

ASEAN Energy Sector Trend and Statistics

Nomura Research Institute Singapore

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Report summary

Background & Objective

- ✓ This summary is a selection of findings and charts from the full report. To inquire about the complete ASEAN Energy Sector Trend and Statistics 2022, please [contact us](#).
- ✓ Global energy-related trends such as decarbonization are progressing rapidly in the ASEAN region. On the other hand, the situation in the area is not uniform, and the degree of influence and progress is different for each country.
- ✓ NRI Singapore's energy team will publish a regular energy report for the purpose of assisting the market players to understand the market situation better.
- ✓ In this 2nd report, we will introduce basic statistics on the energy and electric power fields, as well as a comparison of trends such as deregulation decarbonization.

Contents of the full report

1. Carbon Neutral Target / Policies overview
2. Basic Statistics in ASEAN energy sector
 - Primary energy
 - Electricity
3. Key trend and related indicators
 - De-carbonization
 - De-centralization
 - De-regulation
4. Global and Southeast Asia Investment
5. Individual Country Statistics – Bangladesh, India, Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam

Summary of indicators

In the subsequent slides, we will provide the following list of indicators on primary energy and specifically electricity (1/2)

Segment	Sub-Segment	Indicators
Carbon Neutral	Carbon Neutral Target/ Policies overview	GHG Emission
		Master Plan
Basic Statistics	Primary Energy	Balance of Primary Energy: Production Composition (%)
		Self-Sufficiency (%)
		Energy Final Consumption by end-use (%)
	Electricity	Electricity Domestic Demand & Supply (TWh)
		Electricity Generation Mix (%)
		Electricity Final Consumption by end-use (%)
		Electrification rate
		Electricity tariff
Electricity Trend	De-carbonization	Balance of RE
		Target for RE
	De-centralisation	FIT and other policy
		FiT and renewable energy auctions
		Next generation automobiles (EVs)
	De-regulation	Electricity liberalization
		Penetration of smart meters
Global and Southeast Asia Investment	Energy Investment	Energy supply capacity and energy end-use sectors
		Clean energy and energy efficiency
		SEA Investment – Stated Policies Scenario and Sustainable Development Scenario

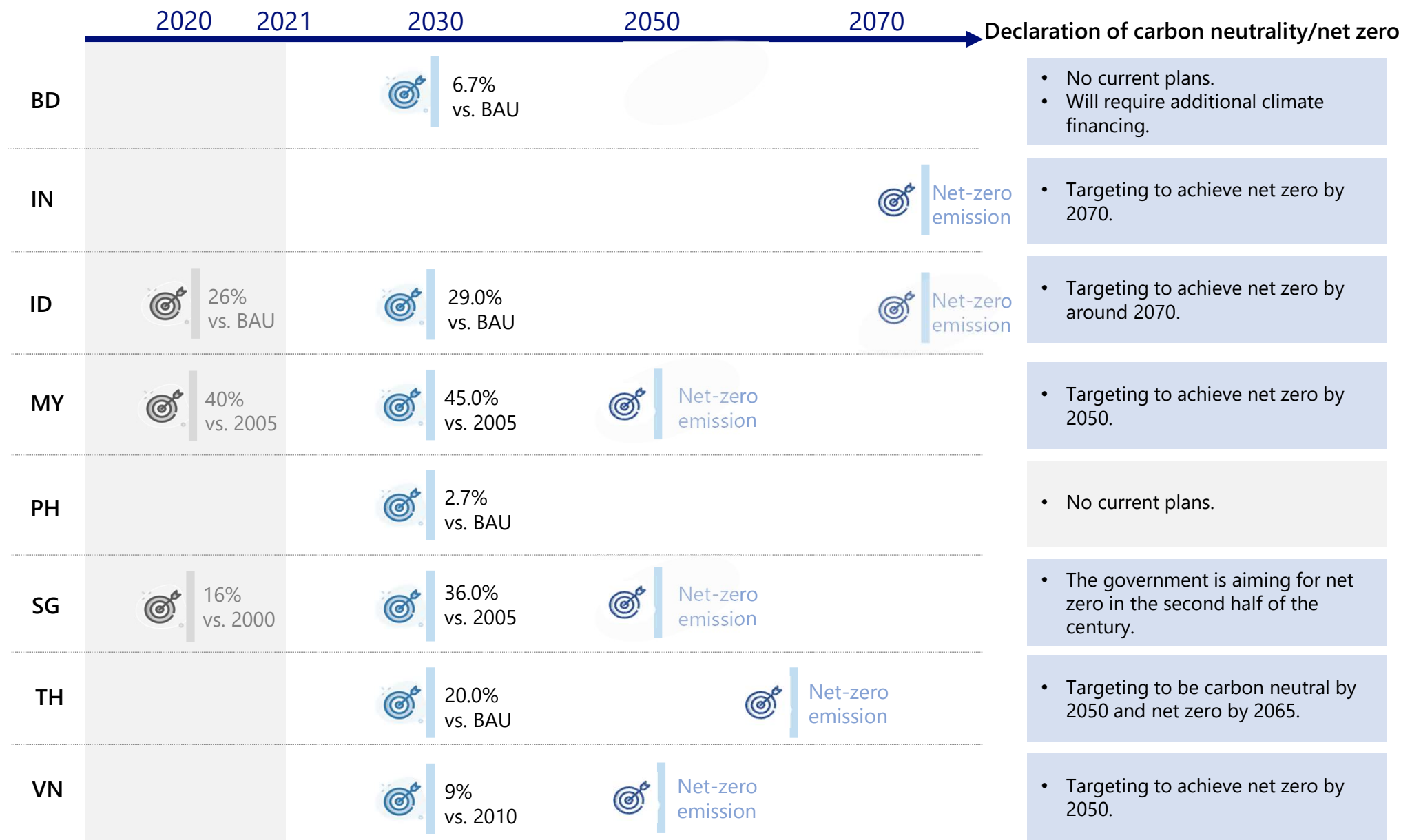
1. Decarbonation policy trends in South East Asian countries

2. Electricity Market

3. Next Generation Automobile

Carbon Neutral Target/ Policies overview: Target

Countries are committed to reduce GHG emission and achieve net zero.



Carbon Neutral Target/ Policies overview: Major Policies

 Goals + incentives/strict regulations in place
  Target has been set
  No target

Governments across SEA place a major focus on accelerating renewable energy

country	Policy Priority Areas				
	Energy (renewable and new energy)	Transportation (EVs, biofuels)	Commercial (e.g. TV) (Green Building)	Industry (energy saving, bio-related, etc.)	Household (Energy saving)
BD	Promote feasibility studies to increase renewable energy sources.	Explore tax and tariff systems for cars. Support the installation of solar/electric charging stations for EV.	Strengthen climate-change-resilient buildings and potential inclusion in the building code
IN	Support through programmes and schemes such as National Solar Mission	Pricing measures to encourage the purchase of efficient vehicles and incentives for the use of public transportation	Energy Conservation Building Code to address the design of new and large commercial buildings	Promote energy conservation	...
ID	Support through FIT, tax incentives, etc.	Establishment of EV introduction targets and support for subsidies Biodiesel and ethanol co-firing mandates	Green building target setting+incentive (Jakarta, etc.)	Promote energy conservation	...
MY	Support through FIT, tax incentives, etc.	Establishment of EV introduction targets and support for subsidies Biodiesel recommended	Setting Green Building Goals	...	Energy Conservation Recommendations
PH	Support through FIT, tax incentives, etc.	Start by converting public vehicles to EVs	Energy Conservation Recommendations	Promote energy conservation	Promote energy conservation
SG	PV bidding through the SolarNova program R&D grant support	Set targets and incentives for EV introduction	Encouragement of Green Mark acquisition and support for subsidies	Promote energy conservation through MEPS, etc.	Energy Conservation Recommendations
TH	Support through FIT, tax incentives, etc.	Establishment of EV introduction targets and subsidy support Biodiesel Co-firing Obligation	Energy Conservation Recommendations	BOI for green factories and bio-industries	Energy Conservation Recommendations
VN	Support through FIT, tax incentives, etc.	Under discussion	Energy Conservation Recommendations	Promote energy conservation	Promote energy conservation

1. Decarbonation policy trends in South East Asian countries

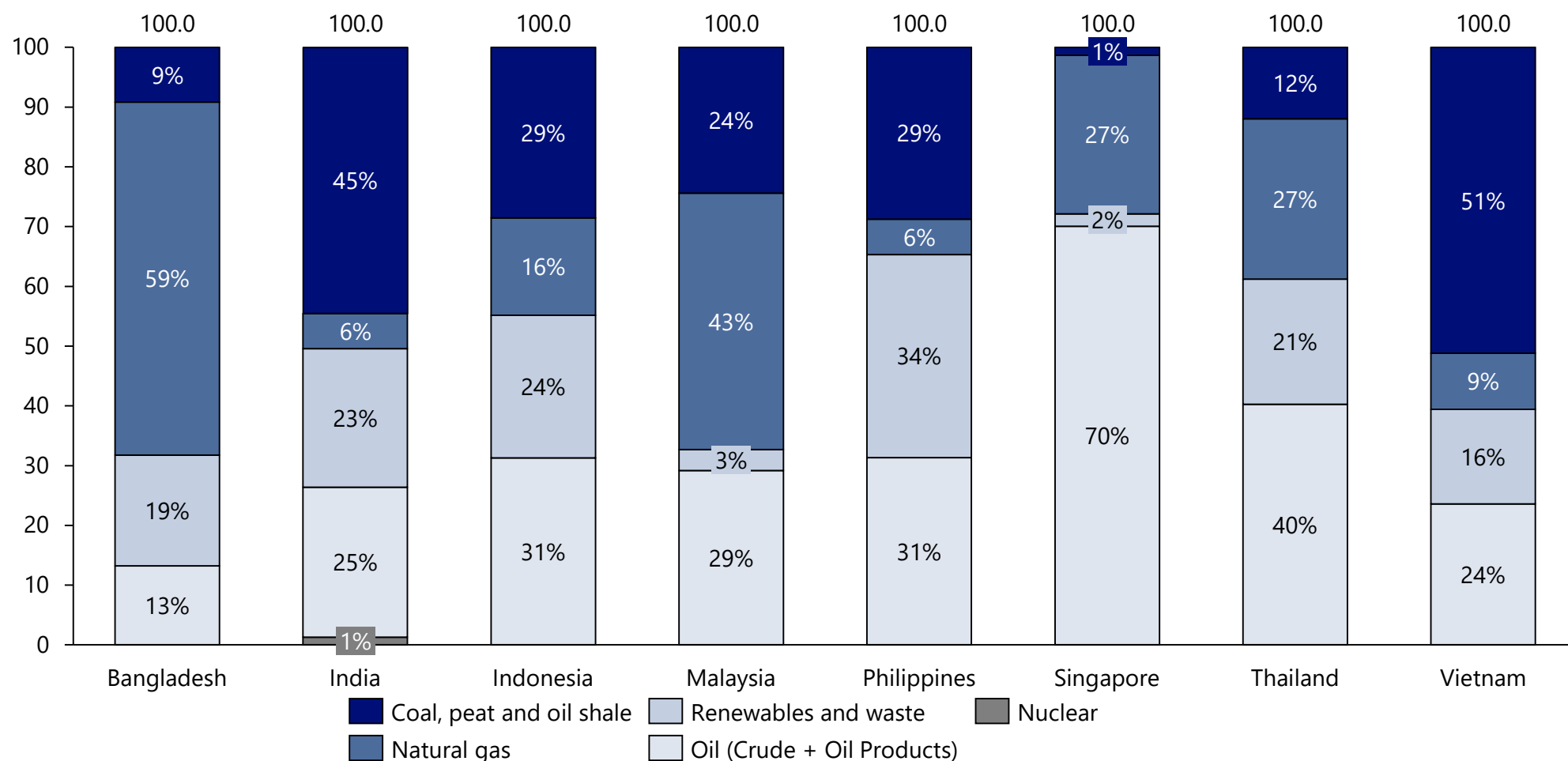
2. Electricity Market

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Total Energy-related indicators: Balance of Primary Energy Supply

The 8 shortlisted countries are still heavily dependent on oil as it is essential for commercial transportation and chemicals.

Balance of 2019 Total Primary Energy Supply by Fuel in selected countries (%)



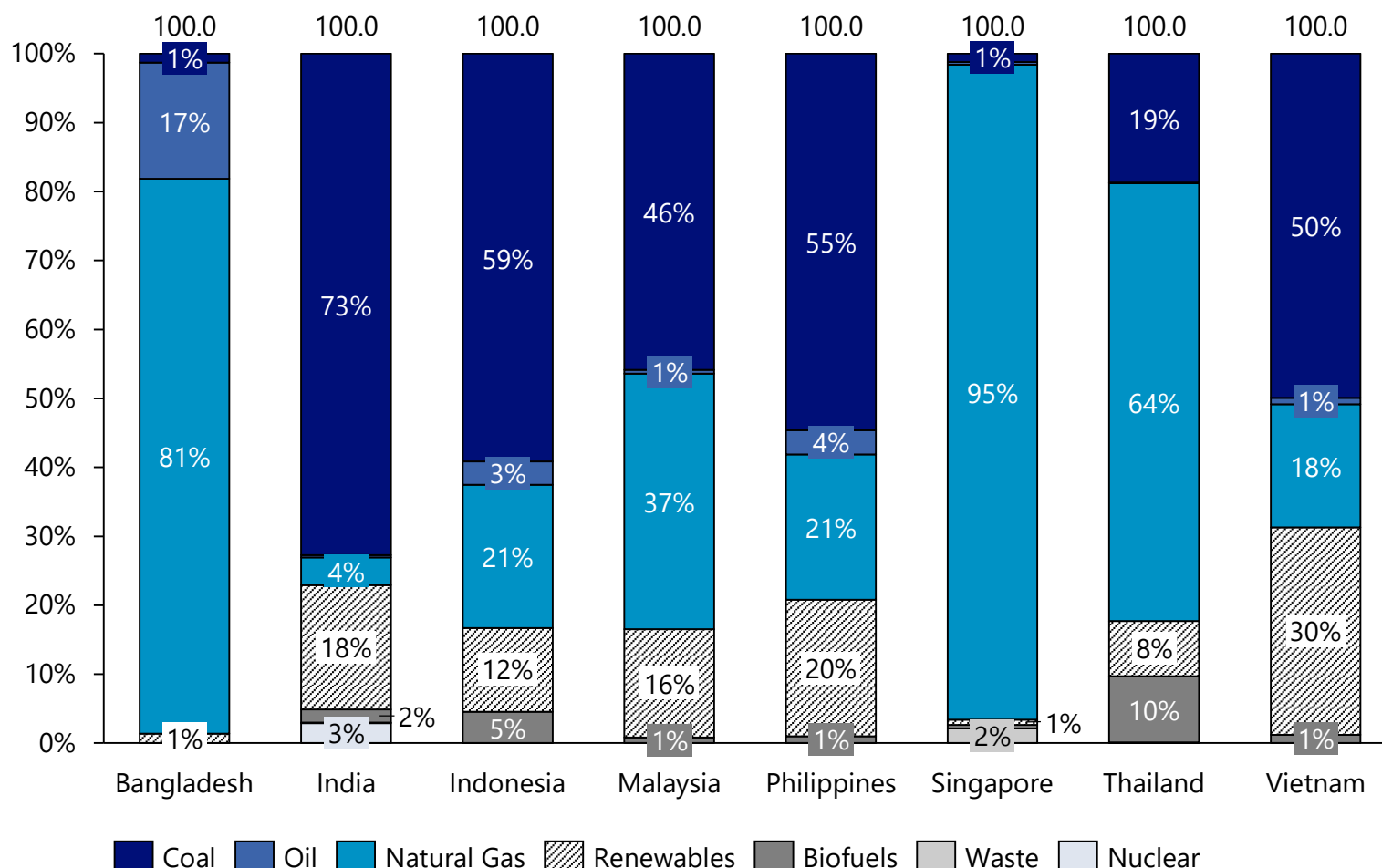
Note(s): Renewable Definition = Hydro + Geothermal + Solar PV + Solar Thermal + Wind + Tide

Source: IEA (Aug 2021) World Energy Balances, NRI Analysis

Electricity-related indicators: Electricity Generation Mix (%)

The rapid growth in energy demand has fueled the use of fossil fuels, especially coal and natural gas for electricity generation.

2019 Electricity Generation Mix in selected countries (%)



Insights

1. Coal and natural gas continue to play a key role in generating electricity. For countries such as India, Indonesia, Malaysia, Philippines, they are heavy on coal as their fuel for electricity. Singapore and Bangladesh are using more natural gas.
2. The availability of these resources domestically has had a key influence on the energy mix, particularly on the use of coal in countries such as Indonesia and India.
3. Due to inadequate land, Singapore and Bangladesh renewable power sources are limited. All in all, government from all countries are trying to expand renewable capacity.

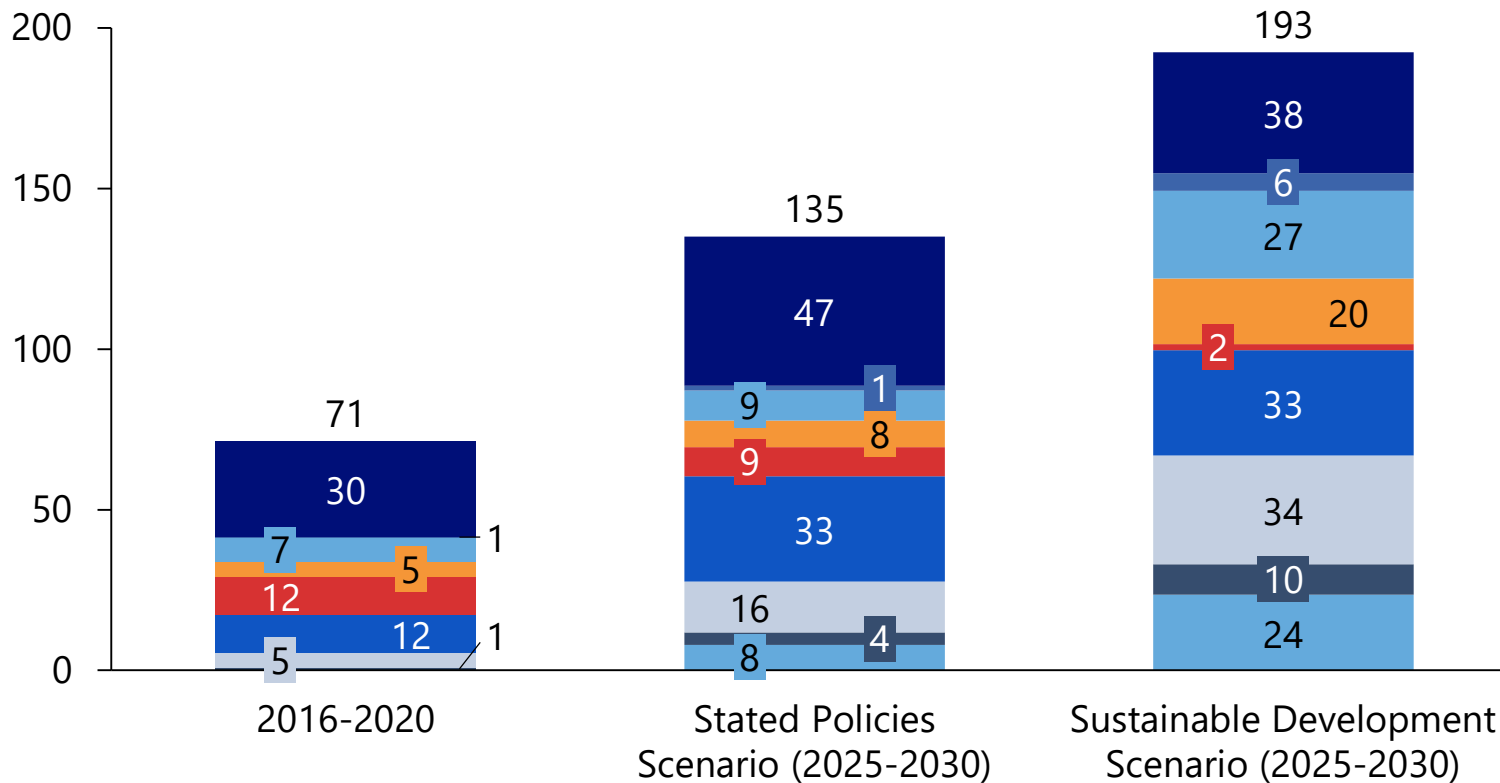
Note(s): Renewable Definition = Hydro + Geothermal + Solar PV + Solar Thermal + Wind + Tide

Source: IEA (Aug 2021) World Energy Balances, NRI Analysis, World Bank

Energy Investments

Investment in energy sector needs to be accelerated in order to meet the increasing demand for energy services and accelerate its clean energy transition.

Average annual energy investment in Southeast Asia, 2016-2030 (Billion USD)



Insights

- Between 2016 and 2020, the annual average energy investment in Southeast Asia was approximately USD 70 billion. Majority of the investment went to Fossil Fuels. Despite advances in renewable energy, there is still no reliable substitute for oil and natural gas.
- Under today's policy settings in the STEPS and SDS, energy investment will reach an annual average of USD 135 billion by 2030 and USD 193 billion respectively

■ Fossil Fuels ■ Solar and Wind ■ Fossil Fuels w/o CCUS ■ Efficiency ■ Renewables for end-use
■ Low emission fuels ■ Other low-carbon ■ Networks ■ EVs

Note(s): Stated Policies Scenario (STEPS) reflects the countries' current policy settings based on a sector-by-sector assessment of the specific policies that are in place or have been announced.

Sustainable Development Scenario (SDS) is based on a surge in clean energy policies and investment that puts the energy system on track for key SDGs.

Source: IEA (2021) World Energy Investment 2021

Electric power-related indicators: Electrification rate

Looking at the electricity access rates shown below, most South Asian and Southeast Asian nations have basic electricity access for their population

Electricity access of populations in selected countries

Country	Total Population in 2019 (millions)	Electricity access metrics (2019)	
		No access to electricity (%)	Population that has no access to electricity (millions)
Bangladesh	163.0	7.8%	<u>12.7</u>
Indonesia	270.6	1.2%	<u>3.1</u>
India	1366.4	2.7%	<u>36.8</u>
Malaysia	31.9	0.0%	0
Philippines	108.1	4.4%	<u>4.7</u>
Singapore	5.7	0.0%	0
Thailand	69.6	0.1%	0.1
Vietnam	96.5	0.6%	0.6

Insights

1. **Majority have access to electricity.** Those affected live mostly in remote areas and are far off from electricity grids.
2. **Most countries are on route to achieve 100% electricity coverage.** The United Nations Sustainable Development Goals (SDGs) calls for all member states to hit target goals by 2030. One of the goals is to allow universal access to electricity, which is being rolled out to all areas.

Electric power-related indicators: Electricity Tariff

Looking at the electricity tariff table shown below, the Philippines' electricity price in the industrial sector is much higher compared to other countries.

Electricity Tariff in selected countries

Country	City	Industrial electricity tariff				Household electricity tariff		
		(USD/kWh)		(USD)		(USD/kWh)		(USD)
		Monthly fee	Per kWh	Average Monthly Bill (Light- Heavy Users)		Monthly fee	Per kWh	Average Monthly Bill
Bangladesh	Dhaka	0.38 – 0.74	0.09 – 0.14	\$3,091.76	\$309,120.56	0.38 – 0.74	0.04 – 0.13	21.44
Indonesia	Jakarta	-	0.07	\$1,881.60	\$188,160.00	-	0.10	37.45
India	New Delhi	2.29 - 3.36 / kVA	per kVA: 0.10	\$319,200.00	\$319,200.00	0.27 – 3.36 / kW	0.04 - 0.10	12.62
Malaysia	Kuala Lumpur	144.23	0.09 – 0.05	\$2,025.83	\$188,304.23	0.72	0.05 – 0.14	36.30
Philippines	Manila	-	0.2	\$5,376.00	\$537,600.00	-	0.09	33.71
Singapore	Singapore	6.97 / kW	0.15 - 0.09	\$4,173.40	\$417,340.00	-	0.17	71.66
Thailand	Bangkok	10	0.16 - 0.08	\$3,235.60	\$322,570.00	1.22	0.10 – 0.14	48.66
Vietnam	Hanoi	-	0.05 – 0.20	\$2,822.40	\$282,240.00	-	0.08 – 0.14	24.56

De-centralisation: FiT and other policy

Most countries have Feed in Tariffs (FIT), and FIT vary depending on the type of projects or the location of deployment

Feed in Tariffs in selected countries

Country	Does country have FIT?	Explanation	Average FIT (USD \$cent/kWh)
Bangladesh	No	An energy starved country that requires a push from the government to promote active investments in renewable energy. FIT is yet to be implemented but draft document has been done so far.	N/A
Indonesia	No	Indonesia has BPP and the price is depending on region. Government is looking at implementing FIT. Different rates for various renewables, depending on the location of the power generation.	N/A
India	Yes	Feed-in tariff rate of ₹15/kWh for the first 15 years starting in 2010 and ₹5/kWh for the next 15 years	19.5
Malaysia	Yes	Different rates for various levels of installed capacity	8.4
Philippines	Yes	FiT is only available for hydro and other projects that were already certified as being eligible for such tariffs.	1.4
Singapore	No	The Singapore government does not provide subsidies such as Feed-in-Tariffs (FiT) to promote renewables. Instead of subsidies, Singapore has taken proactive steps to introduce regulatory enhancements to facilitate the entry of renewable energy when such technologies become commercially viable.	N/A
Thailand	Yes	Different rates for Waste, Biomass, Biogas, Water, Wind and Solar	15.2
Vietnam	No	FIT for wind power projects until end of December 2023.	N/A

De-centralisation: FiT and other policy

Renewable energy policy

○ Exist △ Exist with condition

- Malaysia and Thailand are active in introducing renewable energy. They have established large-scale tendering schemes, net metering schemes and tax incentives in addition to FIT schemes.

Country	FIT scheme (solar)	FIT scheme (others)	Solar power (generation) bidding	Net metering	Import duties, income tax and other tax benefits	R&D support
Bangladesh	○	—	○	○		—
India	○	○	○	○	○	—
Indonesia	△ (capped at BPP price*)	△ (capped at BPP price)	—	○	○	—
Malaysia	○	○	○	○	○	—
Philippines	—	△ (Hydro only)	○	○	○	—
Singapore	—	—	○	—	—	○
Thailand	○	○	○	○	○	—
Vietnam	—	—	—	—	○	○

*BPP (biaya pokok penyediaan pembangkitan) is the PLN's average cost of generation, updated annually by MEMR based on PLN calculations.

Source: Government Websites, News Articles, ERIA, NRI Analysis

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1. Decarbonation policy trends in South East Asian countries

2. Electricity Market

3. Next Generation Automobile

Adoption of EVs is still in the infancy stage in ASEAN.

Electrical vehicle progress in selected countries		
Country	Current Progress	Example / Explanation
Bangladesh	Developing	Manufacturing EVs is still extremely nascent in Bangladesh, considering the inexpensive nature of such modes of transportation. Bangladesh government plans to introduce EVs into the public transport system and begin manufacturing 4 wheeled EVs.
Indonesia	0.5% of total cars sold	Indonesian government plans to become a major player in the global EV market by 2030 with a planned local production capacity of more than 600 thousand units of four-wheeled EV and 2.45 million units of two-wheeled EV annually.
India	0.48% of total cars sold	The total EV sales in 2018 hit 365,920 units and is expected to grow at a CAGR of 36% till 2026. The country aims to be a 100% electric vehicle nation by 2030.
Malaysia	0.4% of total cars sold	Lagging EV adoption could be due to sluggish consumer conversions from purchase anxiety, but this could be mitigated with Malaysia's follow up of the NAP 2020 and Low Carbon Mobility Blueprint 2021 -2030
Philippines	Developing	Philippines signed senate bill 1382 providing the national energy policy and regulatory framework for the use of EVs and the establishment of electric charging station to push for EV sales.
Singapore	3.8% of total cars sold	Singapore aims to develop a more sustainable land transport sector, reducing emissions by 80%, around mid-century. The Singapore Green Plan 2030 pushes the electrification of vehicles to achieve the vision of 100% cleaner energy vehicles by 2040.
Thailand	Developing	Comprehensive EV policy, plans to increase # of plug-in hybrid electric vehicles (PHEV) and battery electric vehicles (BEV) to 1.2 million units and 690 charging stations by 2036.
Vietnam	Developing	Vinfast leading efforts to develop EV market in the country, selling 50,000 e-bikes in 2019, building research institutes and other initiatives like developing electric buses.

De-centralisation: Next-generation automobiles

Policies and targets for electric vehicles deployment

- The introduction of EVs has been limited due to a lack of clear policies and incentives in key ASEAN countries until now, but this is being put in place in recent years.
- EV promotion policies can be roughly divided into two categories: market expansion through the introduction of EVs for public transport, and the provision of tax and other incentives (for consumers and manufacturers) for the introduction of EVs.

Country	Automotive Roadmap/Policy	Targets/action plans
Bangladesh	<ul style="list-style-type: none"> Electric Motor Vehicle Registration and Movement Guideline 2021 	<ul style="list-style-type: none"> ✓ The policy is to remove all complexities for the registration and operation of EVs ✓ No specific numerical targets
India	<ul style="list-style-type: none"> National Electric Mobility Mission Plan Faster Adoption and Manufacturing of Hybrid & Electric Vehicles 	<ul style="list-style-type: none"> ✓ 100% electric-vehicle nation by 2030 ✓ Provision of financial incentives to boost EV sales. ✓ Building of EV charger infrastructure.
Indonesia	<ul style="list-style-type: none"> Acceleration of Electric Motor Vehicle Battery for Road Transportation Program 	<ul style="list-style-type: none"> ✓ Provide 1 million vehicles for export by 2025, of which 20% will be electric vehicles
Malaysia	<ul style="list-style-type: none"> Low Carbon Mobility Blueprint 	<ul style="list-style-type: none"> ✓ 10,000 EV charging stations by 2025 ✓ The policy is to improve vehicle fuel efficiency, introduce EVs, alternative fuels such as biodiesel, and mode shift
Philippines	<ul style="list-style-type: none"> Public Utility Vehicle Modernization Program EV and Charging Station Act (under discussion) 	<ul style="list-style-type: none"> ✓ Market expansion by replacing older public transport vehicles with Euro 4 engines or EVs ✓ Provision of financial and non-financial incentives for EV manufacturers and EV users (under discussion)
Singapore	<ul style="list-style-type: none"> EV Roadmap 	<ul style="list-style-type: none"> ✓ Eliminate internal combustion engine vehicles by 2040 and make all vehicles clean ✓ 60,000 EV charging points by 2030 ✓ Target to have 100% clean energy buses by 2040
Thailand	<ul style="list-style-type: none"> Policy on the promotion of the production and use of electric vehicles. 	<ul style="list-style-type: none"> ✓ 30% of domestic vehicle production (750,000 out of 2.5 million) to be EVs by 2030
Vietnam	<ul style="list-style-type: none"> (currently under discussion). 	<ul style="list-style-type: none"> • —

Incentives to promote electric vehicles deployment

○ Exist △ Exist with condition

Country	EV-related policies		
	Introduction into public institutions (market expansion)	Incentive	Others
Bangladesh	○ • First electric car plant to be set up • Conversion of public buses to EVs.	○ • Financial Incentives • Tax reductions • Interest waiver on loans for local manufacturing and assembly of Evs.	• Establishing charging station network to create stronger EV infrastructure.
India	○ • Electric highway project under discussion • Conversion of public buses to EVs.	○ • Production-linked incentive schemes to incentivise domestic production of EVs. • Tax reductions	• -
Indonesia	× • -	○ • Tax break • R&D grants to manufacturers • Funding for charging infrastructure	• -
Malaysia	○ • Conversion of taxis to EVs	○ • Tax incentives such as excise and import duty exemptions for EVs • Funding for charging infrastructure • R&D subsidies to EV manufacturers	• Implementing hydrogen fuel pilot projects
Philippines	○ • Conversion of public transport vehicles to EVs	△ • Incentives under discussion	• -
Singapore	○ • Conversion of public buses to EVs • Conversion of taxis to EVs (trial)	○ • Registration tax rebate and road tax reductions for EVs, etc.	• Support available to replace diesel vehicles
Thailand	○ • Conversion of water buses (ferries) to EVs • Conversion of Songteu (shared-ride buses) to EVs (trial)	○ • Corporate income tax exemption for manufacturing industries related to EV	• -
Vietnam	× • -	× • Under discussion (promoted by VinGroup)	• -

De-centralisation : Next-generation automobiles

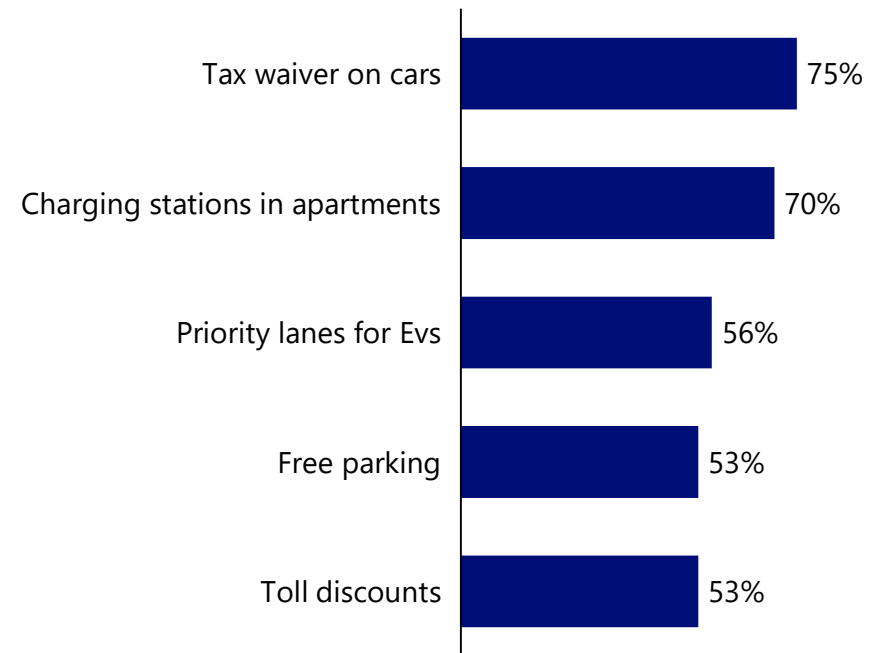
To accelerate the adoption of EV, government incentives and safety standards need to be established.

Electrical vehicle consumer profile in selected countries

Top 3 motivating factors for EV use / purchase

	Bangladesh	Indonesia
	Government incentives	Better safety standards
	Lower operating costs of EVs	Charging flexibility & convenience
	Convenience for short commutes	Environmental awareness
India	Malaysia	Philippines
Government incentives	Better safety standards	Better safety standards
Charging flexibility & convenience	Charging flexibility & convenience	Charging flexibility & convenience
Lower operating costs of EVs	Lower operating costs of EVs	Battery range equal to full tank
Singapore	Thailand	Vietnam
Better safety standards	Better safety standards	Better safety standards
Government incentives	Charging flexibility & convenience	Charging flexibility & convenience
Charging flexibility & convenience	Lower operating costs of EVs	Environmental awareness

Incentives influencing switch from conventional vehicles to electric vehicles



Future of mobility is moving into electric and greener sources, but strong collaboration is required between public and private parties to overcome infrastructure hurdles

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