

# Initiatives for Carbon Neutrality in Transportation Sector in ASEAN

**AJEP Online Seminar for Carbon Neutrality in Transportation Sector  
under  
ASEAN-JAPAN Energy Efficiency Partnership (AJEEP) Scheme V  
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**One Community  
for Sustainable  
Energy**

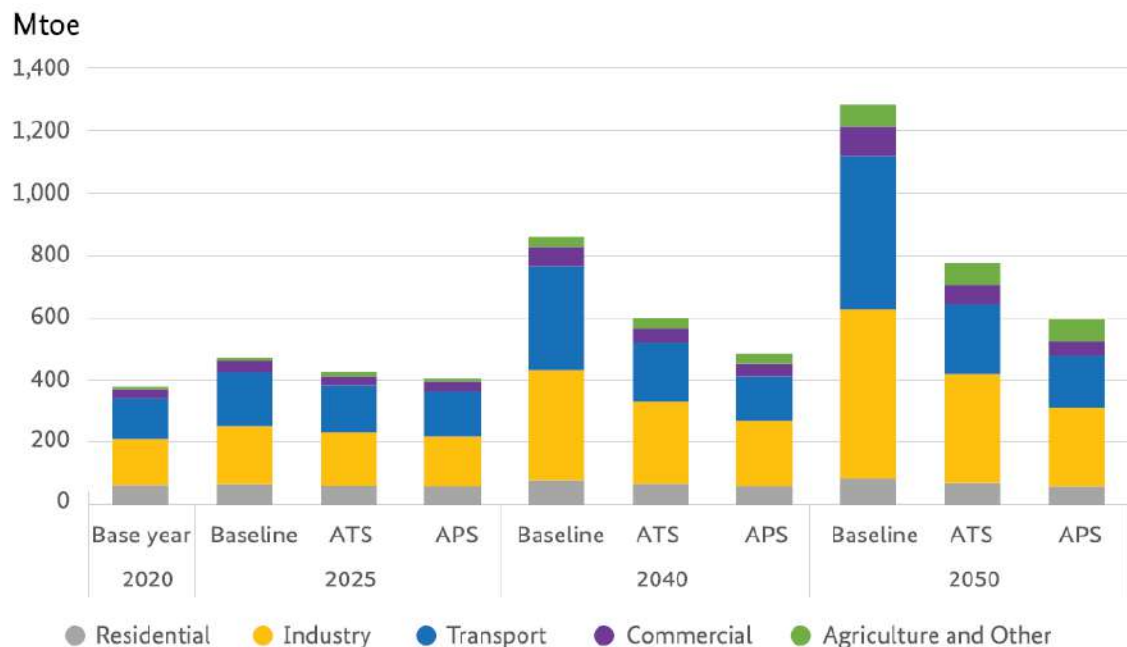


# Content of today's presentation

1. Transport sector in ASEAN Energy Demand Landscape
2. Energy Efficiency and Conservation under APAEC Targets
3. ASEAN Carbon Neutrality Strategy
4. Current initiatives in transportation sector in ASEAN
5. Policy Recommendation

# Transport sector is the second highest energy consuming sector, with oil as primary fuel.

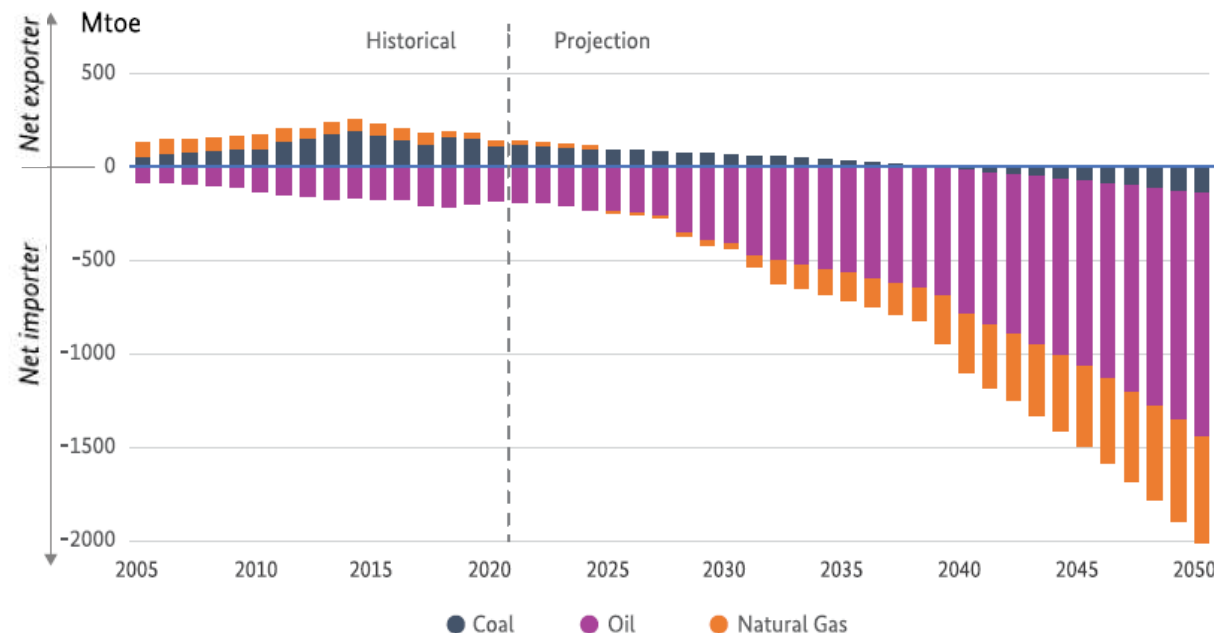
## ASEAN Energy Consumption by Sector



Source: 7<sup>th</sup> ASEAN Energy Outlook

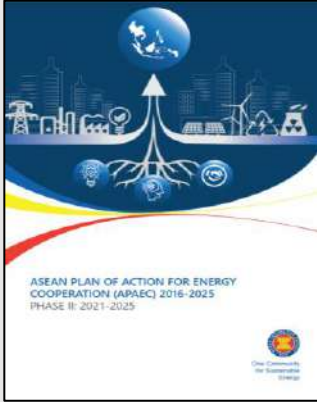
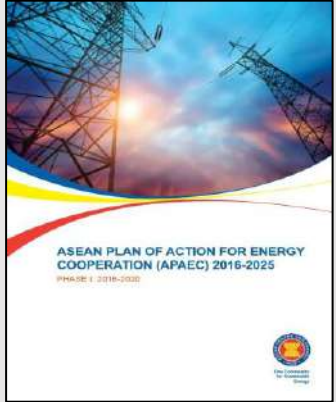
In 2020 alone, the transport sector was responsible for **34.8% of the TREC and 72% of oil demand.**

## ASEAN Energy Import-Export Balance and Projections



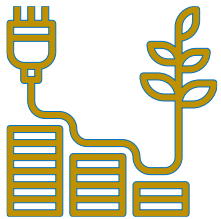
**ASEAN has been the net oil importer region.** Without any significant oil reserves discoveries, it imposes energy security issues in the region.

## 2. ASEAN Plan of Action for Energy Cooperation (APAEC)

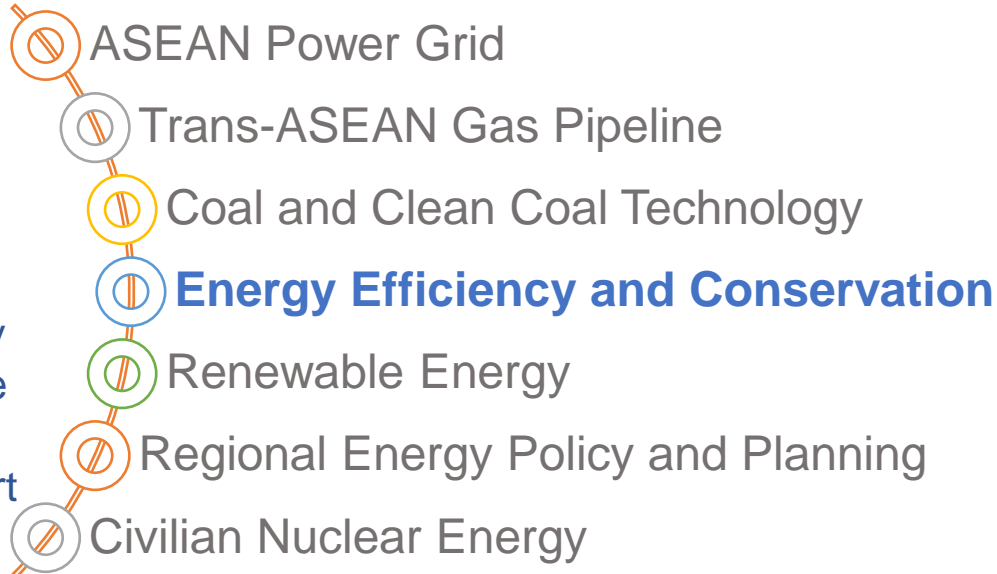


APAEC is a series of guiding policy documents to support the implementation of **ASEAN multilateral energy cooperation** to advance regional integration and connectivity goals.

Serves as a blueprint for better energy cooperation under seven (7) programme areas in achieving the goals of the **ASEAN Economic Community (AEC)** pillar of the ASEAN Community.



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



### **OBS1**

Expand, Harmonise, and Promote EE S&L

### **OBS2**

Enhance Participation of Private Sector, Financial Institutions, and Clusters

### **OBS4**



Pursue Energy Efficiency in Transport

### **OBS3**

Strengthen Energy Efficiency in Building

### **OBS5**

Advance Energy Efficiency in Industry

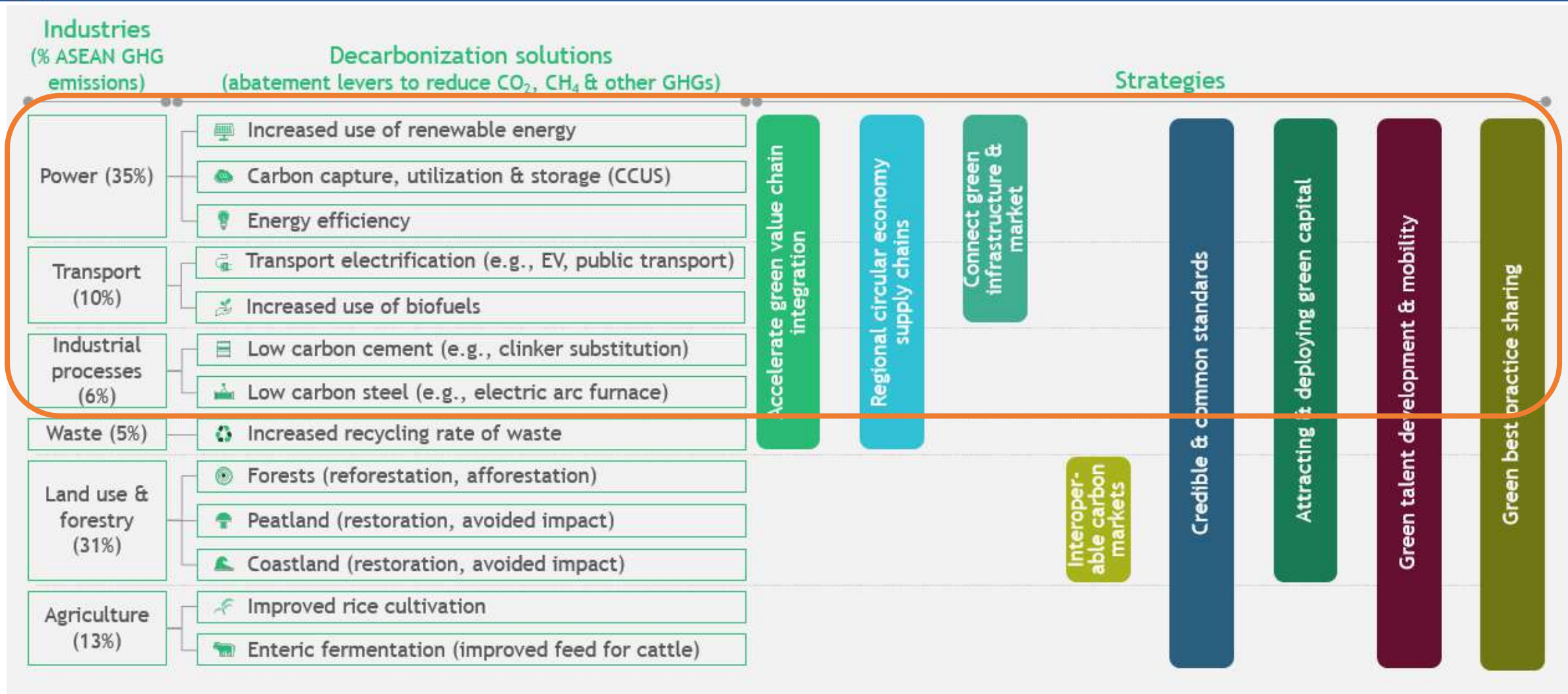
### 3. ASEAN Carbon Neutrality Strategy

Non-exhaustive

Industries (% ASEAN GHG emissions)	Decarbonization solutions (abatement levers to reduce CO <sub>2</sub> , CH <sub>4</sub> & other GHGs)	Key issues	How ASEAN can address this
Power (35%)	<ul style="list-style-type: none"> <li>Increased use of renewable energy</li> <li>Carbon capture, utilization &amp; storage (CCUS)</li> <li>Energy efficiency</li> </ul>	<ul style="list-style-type: none"> <li>Intermittency of renewables</li> <li>Mismatch RE demand-supply centers</li> <li>Cross-border transfer restrictions</li> <li>Skill shortages</li> <li>Individual markets sub-scale</li> <li>Effort to categorize devices</li> </ul>	<ul style="list-style-type: none"> <li>Interconnected grid</li> <li>Devl cross-border RE off-take mechanisms</li> <li>Common CO<sub>2</sub> definition</li> <li>Coordinate regional CCUS value chains</li> <li>Common energy efficiency standards</li> </ul>
Transport (10%)	<ul style="list-style-type: none"> <li>Transport electrification (e.g., EV, public transport)</li> <li>Increased use of biofuels</li> </ul>	<ul style="list-style-type: none"> <li>Capability gaps in value chain</li> <li>Economies of scale vs. China</li> <li>Feedstock under-utilized/unaccepted</li> <li>Complex supply chains</li> </ul>	<ul style="list-style-type: none"> <li>Interconnect EV value chains</li> <li>Common charging infra. standards</li> <li>Promote feedstock collection (e.g., UCO<sup>1</sup>)</li> <li>Build intl. credibility (e.g., LCA<sup>2</sup> for CPO<sup>3</sup>)</li> </ul>
Industrial processes (6%)	<ul style="list-style-type: none"> <li>Low carbon cement (e.g., clinker substitution)</li> <li>Low carbon steel (e.g., electric arc furnace)</li> </ul>	<ul style="list-style-type: none"> <li>Limited demand</li> <li>Complex supply chains</li> <li>Lack of low-carbon product guidelines</li> </ul>	<ul style="list-style-type: none"> <li>Circular scrap steel supply chains</li> <li>Common low-carbon product standards</li> </ul>
Waste (5%)	<ul style="list-style-type: none"> <li>Increased recycling rate of waste</li> </ul>	<ul style="list-style-type: none"> <li>Cross-border waste transfer restrictions</li> <li>Limited awareness and demand</li> </ul>	<ul style="list-style-type: none"> <li>Common waste taxonomy</li> <li>Lower technical circular trade barriers</li> </ul>
Land use & forestry (31%)	<ul style="list-style-type: none"> <li>Forests (reforestation, afforestation)</li> <li>Peatland (restoration, avoided impact)</li> <li>Coastland (restoration, avoided impact)</li> </ul>	<ul style="list-style-type: none"> <li>International concerns on credit quality</li> <li>Skills shortages</li> <li>Limited links to global markets</li> <li>Export restrictions</li> </ul>	<ul style="list-style-type: none"> <li>Common verification standards</li> <li>Best practice verification capacity building</li> <li>Interoperable local &amp; global credit trade</li> </ul>
Agriculture (13%)	<ul style="list-style-type: none"> <li>Improved rice cultivation</li> <li>Enteric fermentation (improved feed for cattle)</li> </ul>	<ul style="list-style-type: none"> <li>Inefficient cultivation techniques</li> <li>Fragmented sector</li> </ul>	<ul style="list-style-type: none"> <li>Skill development on rice cultivation</li> <li>Best practice animal feed mgmt. sharing</li> </ul>

Source: ASEAN Strategy for Carbon Neutrality

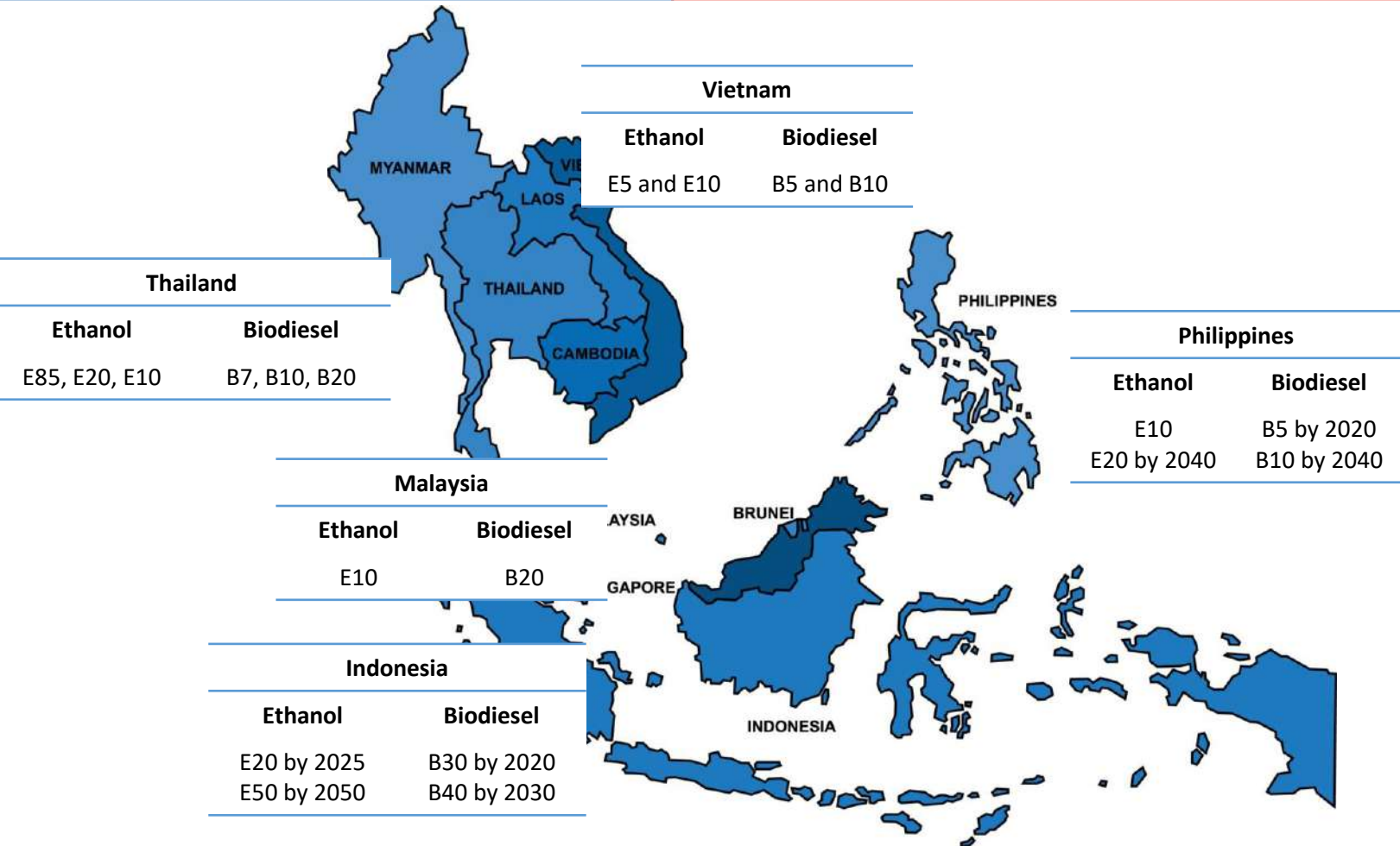
### 3. ASEAN Carbon Neutrality Strategy



Source: ASEAN Strategy for Carbon Neutrality



# 4. Current initiatives on transportation sector in ASEAN – Biofuel Mandate



6 AMS have defined specific biofuel policies

5 AMS have blending mandates

Indonesia, Malaysia, the Philippines, Thailand are major biofuel producers

Biofuel blending can be enhanced through active support and participation of all stakeholders, repositioning biofuel sector as one of transitional energy sources, establish sustainability standards, and maintain price stability.

# ASEAN biofuel feedstock status

## Indonesia



In 2022  
**CPO Feedstock 9.5 BT**  
**Biodiesel Production**  
**10,300 ML**

## Malaysia



In 2022  
**CPO Feedstock 1.1 BT**  
**Biodiesel Production**  
**1,150 ML**

## Philippines



In 2022  
**Coconut Oil 228,000 MT**  
**Biodiesel Production**  
**248 ML**

## Thailand



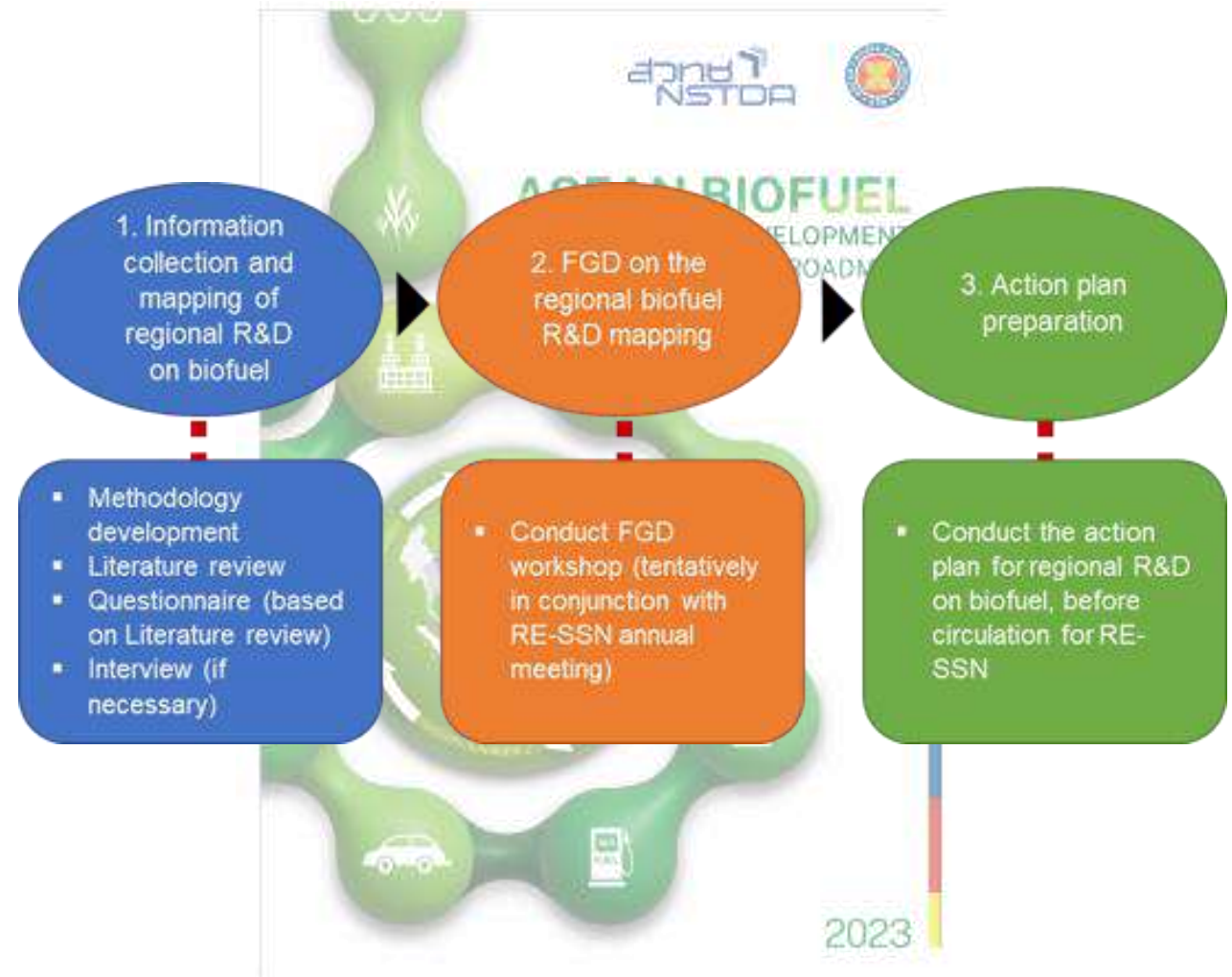
In 2022  
**Sugarcane 1.1 BT**  
**Molasses 3.6 BT**  
**Cassava 3.3 BT**  
**Bioethanol Production**  
**1,460 ML**

However, biofuel production still needs to be increased to help ASEAN member countries' current blending targets and net zero goals



# The Biofuel R&D Roadmap in ASEAN

- ❑ The study was formulated Based on the review of related policies, technologies, feedstocks, verified by questionnaires and focus group discussions with the AMS on the Biofuel (i.e., bioethanol and biodiesel) development,
- ❑ Through evaluation of technology readiness level, key success factors in biofuel deployment, and potential contributions of each AMS for effective regional cooperation, the action plans for each supply chain elements (upstream, downstream, and mid-stream) have been proposed according to near-, mid-, and long-term priorities,

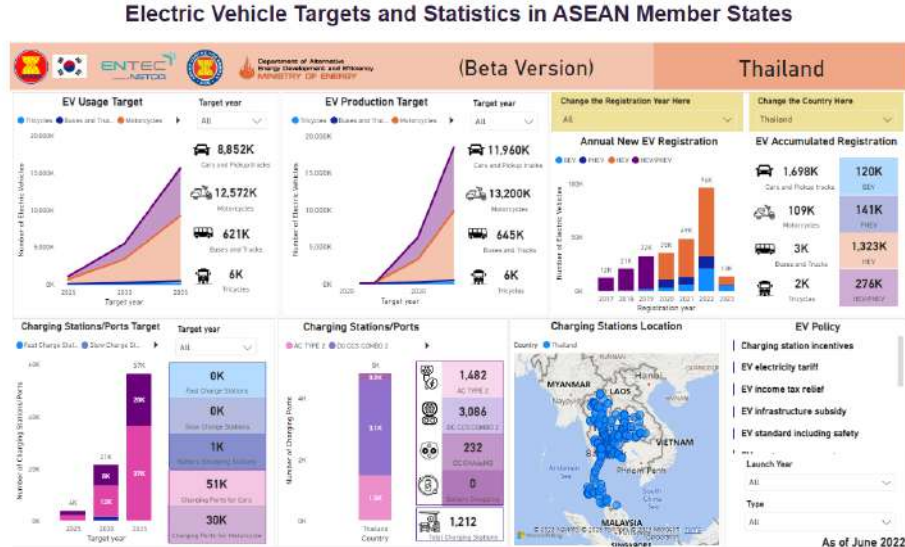


# Efforts to strategise EV integration into Biofuel Roadmap

- ❑ The ongoing study between ACE and the National Science and Technology Development Agency (NSTDA) of Thailand,
- ❑ **Objectives:**
  - Establish policy dialogue on EV for strategic integration into biofuel for energy mix in transportation sector across AMS,
  - Conduct scenario analysis reflecting strategic integration of EV and biofuel-powered vehicles through Focus Group Discussion with relevant government officials,



*The FGD on Plans and Policies for Strategic EV Integration into Biofuel Roadmap with representatives from AMS on 4 May 2023*



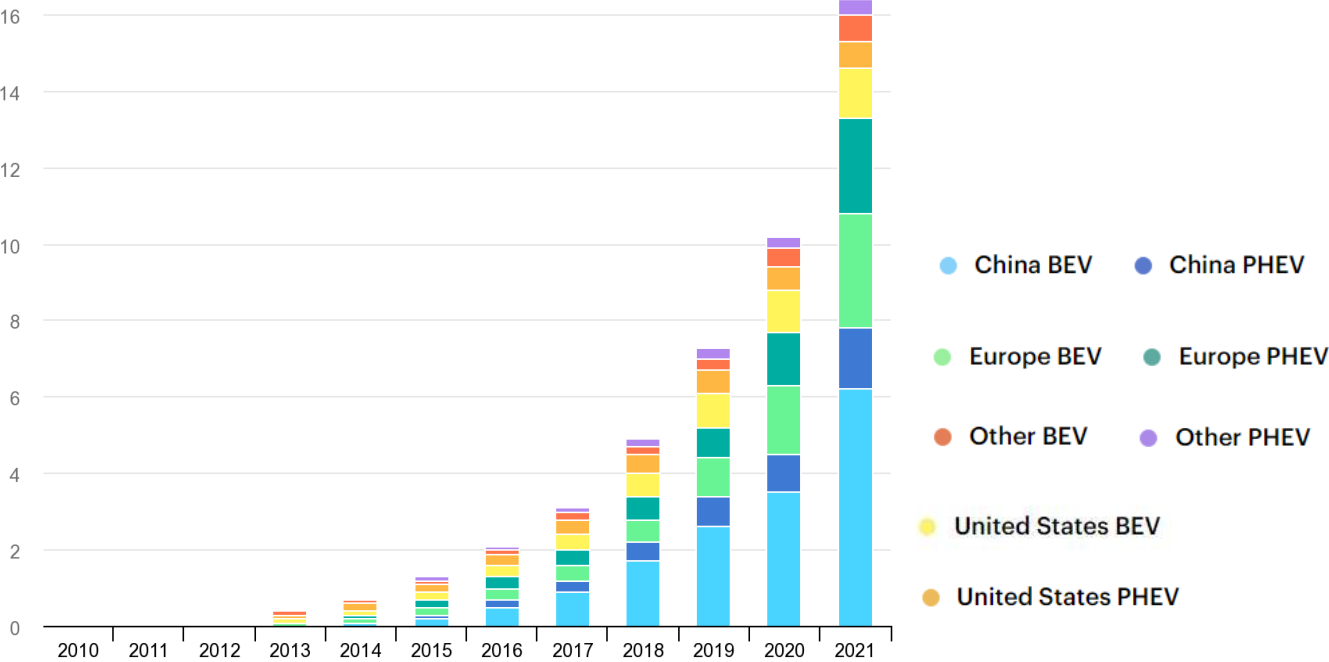
*EV targets & statistics in AMS  
(Available on:  
[https://www.entec.or.th/asean-rov\\_evbiofuel/](https://www.entec.or.th/asean-rov_evbiofuel/))*

## ❑ Expected Outputs:

1. Information on current electric vehicle landscape in ASEAN
2. Strategic integration of biofuel & electricity for transportation sector
3. Action plan on EV strategic integration

# Global EV market is increasing rapidly, with combination of stringent regulations and attractive incentive packages as key policy drivers

Global electric car stock, 2010-2021



Source: IEA, 2022

## Policy Tools to Increase EV

EV Mandate  
/ Target

Fuel  
Economy

Attractive  
Incentives

Readiness of  
Infrastructure

### Imposing Regulations

(EV usage mandate, phasing out ICE vehicles, stringent fuel economy standards)

Most effective and affordable measures to push EV deployment and production



Complimentary

### Provide incentives

(Fiscal and non-fiscal)

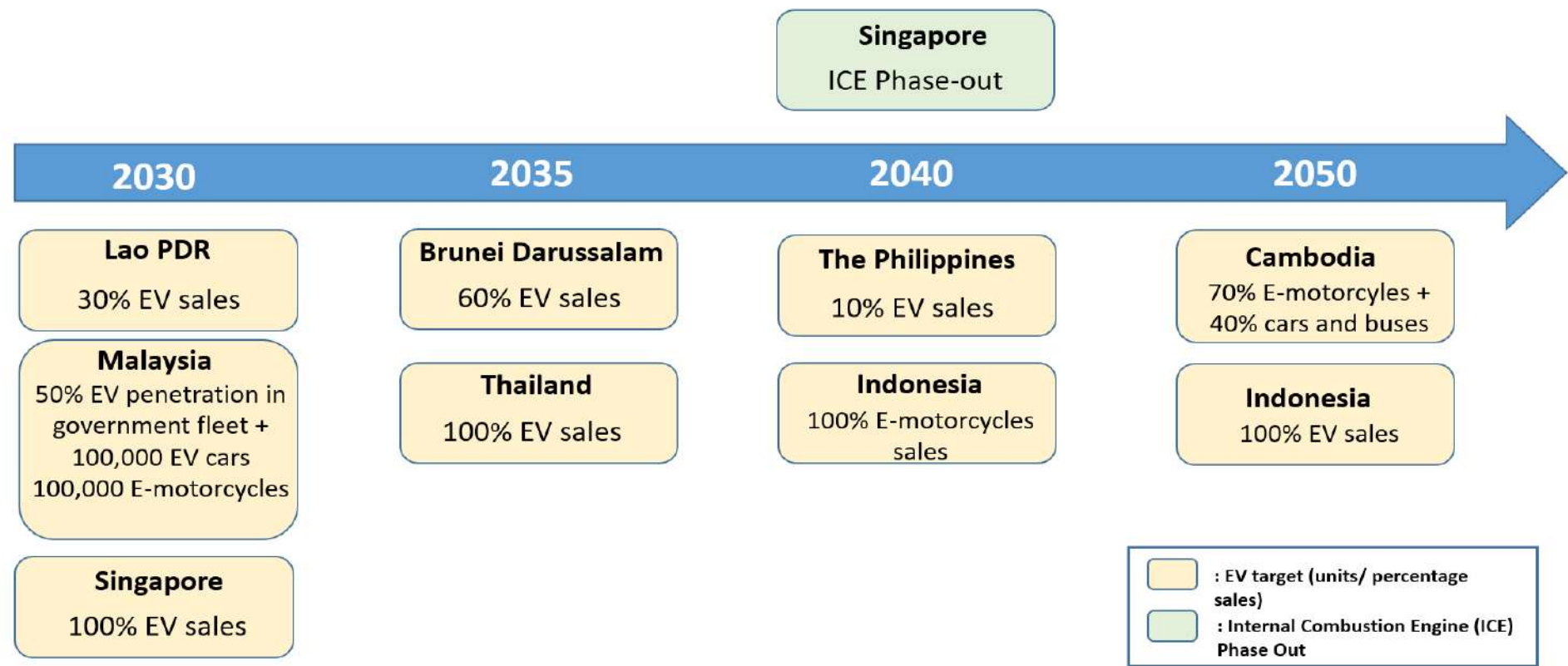
Enable EV being more competitive and achieve cost parity with gasoline vehicles

**China**, largest EV market in volume of sales globally: subsidy programme + fuel economy standards

**Korea**: EV Mandate as new vehicles to public sector (for expansion to private sector) + high fiscal incentives

**Norway**, largest EV market share globally: 100% zero emission vehicle sales target by 2025 + high non-fiscal incentives

# ASEAN member states are aiming towards higher deployment of electric vehicles



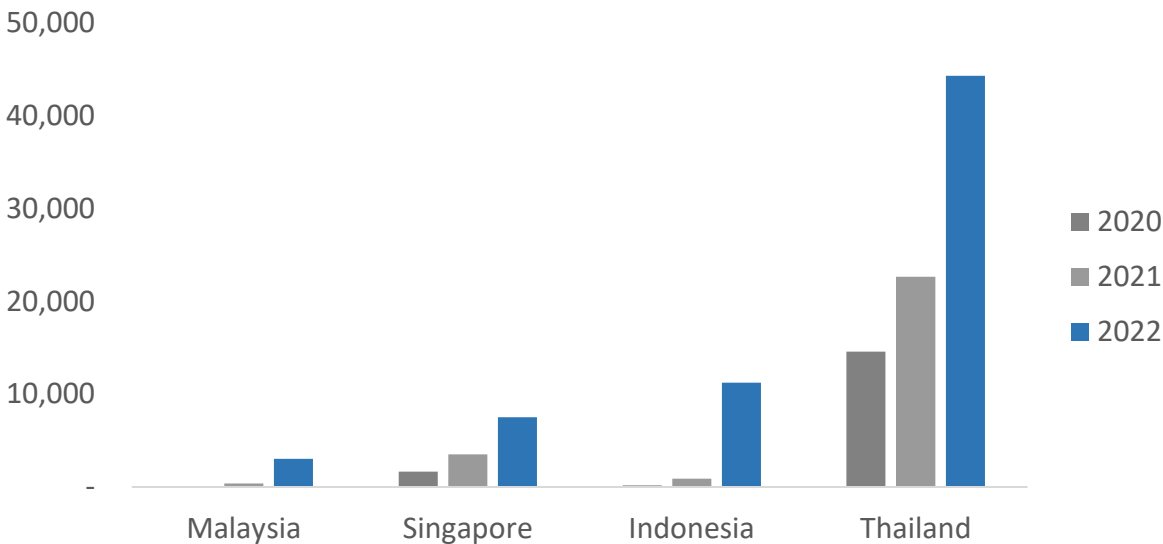
Source: ASEAN Centre for Energy

Eight (8) out of 10 countries have announced their targets to achieve the share electric vehicle sales or phase-out internal combustion engine



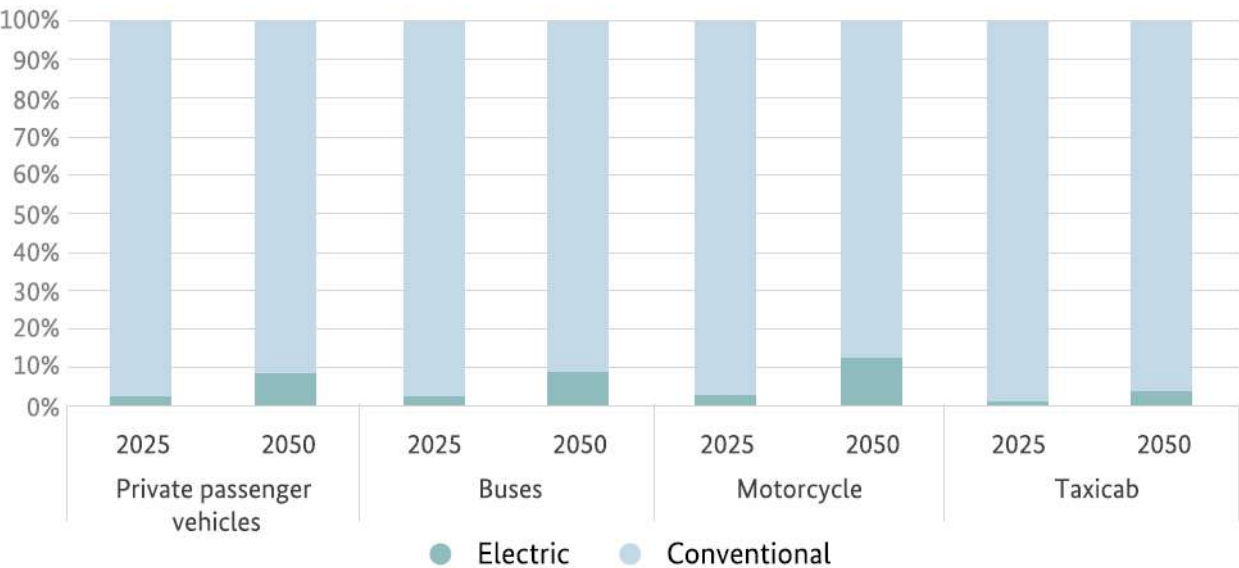
# EV sales are growing but only covers a friction of total vehicle sales in AMS

BEV and PHEV Stocks in Selected AMS, 2020 - 2022



Note: Private passenger vehicles  
Source: ASEAN Centre for Energy

Percent share per vehicle types (%)



Source: 7<sup>th</sup> ASEAN Energy Outlook

EV sales are **growing** in the ASEAN Countries. In 2021, average **EV sales accounts 0.7%** of the total vehicle sales in ASEAN Member States.

EVs could only reach up to **2.6% of the fleet by 2025 and up to 10.6% by 2050 on average**. Higher EV target and/or establishment of transport electrification policies/ incentives could yield more energy savings in the sector.



# AMS are providing various incentives to increase the attractiveness of EV











Source: ASEAN Centre for Energy



	BN	CA	ID	LA	MY	MM	PH	SG	TH	VN
<b>Fiscal Incentives - Consumer</b>										
<b>Purchase Subsidy</b>	-	-	-	-	-	-	-	-	✓	-
<b>Import Duty Exemption</b>	-	✓	✓	✓	✓	✓	✓	-	✓	-
<b>Tax Exemption/Allowance/Rebates (Luxury/excise/road/registration)</b>	-	-	✓	-	✓	-	✓	✓	✓	-
<b>Fiscal Incentives - Manufacturer</b>										
<b>Income Tax Holiday/Breaks</b>	-	-	✓	-	-	-	✓	-	✓	-
<b>Import Duty Exemption</b>	-	-	-	-	✓	-	-	-	✓	-
<b>Tax Exemption/Allowance</b>	-	-	✓	-	✓	-	✓	-	✓	-
<b>Non-Fiscal Incentives</b>										
<b>Government Fleet Mandate</b>	-	-	-	-	✓	-	✓	-	-	-
<b>R&amp;D and Pilot/Demonstration Projects</b>	✓	-	✓	✓	✓	-	-	✓	-	-
<b>Privileges</b>	-	-	✓	-	-	-	✓	✓	-	-

Government have provided **various incentive packages**, mainly targeting consumers through tax-related incentives and purchase subsidy. For car manufacturing countries (Indonesia, Malaysia, and Thailand) **incentives are also provided to manufacturers to boost local EV production**.

# Sufficient EV charging infrastructures are limited

										
EV Infrastructure Target		-	31,589 EVCS by 2030	200 EVCS by 2030	9000 AC and 1000 DC EVCP by 2025	-	-	60,000 EVCP by 2030	12,000 EVCS by 2030	-
EV Charging Infrastructure	-	-	346 EVCS as of 2022	10 EVCS	900 EVCP as of 2022	-	258 AC 59 DC As of 2022	3,600 EVCP as of 2022	693 EVCS 2,285 EVCP as of 2021	3 EVCS
Supporting Measures for EV Infrastructure										
Technical & Safety Standards and Guidelines	-	○	○	-	-	-	○	○	-	-
Feasibility Study, Pilot, and Demonstration Projects	-	-	-	-	○	-	-	○	-	○
Financial Support	-	-	-	-	○	-	-	○	○	-
Mandatory Obligation	-	-	○	-	○	-	-	○	-	-

Source: ASEAN Centre for Energy

The availability and reliability of EV charging infrastructures is crucial to solve barriers of EV adoption. Several countries has set EV charging target, but the number of EV infrastructures are still considerably low. To achieve the target, AMS provided various supporting measures, as listed above.



# ASEAN LEADERS' DECLARATION ON DEVELOPING REGIONAL ELECTRIC VEHICLE ECOSYSTEM



The 42<sup>nd</sup> ASEAN Summit was held on 10 – 11 May 2023 in Labuan Bajo, Indonesia, with the participation of the 10 ASEAN member states. The ASEAN Leaders declared to:



**Affirm** the importance of electric vehicles in reducing greenhouse gas emissions, achieving net-zero emissions, and improving energy security.



**Develop** a regional electric vehicle ecosystem to build ASEAN as a global production hub for the electric vehicle industry and support sustainable economic growth.



**Encourage** harmonization of regional standards, training, and certification based on international standards to strengthen the regional value chain and ensure interoperability.



**Promote** partnerships with external partners through various ASEAN-led mechanisms, international organizations, private sectors, and people.



**Explore** cooperation and collaboration on the development of an electric vehicle ecosystem, creating an enabling business environment and investment climate, optimizing the production and use of sustainable materials and resources, enhancing the participation of Micro Small and Medium Enterprises (MSMEs), collaborating on research and development, renewable energy promotion, phasing-out of conventional internal combustion engines, financing, and more, to support the development of the regional electric vehicle ecosystem.



**Task** the ASEAN Economic Community Council to oversee the implementation of this Declaration, provide guidance, and identify the relevant lead sectoral body to coordinate the development of the regional electric vehicle ecosystem agenda.

# ASEAN Green Transport Rally 2023: Towards Net Zero Emissions

The event aims to **identify potential economic and environmental benefit of different passenger car technologies**, such as plug-in hybrid EV (PHEV), hybrid EV (HEV), full battery-powered EV, ICE with maximum biofuel intake, and fuel cell vehicle.

It will include activities such as:

1. Driving distance from Jakarta to Nusa Dua, a total distance around **1,250 km**.
2. Finish line during ASEAN Energy Business Forum (AEBF) opening day and to be **inaugurated by government officials from Ministries of Energy of 10 ASEAN countries (and President of Indonesia – TBC)**.
3. **No fossil fuel utilisation**, it will be replaced by biodiesel-powered generators and biofuel.
4. **Measurements of fuel consumption, emissions, and available charging infrastructure at designated checkpoints**. For example, checkpoints every 300 km at the closest big cities.





## ACCEPT Phase II: 2023-2026

Supporting **ASEAN** member states and ASEAN's capacity to move towards **Low-Carbon Energy System** and contribute towards **carbon neutrality** or **net zero** in the coming years



Support the implementation and development of APAEC



Assist ASEAN in planning the energy cooperation policies, in **APAEC Phase 2: 2021 – 2025**



Implement the **Programme Area 6**, Regional Energy Policy and Planning (REPP), **OBS 6** to promote information sharing on the Energy-Climate Nexus.

Officially commenced as of **1<sup>st</sup> November 2022**, and expected to be completed in **October 2026 (48 months)**

ACCEPT II will administer APAEC and OBS 6 in its **Outcomes, Outputs and Action Plans**



# Efficient transportation system and infrastructures could significantly reduce energy consumption in the sector.



- In the effort to limit use of private cars and reduce congestion, several AMS cities implemented various measures, such as taxes and restrictions
- Cities in AMS are utilising Mass Rapid Transport, a combination of BRT, MRT and LRT, as their primary inner-city public transportation modes, and are planning further route expansion and integration between modes of transportation. Several cities are piloting the utilisation of **E-Buses**.
- Measures to encourage active mobility are put in place, which involve developing sustainable infrastructure to further promote efficiency and sustainably, such as dedicated bike and pedestrian lane.

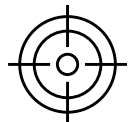
2% annual increase in share of public bus reduce petrol and diesel usage by **72% and 59%** on average.

Source: 7<sup>th</sup> ASEAN Energy Outlook

# Policy Recommendations



**Enhance and harmonise fuel economy standards and labelling policies**



**Develop a long-term strategy for biofuel deployment**



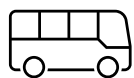
**Accelerate EV deployment through a combination of regulations and incentives**



**Expand EV infrastructure through the development of an integrated EV ecosystem**



**Promote policies and infrastructure that encourage mass transit and active mobility**



**Explore the adoption of energy management policies for freight transportation**



**Provide awareness raising programmes for consumers**

**Fostering and expanding the international collaborations**



One Community  
for Sustainable  
Energy



KOREA ENERGY  
AGENCY



## ASEAN Energy Efficiency and Conservation for the Transportation Sector:

Policy Trends and  
Best Practices

# Scan Here



# Thank You