ERIA-ADB-METI Joint Report
Transition finance for ASEAN hard to abate and high emitting sectors

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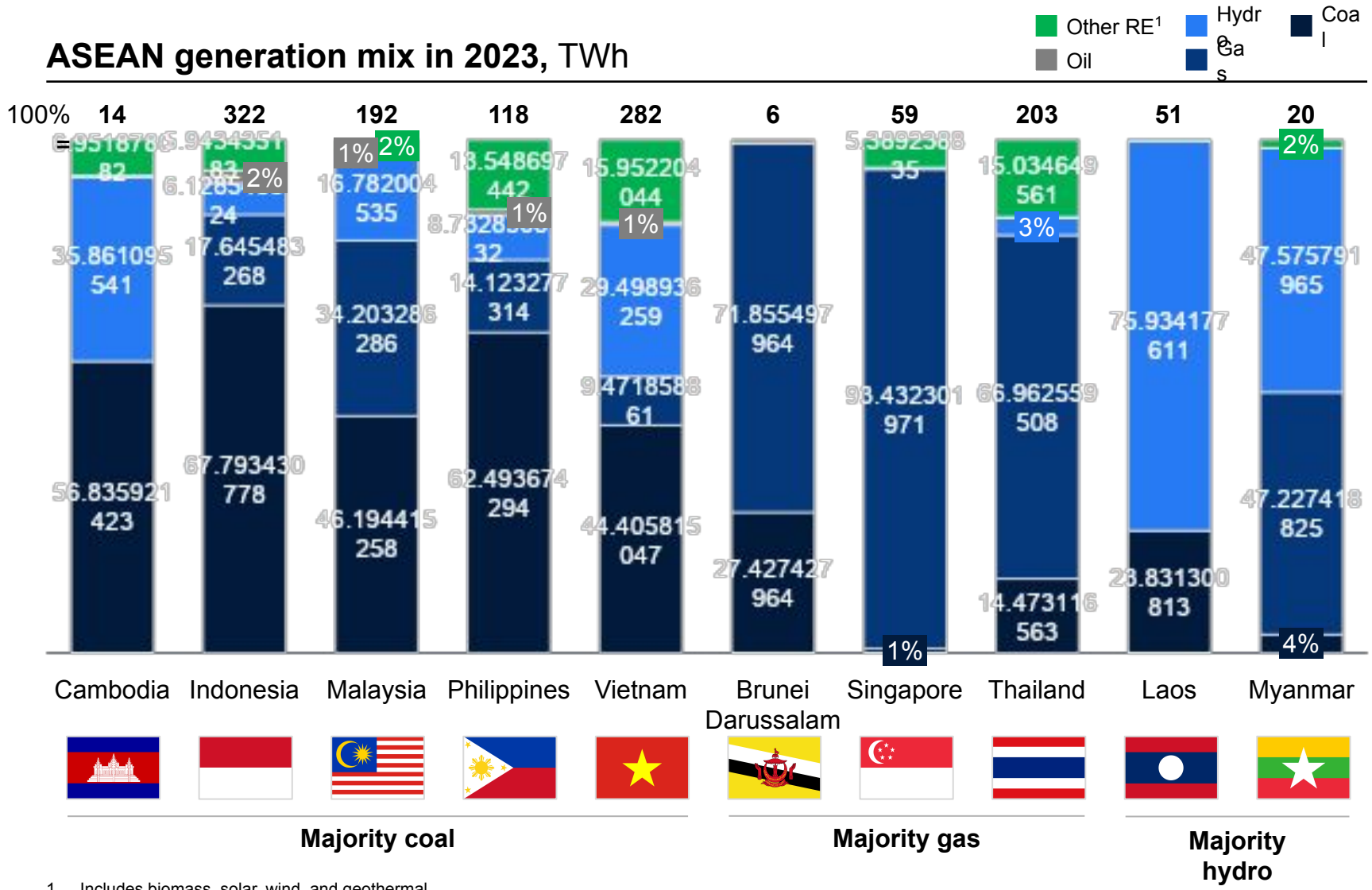
Fossil fuels—especially coal—remain dominant, supplying most of the growth

ASEAN generation mix in 2023, TWh



1. Includes biomass, solar, wind, and geothermal

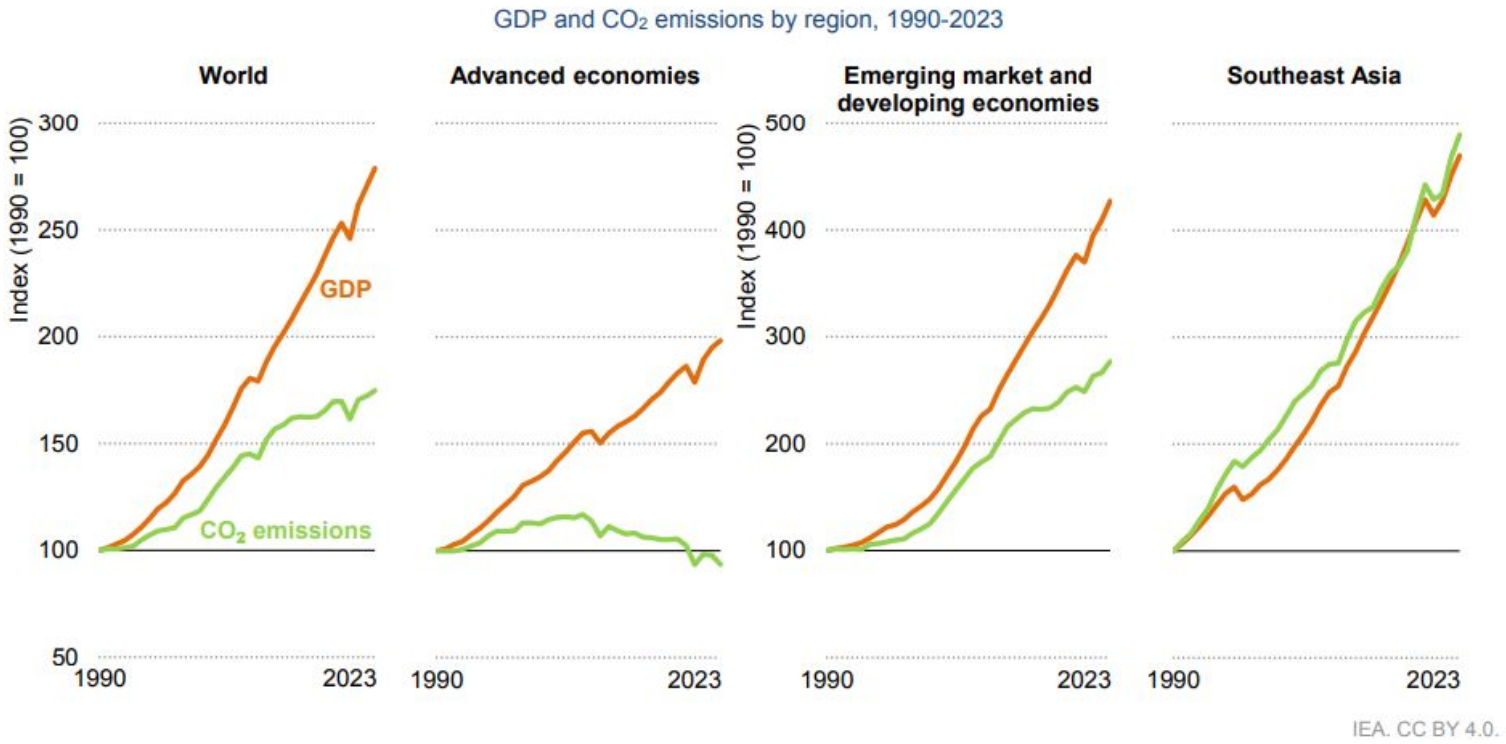
Source: Enerdata

Key takeaways

- **Fossil fuels**, particularly coal, **remain dominant** in ASEAN's power sector
- ASEAN countries have **yet to fully harness clean technologies** for deep decarbonization, for example:
  - renewable energy
  - energy efficiency
  - CCS
  - clean hydrogen
  - cogeneration/trigeneration
- Adoption of these technologies is **held back by**:
  - **limited policy support**
  - **inconsistent investment**
  - **infrastructure gaps**

One of the core challenges in decarbonising ASEAN is that the region is still in a phase of rapid economic expansion

A. Fundamental Challenge



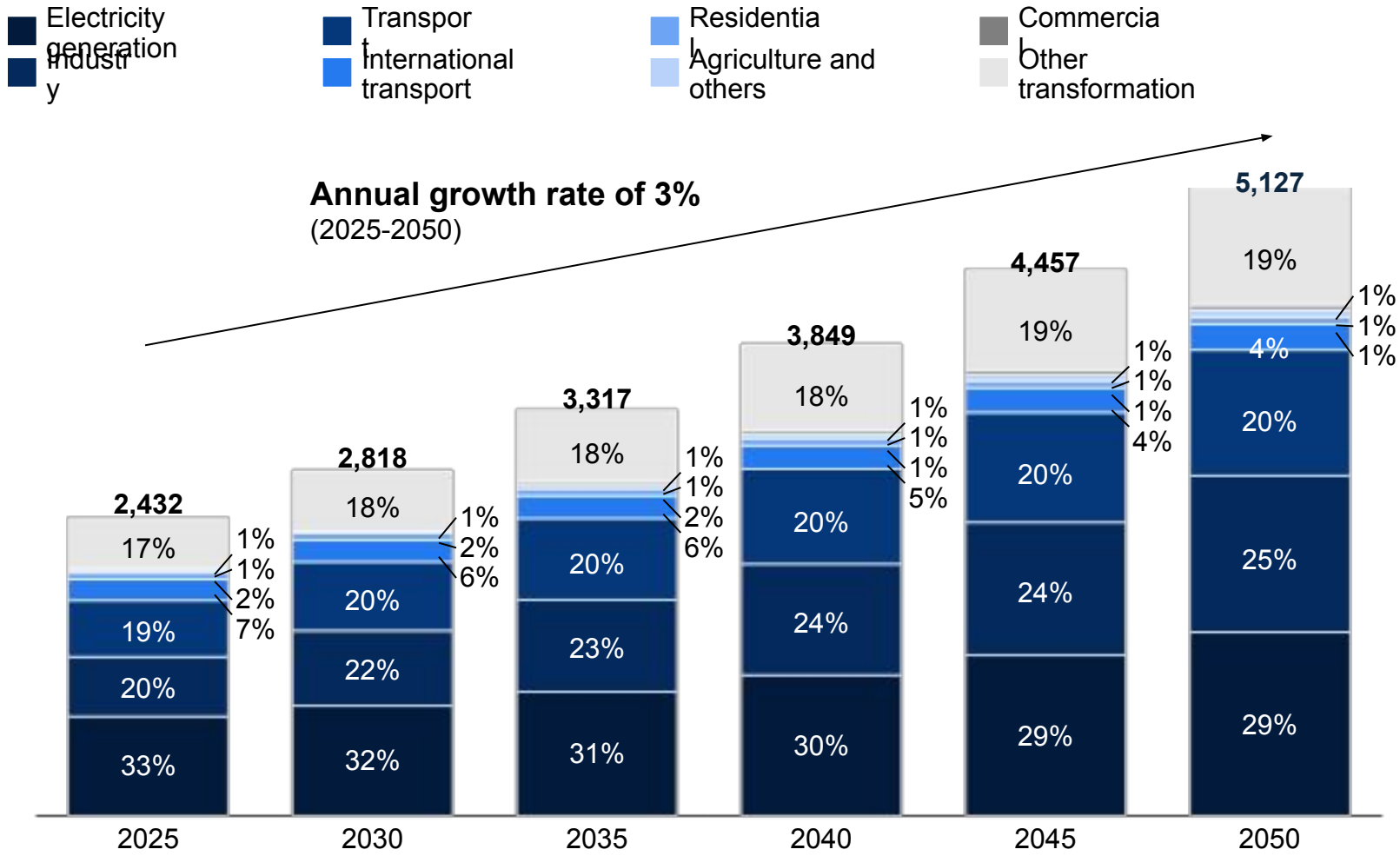
Note: GDP expressed in year-2023 US dollars in purchasing power parity terms (PPP).

Key insights

- ASEAN now contributes about 6 percent of global GDP, and its economy has grown by more than 45 percent in the past decade
- Since 1990, energy demand in Southeast Asia has roughly tripled, and CO_2 emissions have increased by about 250 percent
- Unlike advanced economies where emissions have begun to decline, ASEAN countries still show a strong link between economic growth and rising emissions

Emissions in ASEAN projected to double from 2025 to 2050 if no effort for decarbonization is made

ASEAN emissions by sector, Baseline Scenario (BAS), MtCO2e[1]



1. A unit of measurement including the emissions of all greenhouse gases, such as CO2, methane, nitrous oxide, among others

Source: 8th ASEAN Energy Outlook

Key insights

- ASEAN's annual emissions are estimated to grow 3% annually, **doubling from 2025 to 2050**, if no decarbonization measures are implemented
- **Power, industry, and transport sectors comprise over 70%** of the emissions, with industry showing a particularly high growth

Climate change represents an important threat for the region, as ASEAN countries are particularly vulnerable

Major climate impacts and risks

- Increased risk of river flooding, coastal inundation, and sea level rise
- Increased water stress
- Increased risk from intense cyclones and storms
- Agricultural production and productivity declines
- Increased risk of heat-related mortality, and water– and vector–borne diseases
- Losses of labour productivity
- Higher resource demands
- Coral reef extinction and coastal ecosystem collapse
- Loss of terrestrial forests and biodiversity

Key takeaways

- Understanding the economy-wide implications of climate change is complex
- Studies indicate that Southeast Asia is expected to suffer GDP losses ranging from 1.7% due to 1.0°C of global warming to 12.5% from 4.8°C of warming

Limited investment despite high funding efficiency is an outcome of multiple underlying project risks leading to unfavorable financial projections

B. Financial Challenge

NOT EXHAUSTIVE

Risk applicability: Strong | Partial | Limited

Simplified mapping of key risks to selected climate technologies in ASEAN[1]

	Zero-emission technologies				Transition technologies		
Risks	**Solar PV**	**Wind**	**BESS**	**Nuclear**	**CCUS**	**Coal plant retirement**	**Sustainable fuels co-firing**
Cash flow risk	Complex dependencies e.g., business model, weather, market conditions, regulatory structure				No/uncertain revenue streams		Demand for coal and gas power
Credit risk	Complex dependencies e.g., capital structure, credit rating of project owner				Business model not proven at scale		Demand for coal and gas power
Development risk	Long and unpredictable permitting process			Complex permitting	Emerging regulation	Permitting & planning	Emerging regulation
Construction risk	Emerging technologies and best practices			Complex technology	Immature technology	Remediation & demolition	Emerging technology
Operating risk	Dependency on weather and energy market		Degradation and flammability	Feedstock availability	Immature technology	N/A	Emerging technology
Transport and storage risk	N/A			Prevention and mitigation costs	Leakage and capacity risks	N/A	
Technological risk	Mature technology				Not yet proven at industrial scale	N/A	Evolving technology
Environmental risk	Infra ecosystem interference		Limited impact	Radiation risk	Infra ecosystem interference	Positive impact	Continued emissions
Social risk	NIMBY[2]		Limited impact	Potential societal health risks on HSE incidents		Labor force reduction	Fossil fuel burning health risks
Reputational risk	Neutral/positive societal perception			Potentially controversial	Neutral/positive societal perception		Greenwashing risk
Regulatory risk	Dependency on environmental, climate and energy policy and fiscal policy		Strong dependency on environmental, climate and energy policy, as well as energy security, social stability, and market development				
Political risk	Similar to regulatory risk		Similar to regulatory risk	Feedstock supplier	Similar to regulatory risk		
Currency and interest rate risk	Common risk						
Force majeure risk	Common risk			Magnifying potential	Common risk		
Legal risk	Common risk						

Impact on project economics

- ↑ Operational cost
- ↑ CAPEX cost
- ↑ Cost of capital

Impact on key metrics

- ↑ LCOE
- ↑ Abatement cost
- ↓ IRR

1. Risk mapping may change depending on nature of technology, country and market contexts, and objective of the financing
2. Not in my back yard

Source: ATF SG 2023

Apart from growing economy and energy demand, transition in ASEAN is also challenged by financial, technical, and policy constraints

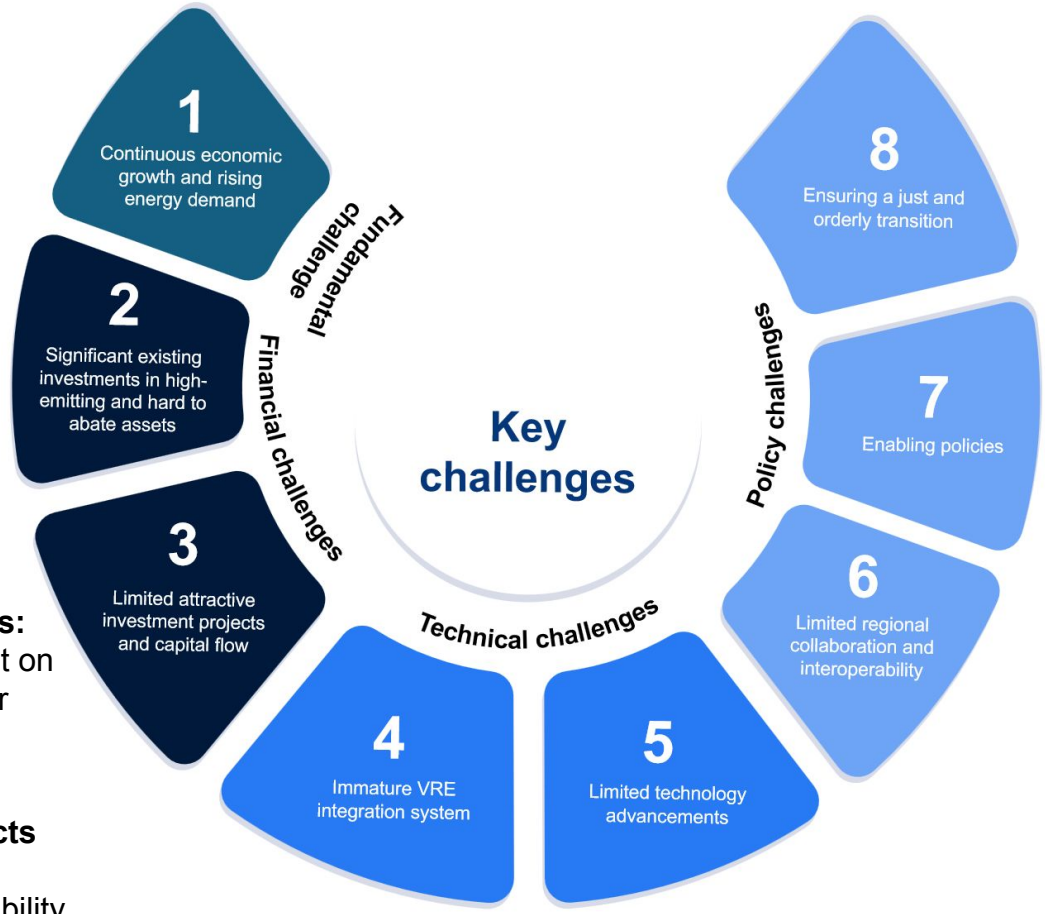
A. Fundamental challenge

1. Continuous economic growth and rising energy demand: ASEAN 8th Energy Outlook's baseline scenario projects the regions' energy consumption to increase by 2.6x by 2050 from 2022 levels

B. Financial challenges

2. Significant investments in high-emitting and hard-to-abate assets: ASEAN's energy system is heavily reliant on fossil fuels, which currently make up over 70% of the region's energy mix

3. Limited attractive investment projects and capital flow: Many ASEAN projects struggle to secure investment and bankability due to unappealing financial projections and low internal rates of return



C. Technical challenges

4. Immature VRE integration system: Variable renewable energy (VRE) sources are crucial if switch to renewable energy was to be made

5. Limited technology advancement and enabling environment: ASEAN's energy transition requires tailored strategies due to diverse challenges, varying energy mixes, and the need for scalable low-carbon technologies like CCS and green hydrogen

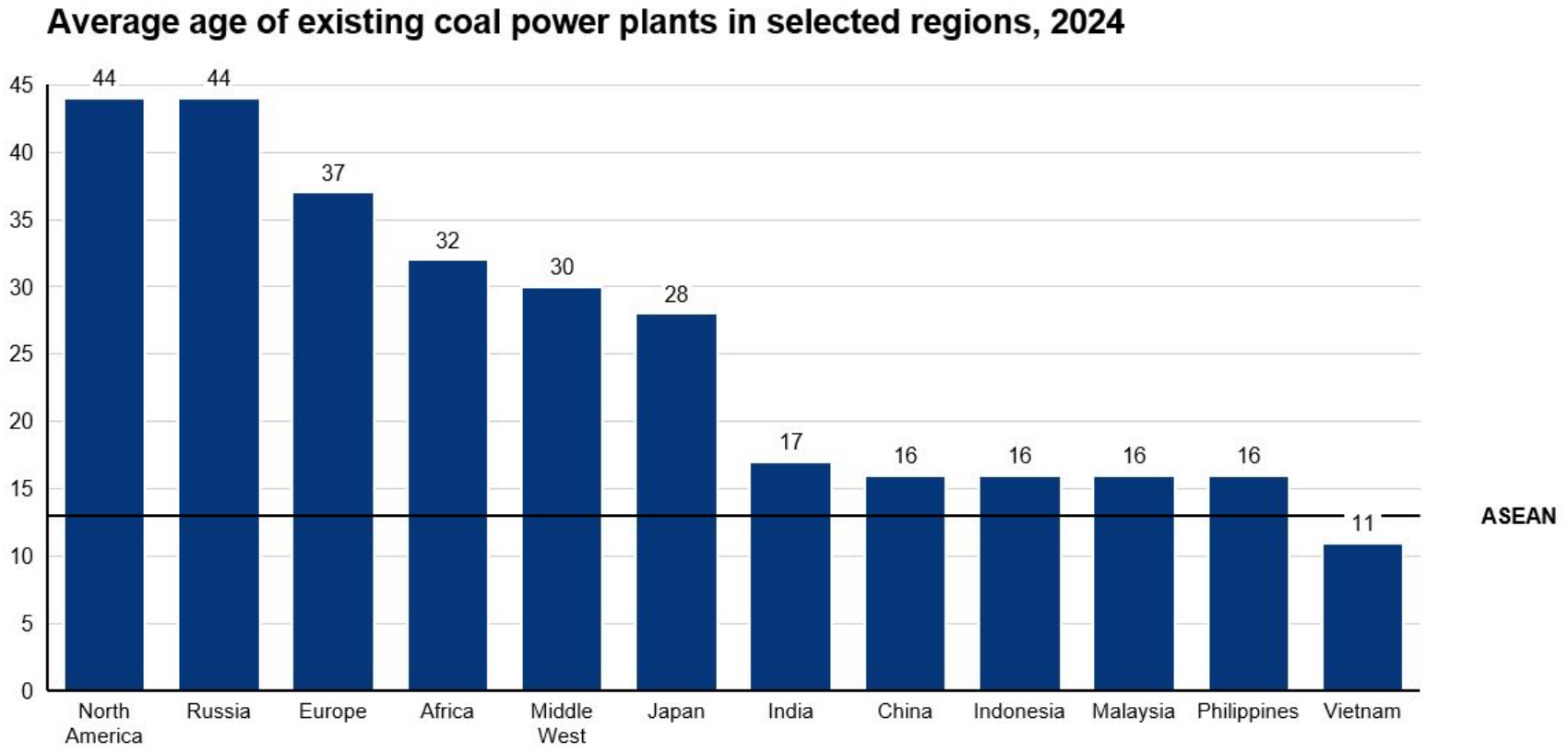
D. Policy challenges

6. Limited regional collaboration, interoperability and enabling policies: Asia's energy reliance and policy diversity demand regional collaboration for security and sustainable decarbonization

7. Enabling policies: Addressing regulatory inconsistencies, weak political will, fragmented market structures, and insufficient incentives is critical

8. Ensuring a just and orderly transition: As ASEAN moves toward cleaner energy, it must also address broader social and economic impacts of transition while balancing concerns related to availability, affordability, and reliability

2. CFPPs in ASEAN significantly younger than in other regions, posing challenge to early retirement



Source: Updated based on 2021 data from IEA Coal in Net Zero Transition

Key insights

- **Average age of CFPPs in ASEAN is significantly lower** compared to other regions
- **High dependency on a relatively young fleet of CFPPs** results in **substantial unrecovered locked-in capital** due to long-term take-or-pay power purchase agreements
- Consequently, there is a **reluctance to retire these plants early** due to the **economic infeasibility** of such transactions

As ASEAN moves toward cleaner energy, it must also address the broader social and economic impacts of the transition

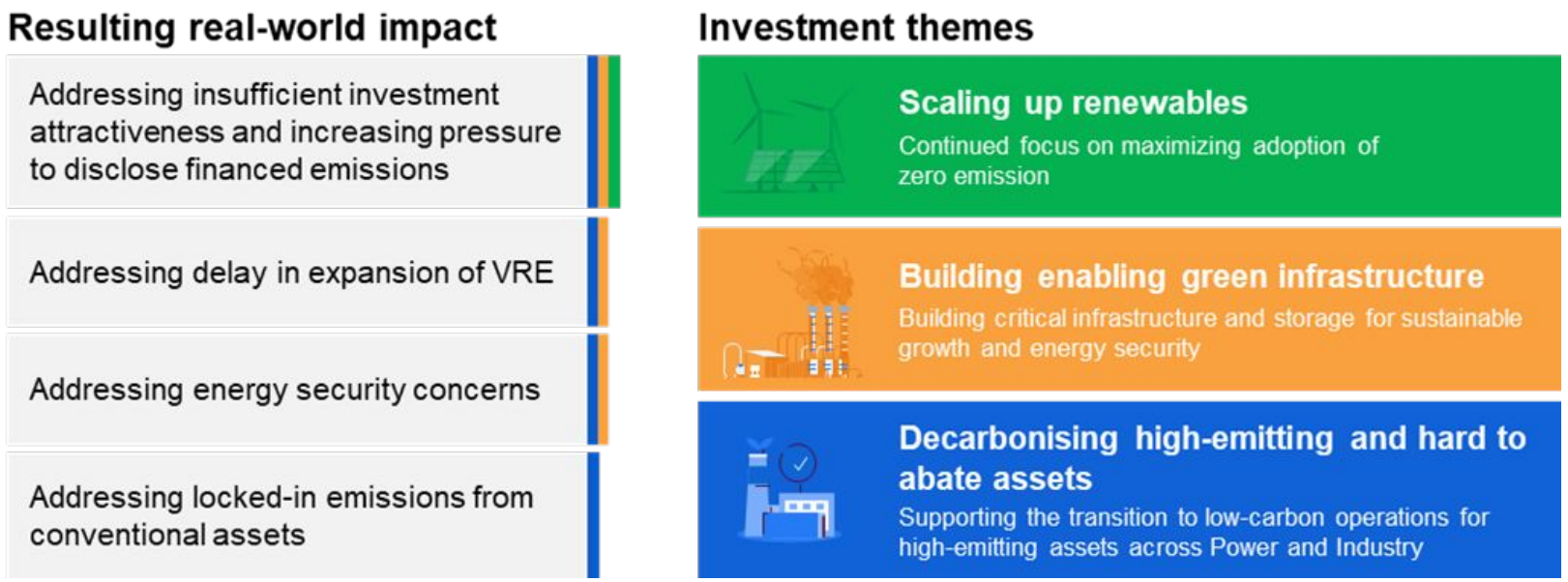
D. Policy Challenge

Energy trilemma

Key insights

- ASEAN must decarbonise while balancing concerns related to **availability, affordability, and reliability**
- A strategic, holistic approach to reduce emissions in the near term while considering practical constraints is required
- A just transition must also consider the significant share of public revenues and utility income that many ASEAN countries derive from fossil fuel-related activities

Accelerating ASEAN's decarbonization: holistic and sustainable approach to energy transition



Continued green growth by itself is not enough to fulfill all four necessary requirements

It is necessary to deploy **all three investment themes jointly**:

- Scaling up renewables
- Building green infrastructure
- Decarbonizing high-emitting and hard to abate assets

A full suite of policy needed

Scaling Up Transition Finance in ASEAN: Strategic Actions

Promote Innovative Financing Instruments

- Encourage the use of transition-labelled bonds, Sustainability-Linked Bonds (SLBs), and Sustainability-Linked Loans (SLLs) tailored to hard-to-abate sectors.
- Support early-stage tech startups through crowdfunding and blended finance.
- Support R&D through seed funding and public-private co-investment

Adopt International Sustainability Disclosure Standards

- Implement ISSB-aligned disclosure frameworks to support forward-looking transition plans.
- Use digital platforms to monitor and report transition performance, especially for SMEs in supply chains.
- Improve transparency and comparability to attract investor confidence.

Create Fiscal and Policy Incentives

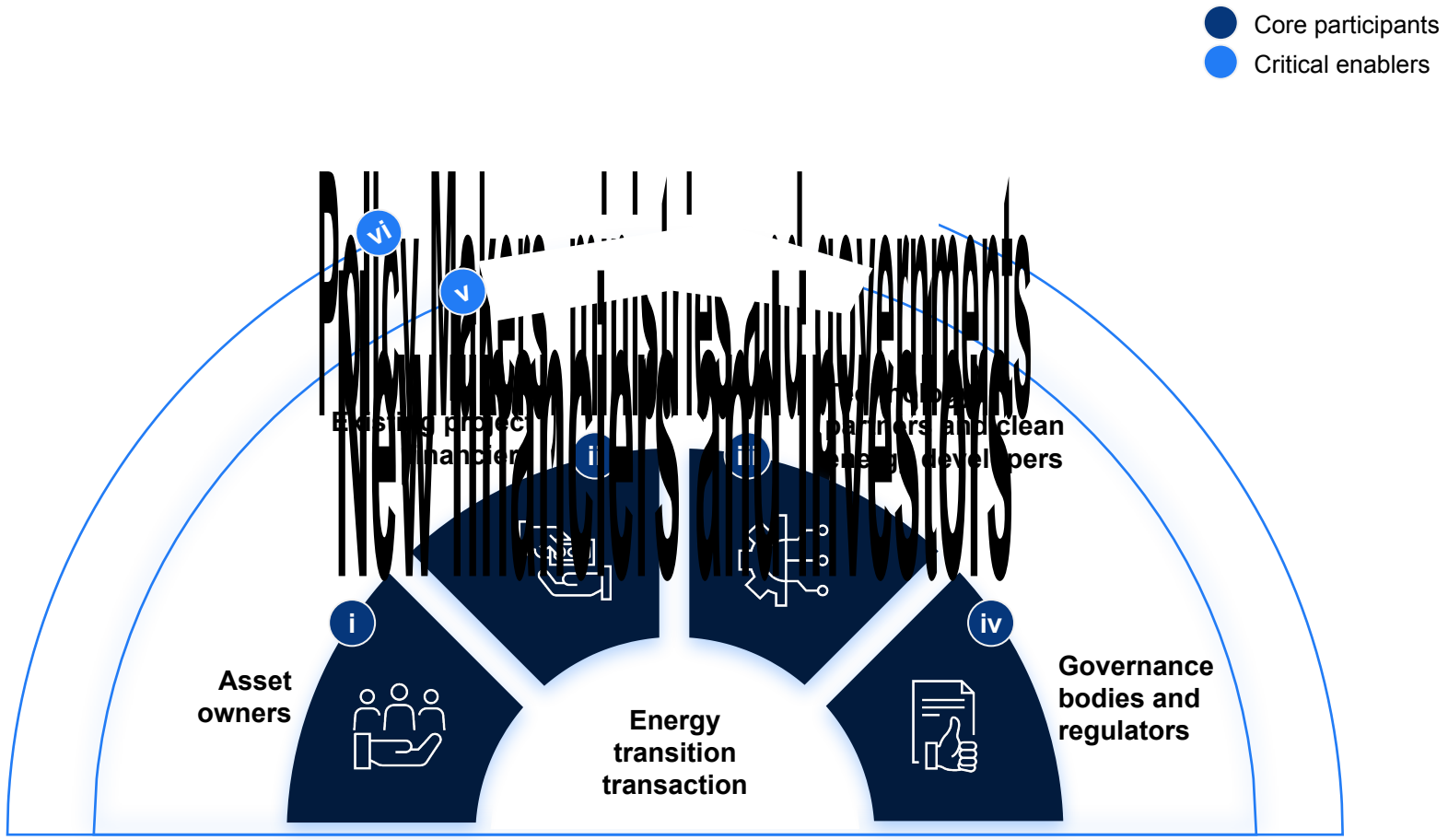
- Provide clear guidelines for high-emitting sectors to develop credible transition plans.
- Use blended and concessional finance to de-risk investments and lower borrowing costs.

Encourage Regional Collaboration and Partnerships

- Leverage ASEAN platforms like AZEC, engage in cross-border initiatives
- Share knowledge and resources to scale up transition finance across diverse economies.

Successful energy transition depends on collaboration among diverse stakeholders, supported by policy makers and investors

Different roles in an energy transition transaction



Key takeaways

- **Various stakeholders exist within the transaction ecosystem with a distinct role to play** in driving decarbonization efforts, such as:
  - Asset owners
  - Existing project financiers
  - Technology partners and clean energy developers
  - Governance bodies and regulators
  - New financiers and investors
  - Policy makers, ministries and governments

Potential areas of collaboration

- Regional Standards
- Green Industrial Parks
- ASEAN Power Grid
- Regional Financing Facility

Thanks for you attention