Myanmar	Reduce GHG emissions by 244.5 Mt CO2e by 2030 (unconditionally) and by 414.75 Mt CO2e by 2030 (conditionally)	Partial NZE from LULUCF by 2040
Philippines	Reduce GHG emissions by 75% by 2030 from the BAU scenario, of which 2.71% is unconditional and 72.29% is conditional	N/A
Singapore	Reduce GHG emissions to around 60 MtCO2e in 2030 after peaking emissions earlier	NZE by 2050
Thailand	Reduce GHG emissions by 30% by 2030 from the BAU scenario	Carbon neutrality by 2050, NZE by 2065
Vietnam	Reduce GHG emissions by 15.8% by 2030 (unconditionally) and by 43.5% by 2030 (conditionally) from the BAU scenario	NZE by 2050

Data source: UNFCCC

Several AMS have pledged to transition from coal through phase out or moratorium, but none has outlined this commitment in national energy plans

Share of coal in power generation mix in 2023 (%) and coal-related policies in power sector by 2025



Data source: ACE analysis, 2025

Indonesia's coal policy has progressed through a **complex interplay** of decarbonization pledges, industrial demands, and financial constraints, … *(continued to the next page)*

Category of progression status

Towards addition of CFPP capacity			Towards a pause of CFPP capacity			Towards decrease of CFPP capacity		
Constructing/ commercially launching new CFPP	Releasing regulation/roadmap that allows new CFPP	Announcing, planning or permitting new CFPP	Announcing, planning for no newer CFPP	Releasing regulation/roadmap that's does not allow new CFPP	Halting/cancelling new CFPP projects	Announcing, planning, or permitting CFPP retirement	Releasing regulation/roadmap to support CFPP retirement	Retiring CFPP
A3	A2	A1	B1	B2	B3	C1	C2	C3

Indonesia

Published Time	Policy/Regulation/Roadmap/Statement	Description	
2021 - May	Former President Joko Widodo's statement on limited meeting	No more construction of new CFPP in 2021-2030 period except projects under the pipeline	B1
2021 - July	Indonesia Long-Term Strategy for Low Carbon and Climate Resilience 2050 (LTS LCCR)	To mitigate emission from the remaining CFPP with CCS/CCUS and BECCS.	X
2021 - October	***Rencana Usaha Penyediaan Tenaga Listrik* (RUPTL)/ Electricity Supply Business Plan 2021-2030**	No new CFPP are planned beyond those already under construction or committed	B2
2021 - November	COP26 Statement from Minister of EMR Arifin Tasrif	**Net-zero by 2060 or sooner.** No new CFPP addition between 2026-2030 except projects under pipeline.	B1
		Gradual CFPP retirement from 2031-2035, 2036-2040, 2051-2060.	C1
	COP26 Coal to Clean Power Transition Statement	Signed ¾ statement and will consider accelerating coal phase-out to 2040s under some conditions	C1
2021 - November	Friend of Indonesia-Renewable Energy (FIRE)	Exercising CFPP retirement before 2030	C1
2022 - September	Enhanced NDC (ENDC)	Coal will still constitute at least 30% TPES by 2025 and 25% by 2050. SC and USC will be implemented.	X
2022 - September	President Regulation No. 112/2022 on the Acceleration of Renewable Energy Development for Electricity	Prohibits new CFPP development except those already included in RUPTL 2021-2030 or those meeting **specific criteria.**	B2 C2

Data source: ACE analysis, 2025

(continuation from previous page)..., which resulting in **selective restrictions, continued captive coal expansion**, and a transition strategy **increasingly reliant on international support**.

Category of progression status

Towards addition of CFPP capacity			Towards a pause of CFPP capacity			Towards decrease of CFPP capacity		
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A3	A2	A1	B1	B2	B3	C1	C2	C3

Published Time	Policy/Regulation/Roadmap/Statement	Description	
2024 - February	*Taksonomi untuk Keuangan Berkelanjutan Versi 1*/ Taxonomy for Sustainable Finance Ver. 1	Kept direct CFPP investments out of the "green" category of activities (to "yellow" and "red)	B2
2024 - November	G20 - President Prabowo Subianto's statement	To replace all CFPP in the next 15 years and to **phase out all fossil fuels power capacity by 2040**	C1
2025 – February	Minister of EMR Bahlil Lahadalia's Statement	Announces 7-year early retirement plan of Cirebon-1 CFPP in West Java as JETP pilot project	C1
2025 - Maret	*Rencana Umum Ketenagalistrikan Nasional*/ National Electricity Master Plan 2024-2060	Plan to increase CFPP capacity up until 2030 with captives as the main driver (75% of the addition)	A2
		Restrict new CFPP construction based on the **President Regulation No. 112/2022**	B2
2025 - April	MEMR Regulation No. 10/2025 – Roadmap for Energy Transition	Prohibits new CFPP development except those already included in RUPTL 2021-2030 or those meeting **specific criteria.**	B2 C2
2025 - May	*Rencana Usaha Penyediaan Tenaga Listrik* (RUPTL)/Electricity Supply Business Plan 2025-2034	Plan to add CFPP by 2034, with significant portion expected to operate in the first five years	A2
		Prohibits new CFPP development except those already included in RUPTL 2021-2030	B2
		Allow captives addition based on specific criteria, but only those established until 2030	A2
2025 - May	*Taksonomi untuk Keuangan Berkelanjutan Versi 2*/ Taxonomy for Sustainable Finance Ver. 2	Inclusion of some captive CFPP as low-carbon transition under several strict qualifications, opening enabling new ones to be added.	A2
2025 - May	Special envoy for energy and climate Hashim Djojohadikusumo's statement in media interview	No phase-out within 15 years, CFPP will keep being added up until 2040	A1

Data source: ACE analysis, 2025

Malaysia's coal transition reflects a **steadily intensifying commitment** to **carbon neutrality by 2050**, anchored by a **clear moratorium** and a phased retirement strategy culminating in **full CFPP exit by 2044.**

Category of progression status

Towards addition of CFPP capacity			Towards a pause of CFPP capacity			Towards decrease of CFPP capacity		
Constructing/ commercially launching new CFPP	Releasing regulation/roadmap that allows new CFPP	Announcing, planning or permitting new CFPP	Announcing, planning for no newer CFPP	Releasing regulation/roadmap that's does not allow new CFPP	Halting/cancelling new CFPP projects	Announcing, planning, or permitting CFPP retirement	Releasing regulation/roadmap to support CFPP retirement	Retiring CFPP
A3	A2	A1	B1	B2	B3	C1	C2	C3

Malaysia

Published Time	Policy/Regulation/Roadmap/Statement	Description	
2021 - September	Prime Minister Datuk Seri Ismail Sabri Yaakob's Statement on the 12th Malaysia Plan presentation [96]	**To achieve net-zero by 2050,** Committed to no longer building new CFPP	B2
2022 - August	TNB's announcement on sustainable agenda[97]	Retiring some CFPPs earlier than planned **TNB net-zero emissions by 2050**	B1
2023 - February	Electricity Supply and Tariff Development and Implementation Committee (JPPPET) decision [98]	Ceased CFPP development approval	B3
2023 – July & August	The National Energy Transition Roadmap (NETR) [99]	**To phase out coal entirely by 2045** Driven by natural retirement and restricting the addition of new CFPP development	C2
2023 - December	Natural Resources, Environment and Climate Change Minister Nik Nazmi Nik Ahmad's statement [100]	Launched a request for information (RFI) for possible early coal phase out	C1
2024 - June	Deputy Prime Minister Fadillah Yusof's statement [101]	**Plan to retire all CFPP by 2044** Plan to halve CFPP capacity by 2035	C1
2024 - October	Deputy Prime Minister Fadillah Yusof's statement	To gradually phase out CFPP	C1
		No new CFPP will be established	B1

Data source: ACE analysis, 2025

The Philippines' coal policy is defined by a **conditional moratorium** on new greenfield CFPPs, **ongoing exemptions** for pre-approved projects, and a pragmatic shift toward **early retirements.**

Category of progression status

Towards addition of CFPP capacity			Towards a pause of CFPP capacity			Towards decrease of CFPP capacity		
Constructing/ commercially launching new CFPP	Releasing regulation/roadmap that allows new CFPP	Announcing, planning or permitting new CFPP	Announcing, planning for no newer CFPP	Releasing regulation/roadmap that's does not allow new CFPP	Halting/cancelling new CFPP projects	Announcing, planning, or permitting CFPP retirement	Releasing regulation/roadmap to support CFPP retirement	Retiring CFPP
A3	A2	A1	B1	B2	B3	C1	C2	C3

Philippines

Published Time	Policy/Regulation/Roadmap/Statement	Description	
2020 - October	Department of Energy (DoE)'s Moratorium on Endorsement for Greenfield Coal Power Plants [102]	Moratorium on endorsement for greenfield CFPPS is declared by the Energy Secretary	B2
2020 - December	Advisory on the Moratorium of Endorsements for Greenfield Coal Power Plants [103]	A legal advisory is issued to support the moratorium	B2
2021 - October	CIF-ACT Investment Plan [104]	To accelerate the voluntary retirement up to 900 MW capacity of CFPP by 2027	C2
2024 - June	CIF-ACT Endorsement [105]	A more detailed plan on CIF-ACT IP	C2
2024 - July	DoE's clarification on coal moratorium policy [106]	To explain that the moratorium excludes pipeline CFPP projects	A1
2024 - Dec	Pipeline project expected to continue[107]	Several pipelines CFPP projects expected to come online by 2028	A1
2025 - April	A CFPP plan has been approved[108]	A CFB CFPP plan has been approved	A1
2025 - May	Collaboration on South Luzon CFPP early retirement[109]	MHI and ACEN aims to retire the CFPP by 2030	C1
2025 - June	Policy on transition of coal to renewables [110]	DoE is awaiting policy updates from DENR	C1

Data source: ACE analysis, 2025

Vietnam's coal transition is shaped by a **justice-driven narrative** that calls for fairness in global climate responsibility, balancing its recent **rapid industrialization** with a **phased coal decline.**

Category of progression status

Towards addition of CFPP capacity			Towards a pause of CFPP capacity			Towards decrease of CFPP capacity		
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A3	A2	A1	B1	B2	B3	C1	C2	C3

Viet Nam

Published Time	Policy/Regulation/Roadmap/Statement	Description	
2021 - November	COP26 Statement from Prime Minister Pham Minh[111]	**To reach net-zero emission by 2050** **To phase out CFPP in 2040s or sooner**	C1
2022 - December	Just Energy Transition Partnership (JETP) [112]	Limiting CFPP capacity to 30.2 GW	B2
		Setting pathway to phase out unabated CFPP	C2
2023 - May	The National Power Development Plan 8 (PDP 8)	**To gradually phase out CFPP to zero by 2050**	C2
2023 - May	Cancellation of planned CFPP [113]	Drop of planned capacity in Jan-May 2023	B3
2023 - August	Pipeline CFPP plans under construction are reported[114]	Several CFPP are reported to be constructed and expected to start operation in 2025/2026	A3
2025 - March	Carbon Reduction Action Plan [115]	To stop the operation of two CFPPs and all inefficient ones if stays unabated	B2
2025 - April	The Revised PDP 8 [116]	To cap CFPP capacity at 31 MW through 2030, with no new CFPP to be approved thereafter	B2
		All CFPP must convert to biomass/ammonia or shut down by 2050	C2

Data source: ACE analysis, 2025

The progression of coal-related transition regulations in key AMS is profoundly shaped by **divergent perspectives** among regulators, the energy industry, and society, creating a **multifaceted** and **often challenging policy landscape.**

Shared challenges

Challenges	ID	MY	PH	VN
Policy cohesion and consistency	●		●	
Balancing with economic development	●	●	●	●
"Pipeline" project	●		●	●
Financial constraint and external funding reliance	●		●	●

Explanation

Policy Cohesion and Consistency

AMS face fragmented coal transition policies due to **misalignment** between international decarbonization commitments and domestic energy realities. **Public expectations** for rapid coal phase-out often clash with regulatory caution, leading to frequent policy clarifications and special provisions.

"Pipeline" Project

While AMS increasingly adopt "no new CFPP" policies, these **typically exclude** projects already approved or under construction. Such pipeline projects continue to add coal capacity, complicating efforts to cap emissions and align with net-zero targets.

Balancing with Economic Development

Rapidly industrializing AMS like Indonesia, Vietnam, and the Philippines prioritize energy security and affordability to **sustain growth.** This results in continued support for CFPPs, especially **captive coal** for industries like nickel smelting, despite long-term decarbonization goals.

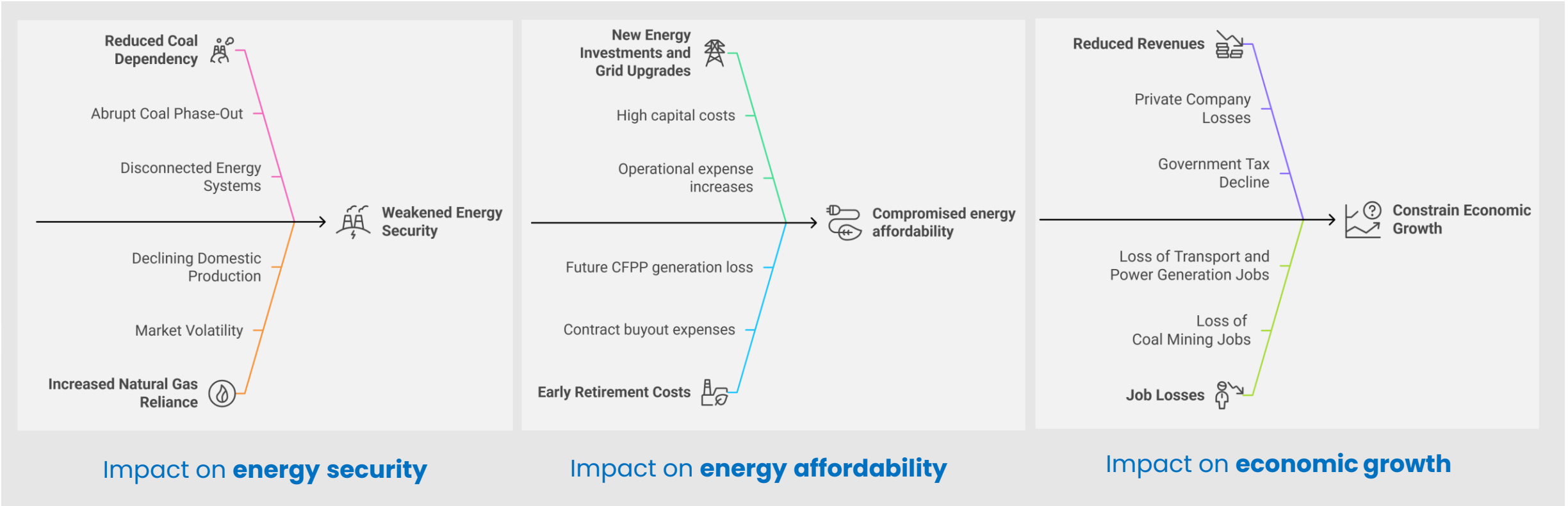
Financial Constraints and External Funding Reliance

Accelerating coal phase-out is financially **burdensome** due to asset write-downs, PPA penalties, and renewable infrastructure costs. AMS depend heavily on international support—via mechanisms like JETP and ETM—to fund early retirements and enable cleaner transitions.

Data source: ACE analysis, 2025

Without **careful planning**, the coal phase-out initiative could **disrupt energy security, energy affordability**, and **economic growth**

Implications of hasty coal phase-out on the energy and economy



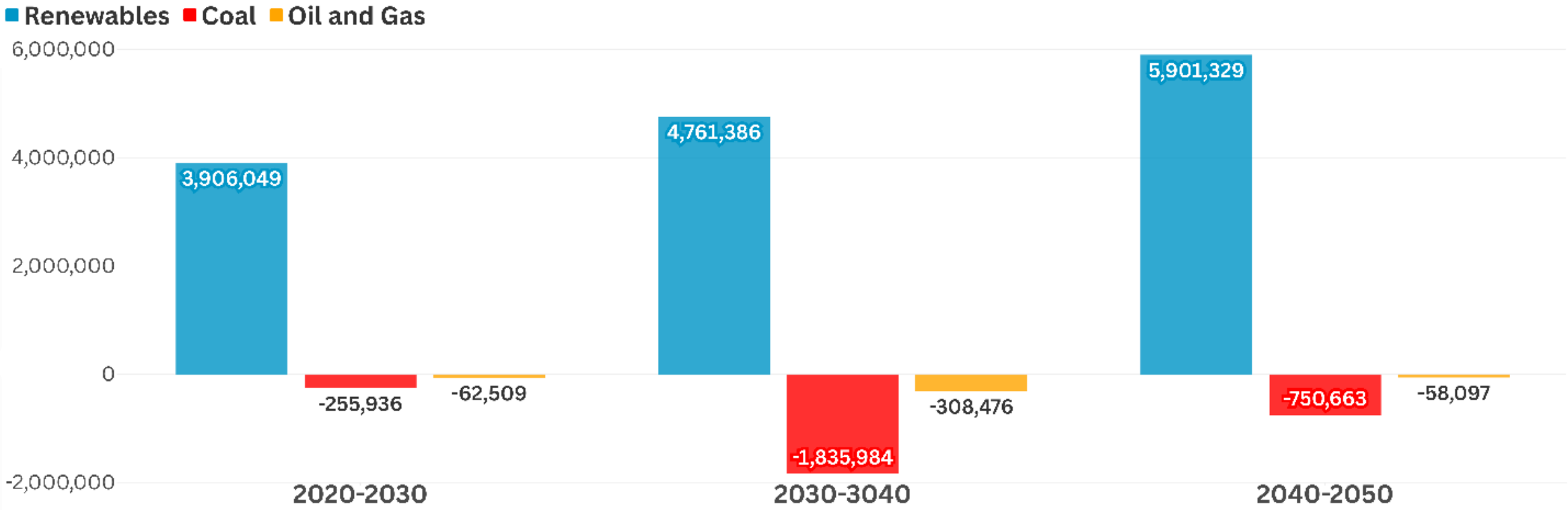
Impact on **energy security**

Impact on **energy affordability**

Impact on **economic growth**

Almost **3 million job losses** will happen to coal sector in the transition to carbon neutrality, **much higher** compared to loss in oil and gas sector.

Job created and job losses in Carbon Neutrality Scenario of ASEAN



Data source: 8th ASEAN Energy Outlook (AEO8)

New and mature advanced technologies in the coal power sector are continuously being developed and deployed to minimise CO_2 emissions

Technologies and actions to minimise CO_2 in coal power sector

Processes	Pre-energy conversion		Energy conversion			Overall System
						
	Coal mining and transport	Coal pre-treatment	Pre-combustion	Combustion	Post-combustion	System Efficiency
Technologies/ Actions	• Methane management • Renewable energy integration • Digitalisation	• Physical (gravity separation, etc.) • Thermal (drying, calcination, etc.) • Chemical (solvent extraction, etc.)	• Coal gasification (syngas)	• Supercritical (SC) • Ultra-supercritical (USC) • Advance ultra-supercritical (A-USC) • Circulating Fluidized Bed (CFB) • Co-firing (biomass, ammonia) • Combustion tuning	• Desulphurization (FGD) • Denitrification (SCR) • PM control (ESP, Fabric Filters) • CCS/CCUS	• Combined cycle (gas turbine → steam turbine) • Heat co-production (CHP)

Data source: US Energy Information Agency (EIA), Future Coal, US Department of Energy (DOE)

Rethinking ASEAN's Journey on Coal

ASEAN needs to acknowledge and reflects the coal dynamics on the region's next phase of regional energy blueprint.

There are things we need to take care of..

1. Huge amount of coal reserve lasting for several decades later
2. The rising of the region energy demand to answer population and economy growth
3. The need to reduce emission from coal as energy source
4. Large workforce depending on coal-related economy activities
5. The region's specific needs on timeline and capacity for phasing out
6. The emerging possibility to explore coal role outside combustion

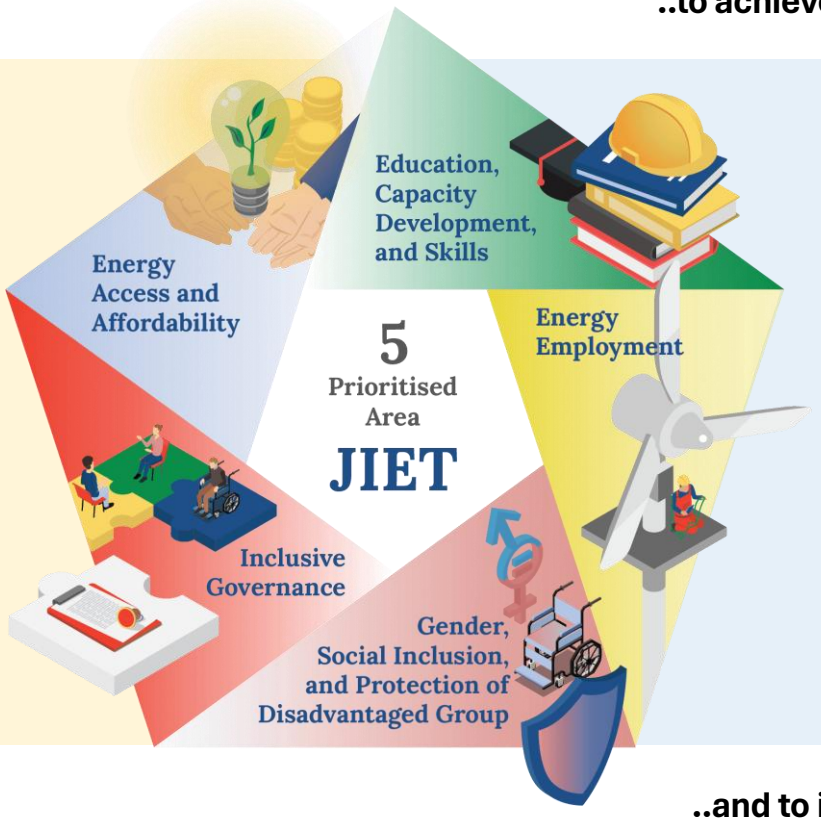


Illustration source: *A Guide to a Just and Inclusive Energy Transition in ASEAN*, 2025.

..to achieve a just and inclusive energy transition in ASEAN,

Responsible coal mining and processing across the value chain

&

Paving coal's pathway in ASEAN carbon neutrality framework

..and to integrate them into our regional energy blueprint.

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Thank You