ASIA CLEAN ENERGY FORUM 2025

Empowering the Future: Clean Energy Innovations, Regional Cooperation and Integration, and Financing Solutions

2–6 June | ADB Headquarters, Manila

ADB

Crossing Borders: Integrated Solutions for Net Zero-Carbon Development

ACE's Support on Zero-Carbon Industrial Parks

5 June 2025 | 14:00–17:35 (GMT+8)

In cooperation with

ENERGY FOUNDATION 能源基金会

BGFA 北京绿色金融协会 Beijing Green Finance Association

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Zulfikar Yurnaidi

Manager of Energy Modelling and Policy Planning (MPP) Department

ASEAN Centre for Energy

Featured Speaker

ASEAN Centre for Energy (ACE)

About

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

Think Tank

Identifying and Surfacing Innovative Solutions

- Policies, Legal & Regulatory Frameworks and Technologies

Energy Data and Knowledge Hub

Provide a Knowledge Depository for AMS

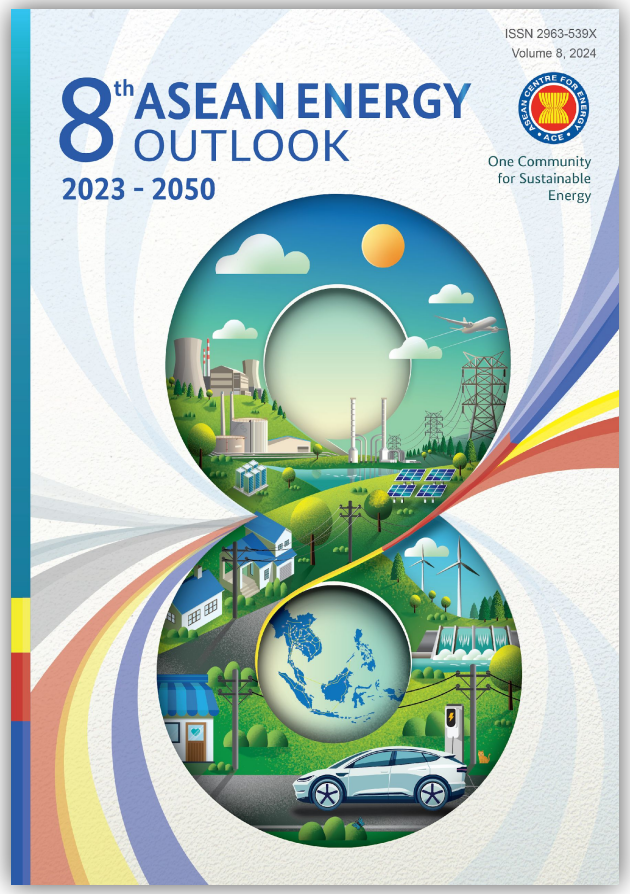
- Policy and Research Analytics
- Energy Database

Catalyst

Unify and Strengthen ASEAN Energy Cooperation and Integration

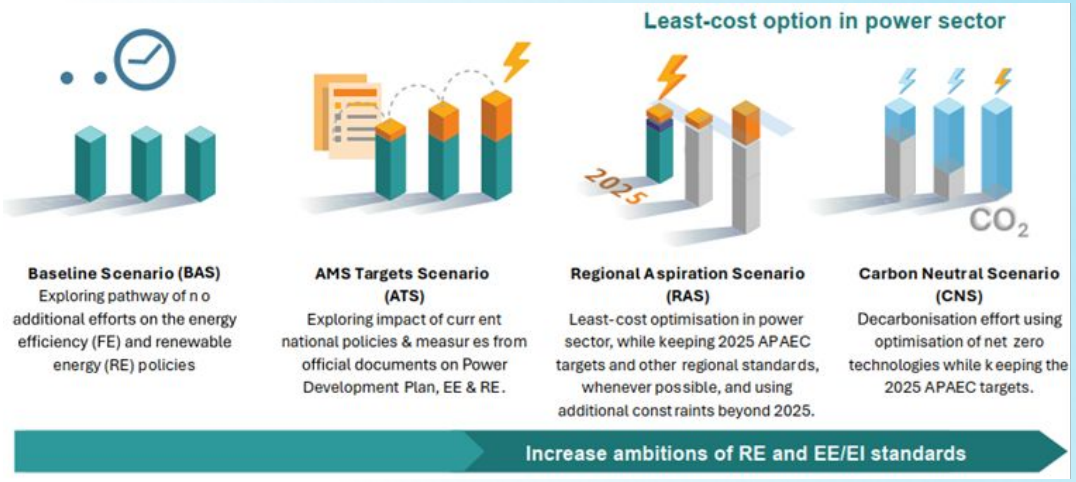
- APAEC Activities, including with DPs/IOs
- Secretariat

8th ASEAN Energy Outlook



- The 8th edition presents a comprehensive analysis of the current state of ASEAN's energy landscape and offers projections for several plausible future scenarios.
- Endorsed by 42nd AMEM in Lao PDR, September 2024.

Historical data from 2005 - 2022 are projected out to 2023 - 2050 in four scenarios



- The AEO8 serves a critical reference, gearing up towards the final year of **ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025 Phase II (2021-2025)**, guiding the development of the new phase of APAEC 2026-2030, and monitoring the region's energy ambitions.

> *"AEO8 is poised to serve not only as a guiding compass but also as a catalyst for the formulation of visionary regional targets and driving strategic energy policy development for the APAEC 2026-2030 and for a coming transformative decade"*

DOWNLOAD HERE

go.aseanenergy.org/AEO8

METI Ministry of Economy, Trade and Industry | ACCEPT II ASEAN Climate Change and Energy Project | Energy Foundation 能源基金会 | USAID FROM THE AMERICAN PEOPLE | Australian Government | Partnerships for INFRASTRUCTURE

ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025 Phase II: 2021-2025

- Enhancing Energy Connectivity and Market Integration in ASEAN to Achieve Energy Security, Accessibility, Affordability and Sustainability for All
- Accelerating Energy Transition and Strengthening Energy Resilience Through Greater Innovation and Cooperation

APAEC Programme Areas

To **reduce energy intensity** by 32% by 2025 and encourage EE&C efforts, especially in transport and industry

- ASEAN Power Grid
- Trans-ASEAN Gas Pipeline
- Coal and Clean Coal Technology
- **Energy Efficiency and Conservation**
- Renewable Energy
- Regional Energy Policy and Planning
- Civilian Nuclear Energy

Outcome-Based Strategies (OBS)

OBS1:
Expand, Harmonise, and Promote EE S&L (Energy Efficiency Standards & Labeling)

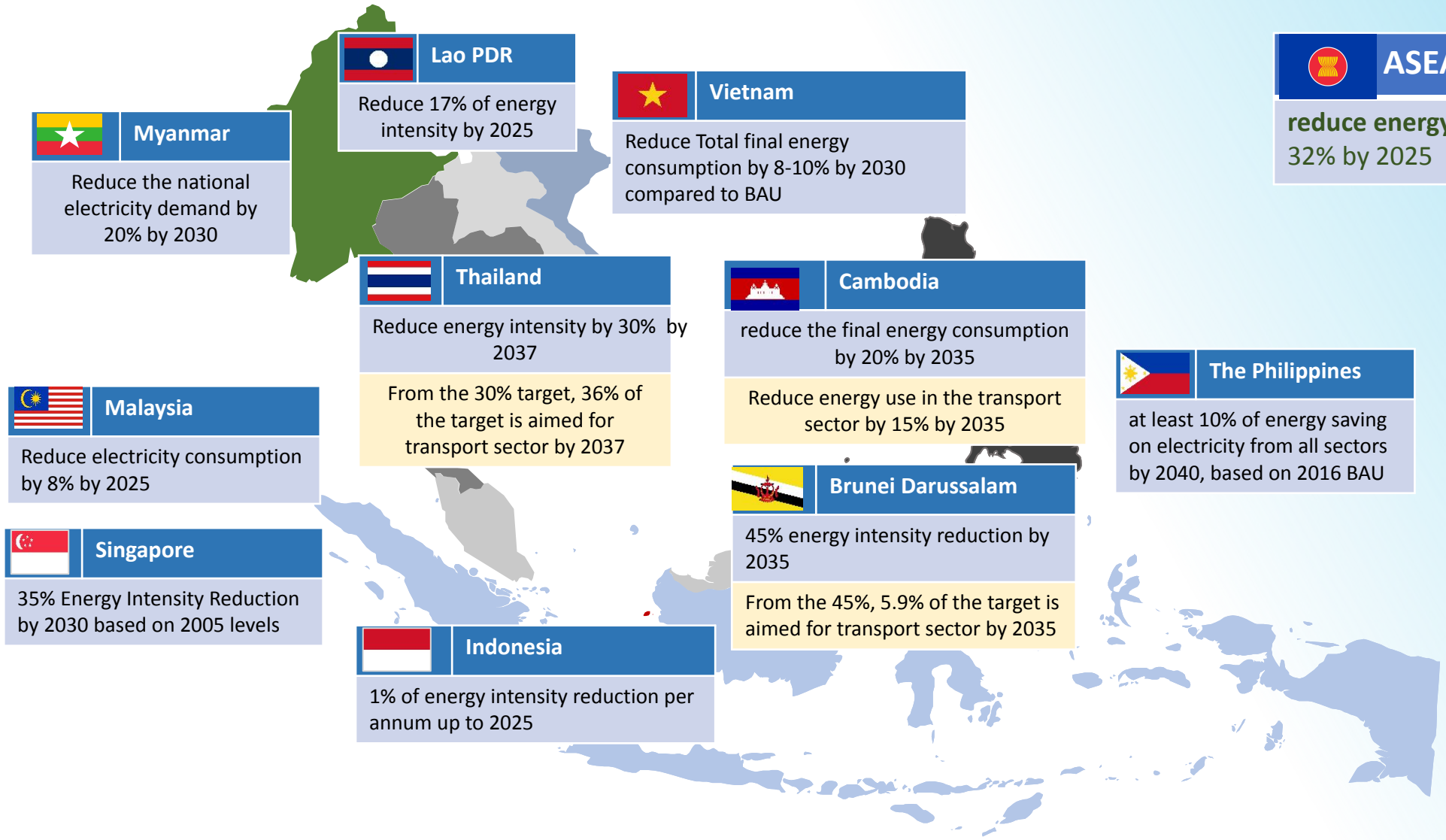
OBS2:
Enhance Participation of Private Sector, Financial Institutions and Clusters

OBS3:
Strengthen Sustainability of EE in Buildings

OBS4:
Pursue Energy Efficiency in Transport Sector

OBS5:
Advance Energy Efficiency and Energy Management in Industry

ASEAN National EE&C Targets



Lao PDR

Reduce 17% of energy intensity by 2025

Myanmar

Reduce the national electricity demand by 20% by 2030

Vietnam

Reduce Total final energy consumption by 8-10% by 2030 compared to BAU

Thailand

Reduce energy intensity by 30% by 2037

From the 30% target, 36% of the target is aimed for transport sector by 2037

Cambodia

reduce the final energy consumption by 20% by 2035

Reduce energy use in the transport sector by 15% by 2035

Malaysia

Reduce electricity consumption by 8% by 2025

Singapore

35% Energy Intensity Reduction by 2030 based on 2005 levels

Brunei Darussalam

45% energy intensity reduction by 2035

From the 45%, 5.9% of the target is aimed for transport sector by 2035

Indonesia

1% of energy intensity reduction per annum up to 2025

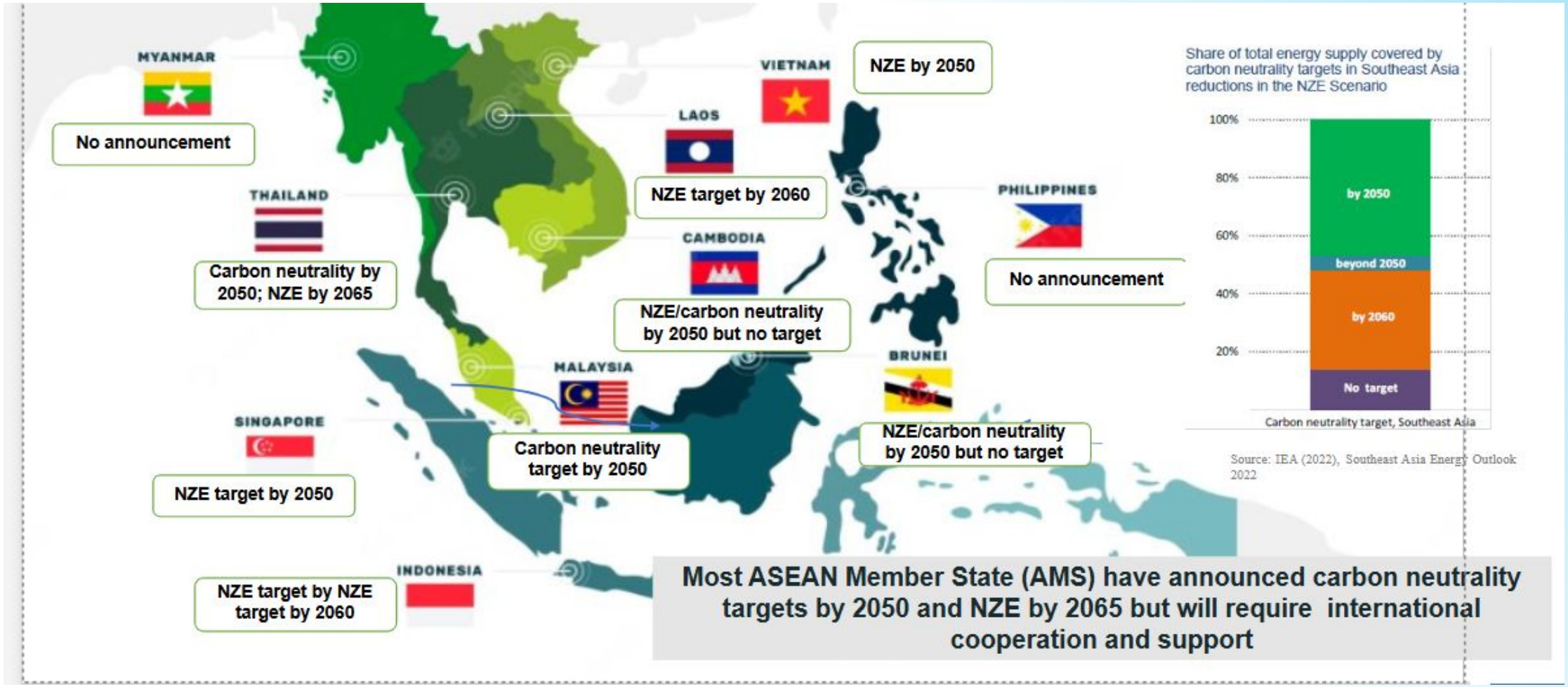
The Philippines

at least 10% of energy saving on electricity from all sectors by 2040, based on 2016 BAU

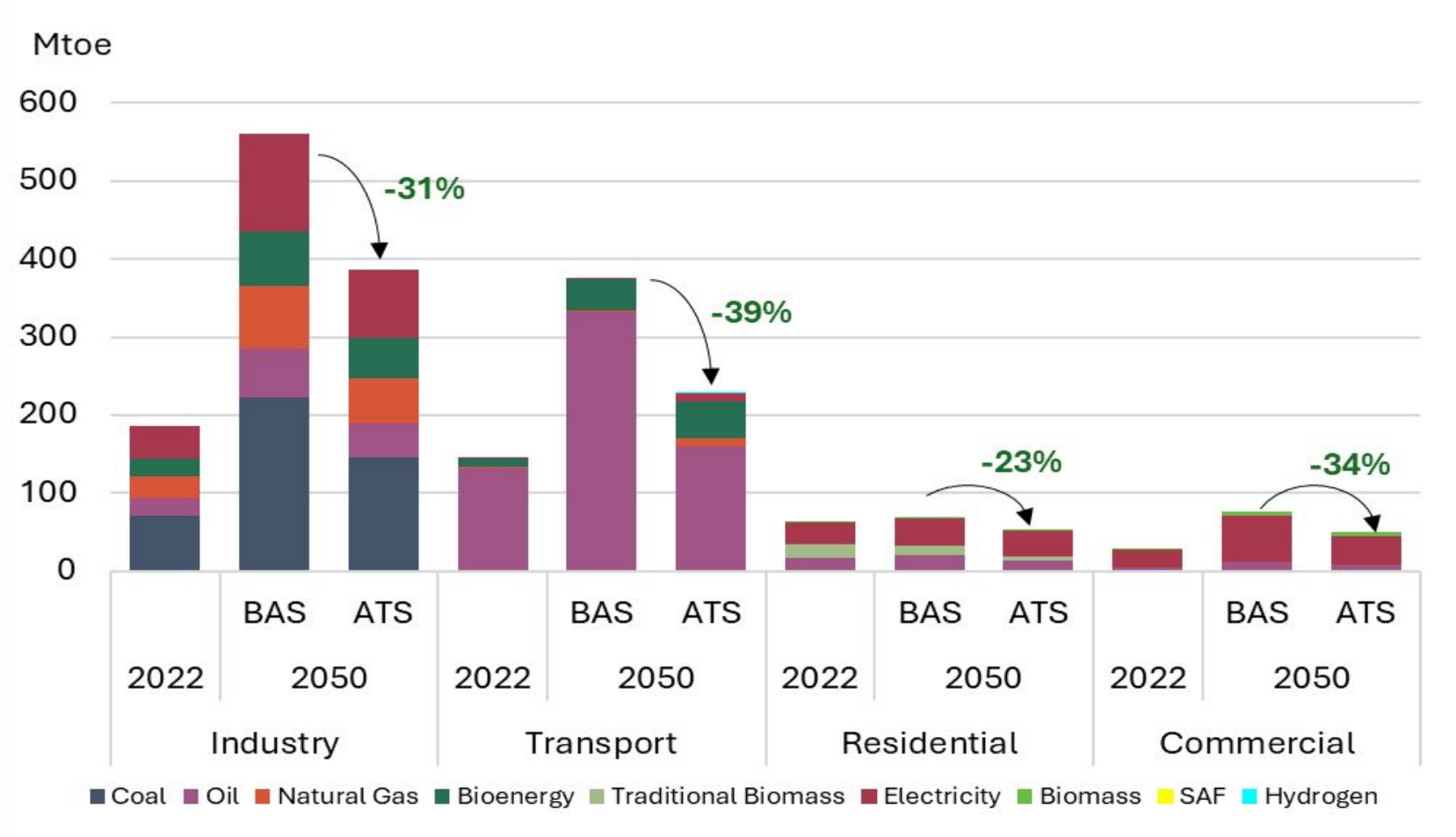
ASEAN

reduce energy intensity by 32% by 2025

ASEAN Pathways towards Carbon Neutrality



ASEAN Final Energy Demand in 2050



Source: The 8th ASEAN Energy Outlook, 2024
https://aseanenergy.org/publications/the-8th-asean-energy-outlook/

- Energy demand in 2050 is **2.6 times** higher than 2022 (BAS)
- **Industry** and **Transport** are the highest energy-consuming sectors, dominated by **coal and oil**

ASEAN Industrial Energy Efficiency Overview

2022 Industrial TFEC Growth:
↑ **27.4%**
Industrial Energy Consumption:
185.7 Mtoe

Required Investment:
USD 600+ Billion
For Energy Efficiency Improvements

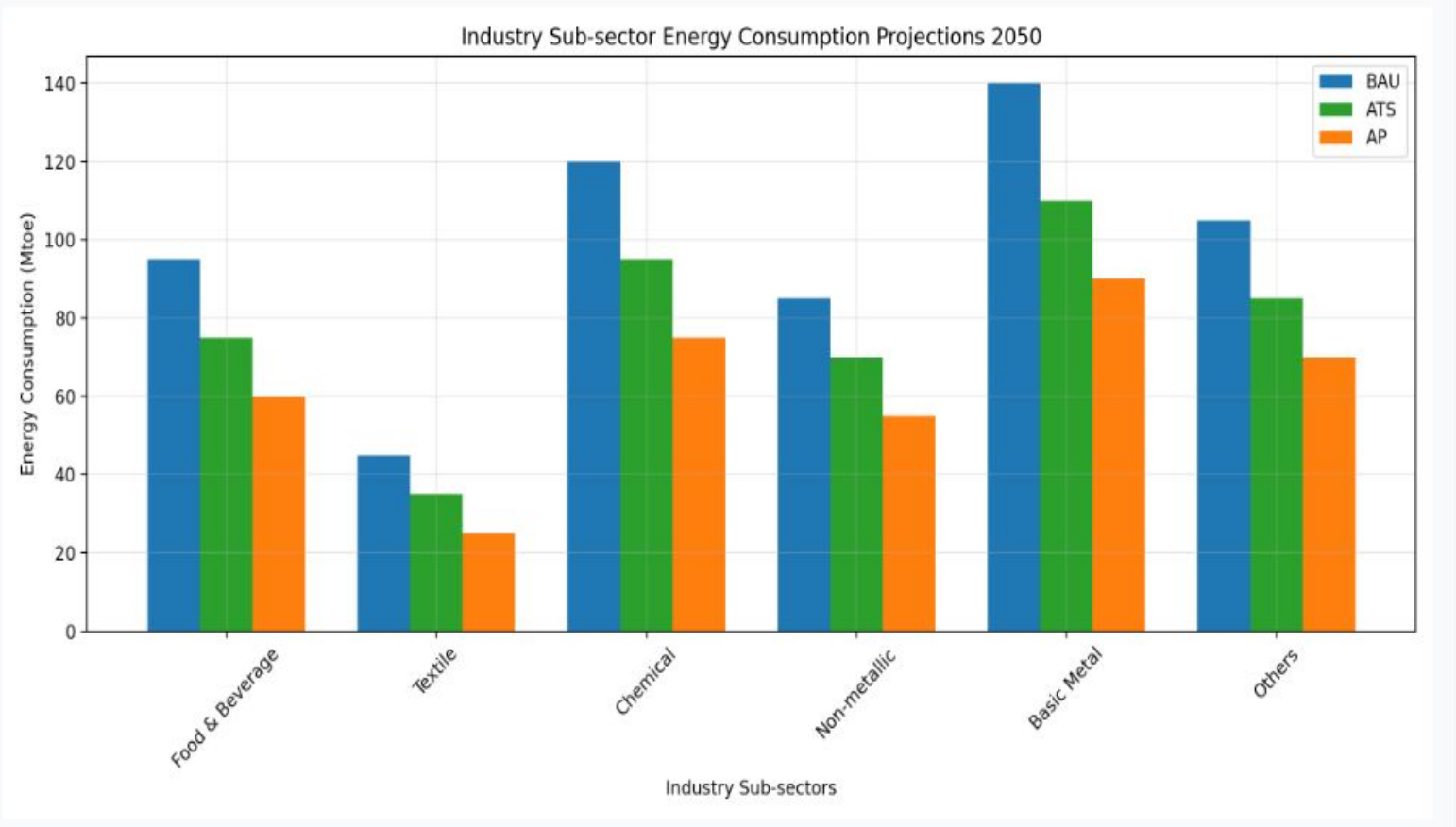
70%
ASEAN Export Value from Manufactured Goods

Key Energy-Consuming Systems:
- Chilled Water Systems
- Compressed Air Systems
- Motor-driven Systems
- Lighting and Industrial Boilers

Key Barriers to Energy Efficiency Adoption:
- Lack of Capital (especially for SMEs)
- Limited Information and Knowledge
- Management Focus and Commitment Issues
- Uncertainty About New Technologies

Sources: 8th ASEAN Energy Outlook (AEO8), IEA Southeast Asia's Energy Transition

Industry Sub-Sector Energy Demand Projection by 2050



Sources: Author All Sources

- **High Energy Consumers**: Basic Metal and Chemical industries are the most energy-intensive, with Basic Metal projected to reach ~140 Mtoe under the BAU scenario, making them key targets for efficiency measures.
- **Strong Reduction Potential**: Most sectors can cut energy use by 30–40% under Advanced Policy scenarios, indicating major gains are possible through policy action.
- **Broad Sector Impact**: Even low-consuming sectors like Textiles (~40 Mtoe in BAU) show similar proportional reduction potential, highlighting the value of comprehensive, cross-sector efficiency efforts.

Green Industrial Parks Initiatives across ASEAN

Indonesia

- Ministry of Industry with UNIDO through Global Eco-Industrial Park Program (GEIPP) since 2019
- **Three pilot industrial parks** with 35 tenants (Phase I) : MM2100 Bekasi, Batamindo, Karawang
- Impact (2020-2023) : **Annual reduction 12,000 tCO2**, investment USD 1.96 million, recorded financial savings USD 1.53 million/year
- Continue phase II: 2024 – 2028 : Two more pilot projects, EIP greenfield investment

Malaysia

- Supporting Policy: **New Industrial Master Plan 2030**; Green Technology Master Plan 2017-2030 ; Green Investment Strategy
- Some sample project: Bio-XCell, Eco Business Park 1 Johor, Green Technology Park Pahang

Green Industrial Parks Initiatives across ASEAN

Philippines

- The Special Economic Zone Act of 1995
- **Philippines Economic Zone Authority (PEZA) to transform future industrial parks into models of the circular economy**
- The Philippine National Oil Company (PNOC) and the PEZA have entered into a **Memorandum of Understanding (MOU) to jointly explore the development of a Self-Generating Industrial Park (SGIP) for energy-efficiency industrial park**
- **Five industrial parks will serve as case studies** to evaluate the potential impact of EIP adoption. The five are Lima Technology Center, First Philippine Industrial Park, Laguna Technopark, Light Industry and Science Park, and Carmelray Industrial Park

SCIENCE PARK OF THE PHILIPPINES, INC.
A member of the ICCP Group

The Carmelray Group

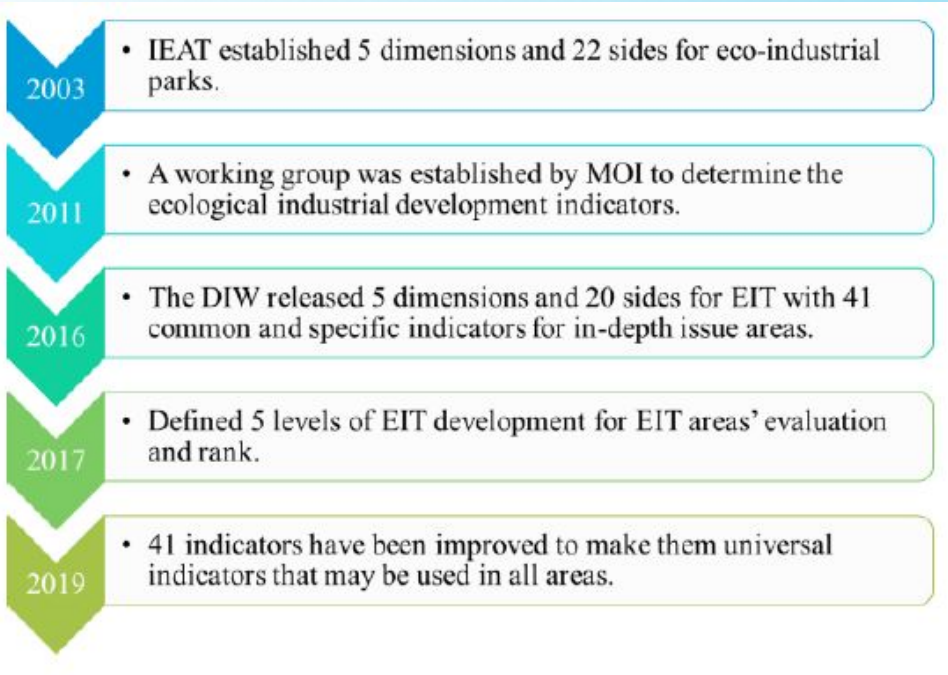
Singapore

- Singapore Green Plan 2030, Green Mark from BCA
- Project: JTC Clean Tech Park, Sungei Kadut Eco-District (SKED)
- **National Park Board** plan to **utilize nature-based solution to drive industrial estate in Pasir Ris Tampines Wafer-Fabrication**
- Challenges: **Land constraints and resource limitation**

Green Industrial Parks Initiatives across ASEAN

Thailand

- **Eco Industrial Town (EIT) development since 2010** with The Industrial Estate Authority of Thailand (IEAT) and Department of Industrial Works
- **5 Pilot Projects**
- Aligning with **Thailand's 20-year national strategy, to develop 40 EIT by 2036** ; Align with Eastern Economic Corridor Plan
- 5 levels: engagement -> enhancement -> resource efficiency -> symbiosis -> livable city



Vietnam

- UNIDO and World Bank support development of Eco-Industrial Park (EIP) in Vietnam since 2015
- National Technical Guideline for EIP in Vietnam, to attract highly qualified investment
- 5 Pilot Projects
- Impact: Annual savings USD 2.99 million, 22,000 MWh of electricity
- Continue with industrial symbiosis / industrial-urban symbiosis within three industrial parks

Green Industrial Parks Initiatives across ASEAN

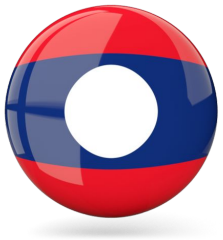
Emerging Efforts

Brunei

- Wawasan Brunei 2035
- Opportunity: Sungai Liang Industrial Park (SPARK) and Pulau Muara Besar (PMB)

Cambodia

- Cambodia had 30 special economic zones in 12 provincial capitals and 20 industrial parks in five provinces
- Partnered with **UNIDO for promoting Eco-Industrial** Park
- **Assess potential Special Economic Zone (SEC) for piloting**



Lao PDR

- Industrial Development Strategy (2016–2030) and the National Green Growth Strategy (to 2030)
- Opportunity good practice: SEZ Savan-Seno

Myanmar

- The Industrial Zone Law, still nascent
- 20 Industrial zones, 3 Special Economic Zones
- 6 Industrial Training Centre

ACE's Programmes - Industrial Energy Efficiency

Supporting Innovative Mechanisms for Industrial Energy Efficiency Financing in Indonesia with Lessons for Replication in other ASEAN Member States

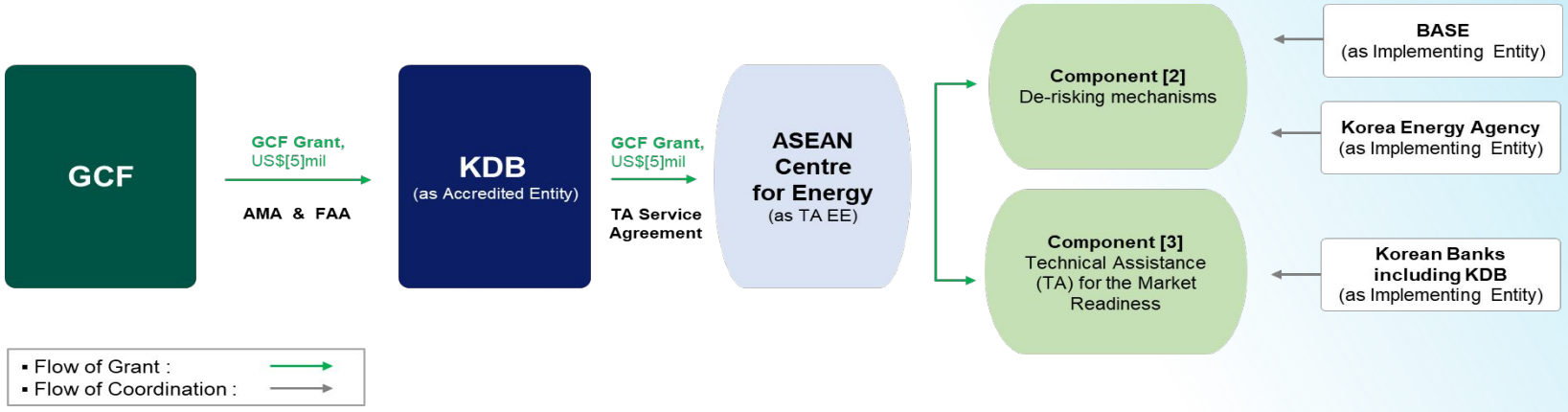
- *Provision of USD 100 million GCF-backed guarantee mechanism*
- *Development of Energy Savings Insurance (ESI) and ESCO financing model*
- *Technical advisory for industry enterprises*

FINANCING COMPONENT

✔ Backstopping
credit risk of industry players
with GCF credit guarantee provision
(USD100M)

TA (Technical Assistance) COMPONENT

✔ New De-risking Mechanisms Development
✔ Capacity Building Activities
(USD5M)



ACE's Programmes - Industrial Energy Efficiency

Net Zero Roadmaps for the Steel Industry in Indonesia and Vietnam

Study to develop a comprehensive roadmap for the deep decarbonisation of Indonesia's and Vietnam's steel industry in alignment with the country's net-zero emissions target

Global Efficiency Intelligence

Stakeholder Engagement and Data Collection	Analysis four scenarios: BAU, Moderate, Advanced, Net Zero	Results: pathway from 5 decarbonization pillar ; Cost analysis of different technologies	Recommendation for: Government, Steel Companies, Steel Consumer, Other Stakeholders Near term, mid-long term

Carbon Neutrality Diagnosis in Select Industry Enterprises

Analyse energy efficiency and carbon reduction measures in select industry enterprises (3 companies since 2023) in ASEAN through site survey and on-site measurement, providing recommendation to support company's sustainability goals

ECCJ
The Energy Conservation Center, Japan

Nitto

unicharm ユニ・チャーム

Coca-Cola

Project Milestones (FY 2024 – 2025):

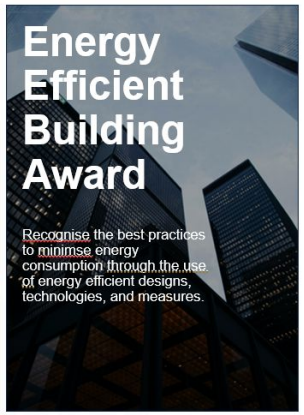
1. Carbon Neutrality Project Startup Meeting in Nitto Denko Material Malaysia **(4 – 5 Sep 2024)**
2. Carbon Neutrality Diagnosis for Industry in two AMS Countries
   - PT Uni-Charm, Indonesia **(17 – 19 Sep 2024)**
   - Coca-Cola Bottling, Lao PDR **(30 Sep – 2 Oct 2024)**
3. ECAP 34 for Industry in Japan **(12 – 15 Nov 2024)**
4. ECAP 35 for SAEMAS in Japan **(9 – 13 Des 2024)**

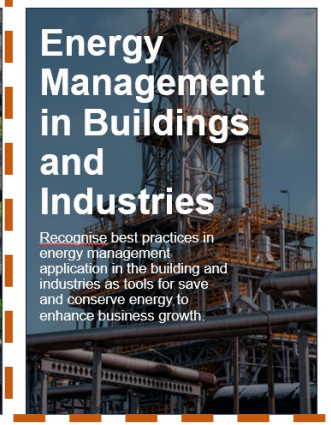
ACE's Programmes - Industrial Energy Efficiency

ASEAN Energy Awards – Energy Management in Building and Industries

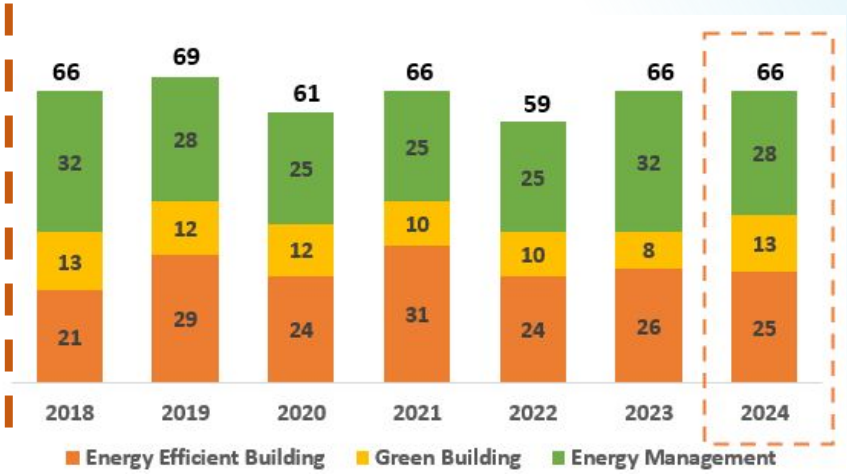
Recognise best practices in Energy Management (EM) in building and industries as a tool to save and conserve energy to enhance business growth

Categories for ASEAN EE&C Awards





Numbers of AEA Entries by Years



The Energy Management in Industry Awards aims to disseminate industry best practices in energy management, encourage implementation of innovative and creative energy management, and promote energy management as a tool to save energy.

AEA 2024 Awarding Ceremonies was held at 25 – 27 September 2024 in Vientiane, Lao PDR

AEA Awarding Ceremonies in August 2023 in Bali Indonesia

ACE's Programmes - Industrial Energy Efficiency

ASEAN Energy Awards – Energy Management in Building and Industries

Winners 2024

Category	Sub-category	Winner/ Runner-up	Country	Industry Name	Company
Energy Management in Buildings and Industries	**Small and Medium Industries**	Winner	Indonesia	PT Adis Dimension Footwear	PT Adis Dimension Footwear
		1st Runner-up	Malaysia	SMART Modular Technologies	SMART Modular Technologies
		2nd Runner-up	Malaysia	Indah Water Konsortium Sdn. Bhd.	Indah Water Konsortium Sdn. Bhd.

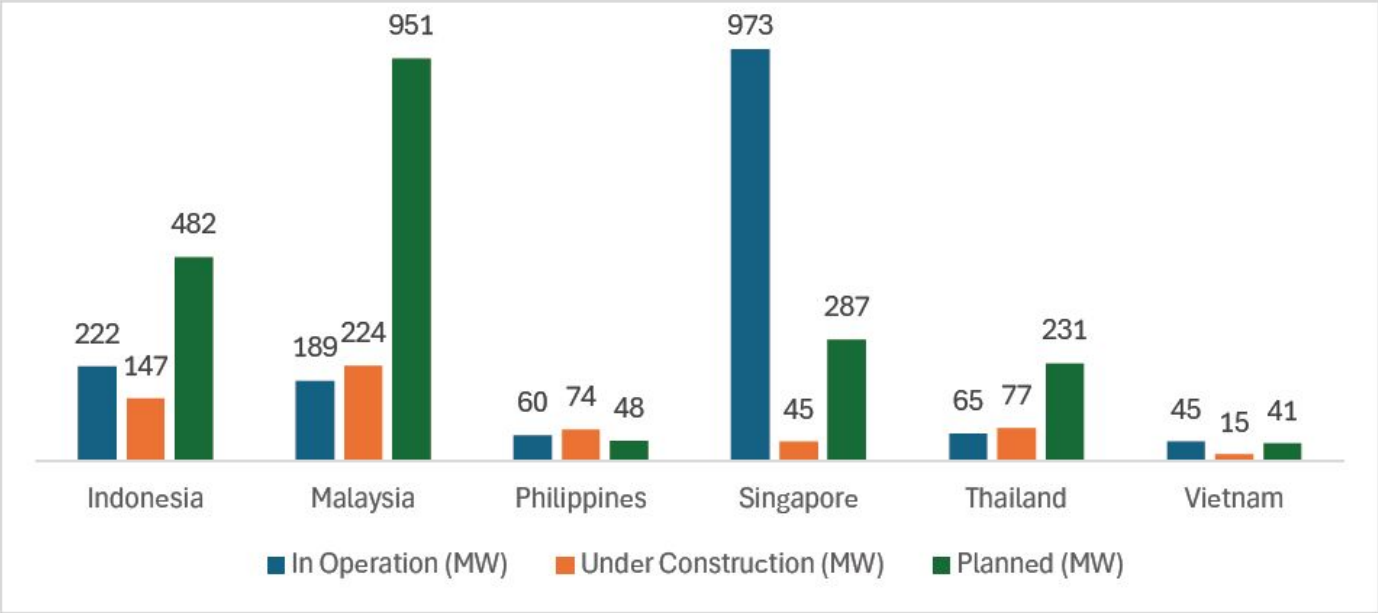
Category	Sub-category	Winner/ Runner-up	Country	Indusry Name	Company
Energy Management in Buildings and Industries	**Large Industries**	Winner	Thailand	Mitsubishi Electric Consumer Products (Thailand) Company Limited	Mitsubishi Electric Consumer Products (Thailand) Company Limited
		1st Runner-up	Thailand	Beiersdorf (Thailand) Co., Ltd.	Beiersdorf (Thailand) Co., Ltd.
		2nd Runner-up	Indonesia	PT PLN Indonesia Power Priok PGU	PT PLN Indonesia Power Priok PGU

ACE's Programmes - Industrial Energy Efficiency

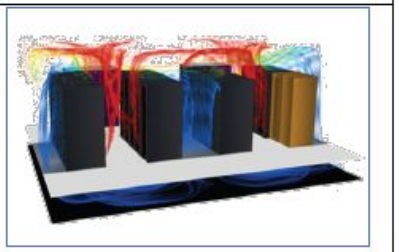
Building Next Generation Data Center Facility in ASEAN

Study on sustainable data centers amid the surge in demand from the digital economy and AI, assessing emerging technologies to reduce power usage effectiveness (PUE)

Figure 1.6. Data Center Capacity in Selected ASEAN Countries



Data Source: Asia Pacific Data Center Update H22023, Cushman&Wakefiled [8]

Item	Modular Data Center	Traditional Data Center
		
Design	Low environmental requirements, no need for professional building	Need professional building
Deployment	7~10 days	30 days
PUE	Precision cooling PUE：1.2~1.5	In-room cooling PUE≥2.0
Power density per rack	5~30kW	≤7kW
Expansion	Flexible expansion, lower Initial investment	Flexible capacity expansion is not supported

Note: A small- and medium-sized equipment room with a maximum of 100 cabinets is used as an example.

Digitalisation in Energy Efficiency & Conservation Sectors

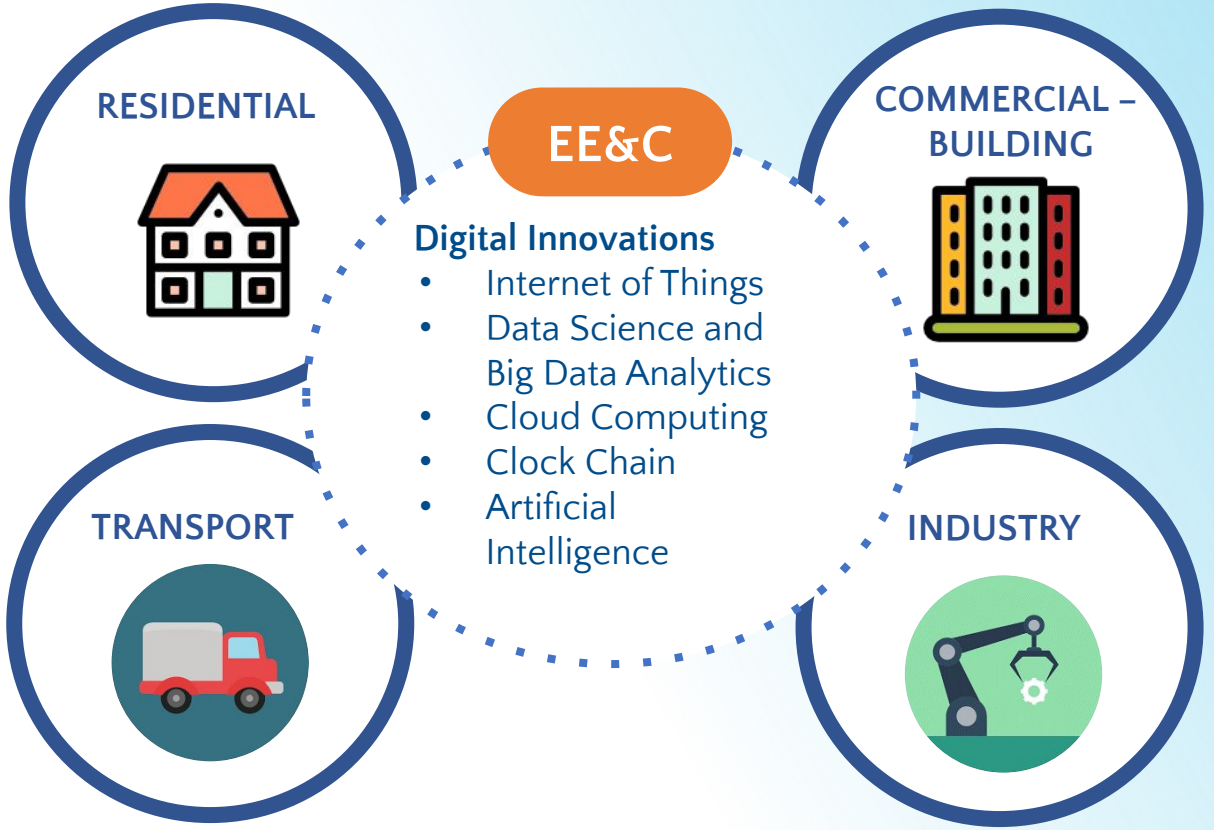
Increasing energy efficiency is one of the key outcomes of digitalisation

Digitalisation Fundamental Elements

Data
Digital Information

Analytics
The use of data to produce useful information and insights

Connectivity
Exchange of data between humans, devices, and machines through digital communications networks.



More advanced technologies and digital penetration can help ASEAN to achieve the energy intensity reduction target

Policy Recommendation to Drive Energy Efficiency in Industrial Sector

Introduce Innovative Financing Mechanism for EE in Industry
encourage industries, especially SMEs, to invest in energy efficiency and digitalisation technologies, through introducing financing mechanism like Energy Savings Insurance (ESI), KDB Guarantee Mechanism, and ESCO Financing Model

Technical Advisory on Energy Management in Industry
exchange best practices, lessons learned, and policy insights on promoting industrial energy efficiency and training for energy auditor/energy manager

Promote Public-private Partnerships
leverage resources, expertise, and innovation from both the public and private sectors.

Develop ASEAN-wide Energy Performance Benchmark and Database in Industry sector
To identify best practices of energy efficiency measures in industrial sector through benchmarking, further encouraging improvement areas and implementation of sustainable measures with innovative financial support to foster a sustainable industrial environment across the ASEAN region

Strengthen Regional Collaboration and Knowledge Sharing
exchange best practices, lessons learned, and policy insights on promoting industrial energy efficiency and digitalisation.

Policy Recommendation to Drive Energy Efficiency & Digitalisation in Industrial sector

Implement Targeted Financial Incentives and Support Mechanisms
encourage industries, especially SMEs, to invest in energy efficiency and digitalisation technologies

Establish ASEAN Digitalisation Hubs of Excellence
facilitate collaboration between governments, industries, academia, and technology providers.

Promote Public-private Partnerships
leverage resources, expertise, and innovation from both the public and private sectors.

Strengthen Regional Collaboration And Knowledge Sharing
exchange best practices, lessons learned, and policy insights on promoting industrial energy efficiency and digitalisation.

Technical Adv
exchange best practices, lessons learned, and policy insights on promoting industrial energy efficiency and digitalisation.

Develop ASEAN-wide Digitalisation Standards and Frameworks for Industrial Energy Efficiency
address key areas such as data collection and sharing, cybersecurity, interoperability of digital systems, and skills development.