



How Electric Vehicles Can Help Shape Future ASEAN Smart Cities

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Contents

- About AFEVA
- Challenges in Urban Mobility
- Smart City and EV Role
- Global & ASEAN Electric Vehicle Status

Asian Federation of Electric Vehicle Associations (AFEVA): An Overview



Main Activities

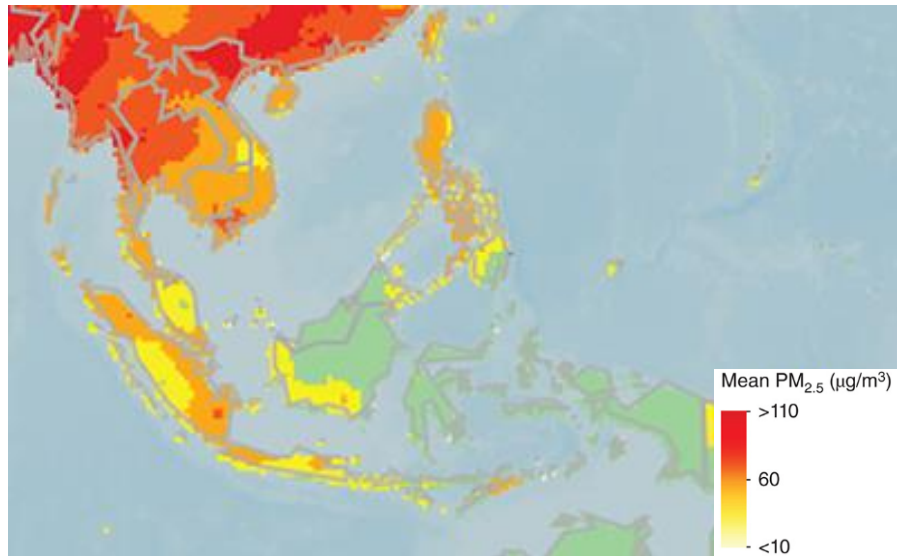
- Encourage and facilitate the exchange of information.
- Promote the transfer of new technology.
- Collaborate and cooperate with other international bodies.
- Collectively represent industry players' views to the government.
- Support regulatory alignment on EV standards.
- Foster cooperation by forging possible joint ventures.
- Help EV industry players in ASEAN to explore market opportunities.
- Carry out training, education and publicity programs.
- Act as a source of relevant information.



Note: AFEVA is non-profit organization under the process of registration in the Securities and Exchange Commission, the Philippines.

Challenges in Urban Mobility

PM 2.5 & Smog Problem



Source:

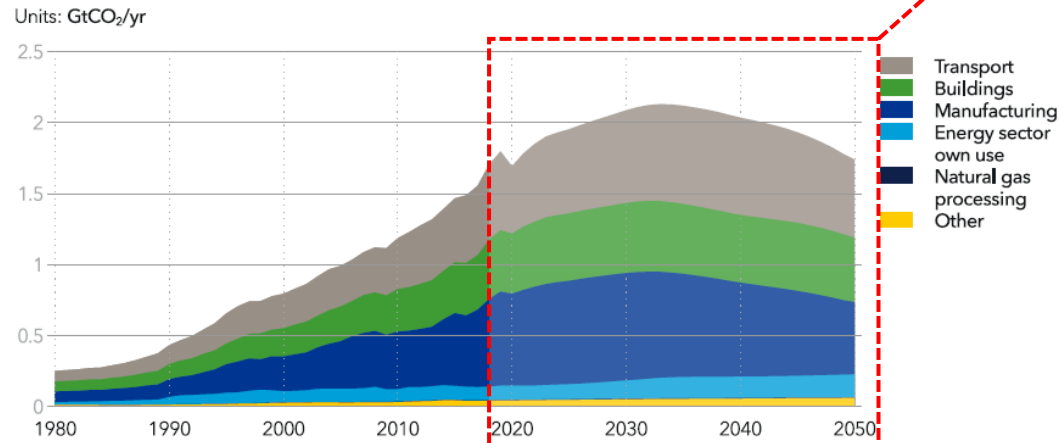
1. World Health Organization (WHO). Global ambient air pollution. [Accessed 25 May 2018.] Available from URL: <http://maps.who.int/airpollution/>

2. <https://www.bangkokpost.com/thailand/general/1762139>
Available 1 Oct 2019

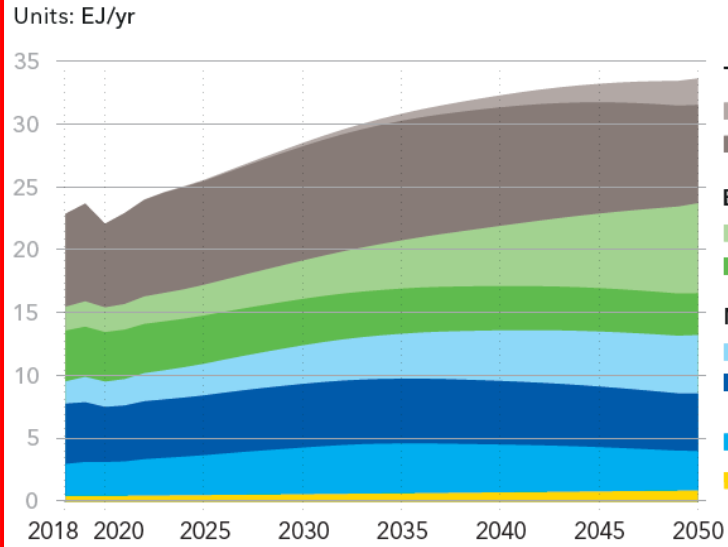
3. Heavy smog in Bangkok forced hundreds of school closures earlier this year © travelview/Getty Images

Energy Demand in Southeast Asia

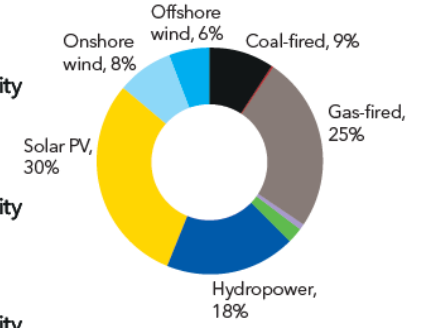
South East Asia energy-related CO₂ emissions by sector



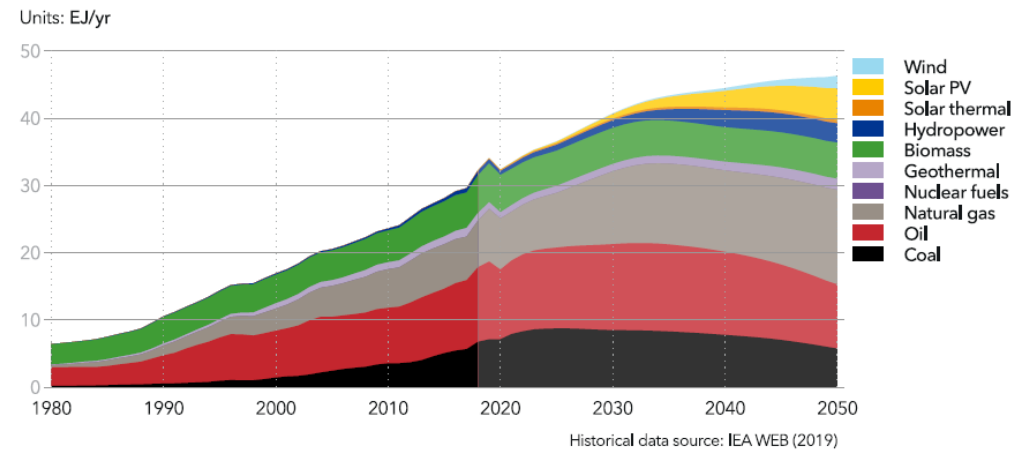
South East Asia final energy demand by sector



2050 electricity mix

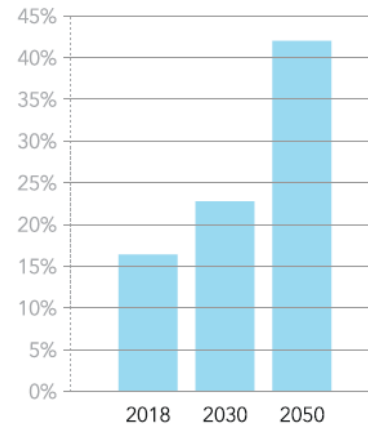


South East Asia primary energy consumption by source



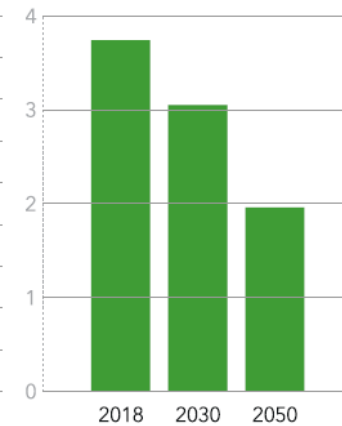
Electrification

Electricity share in final energy demand



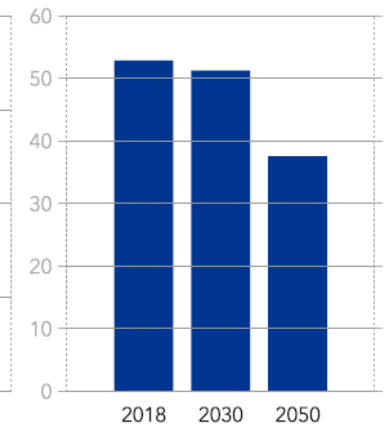
Energy intensity

Units: MJ/USD



Carbon intensity

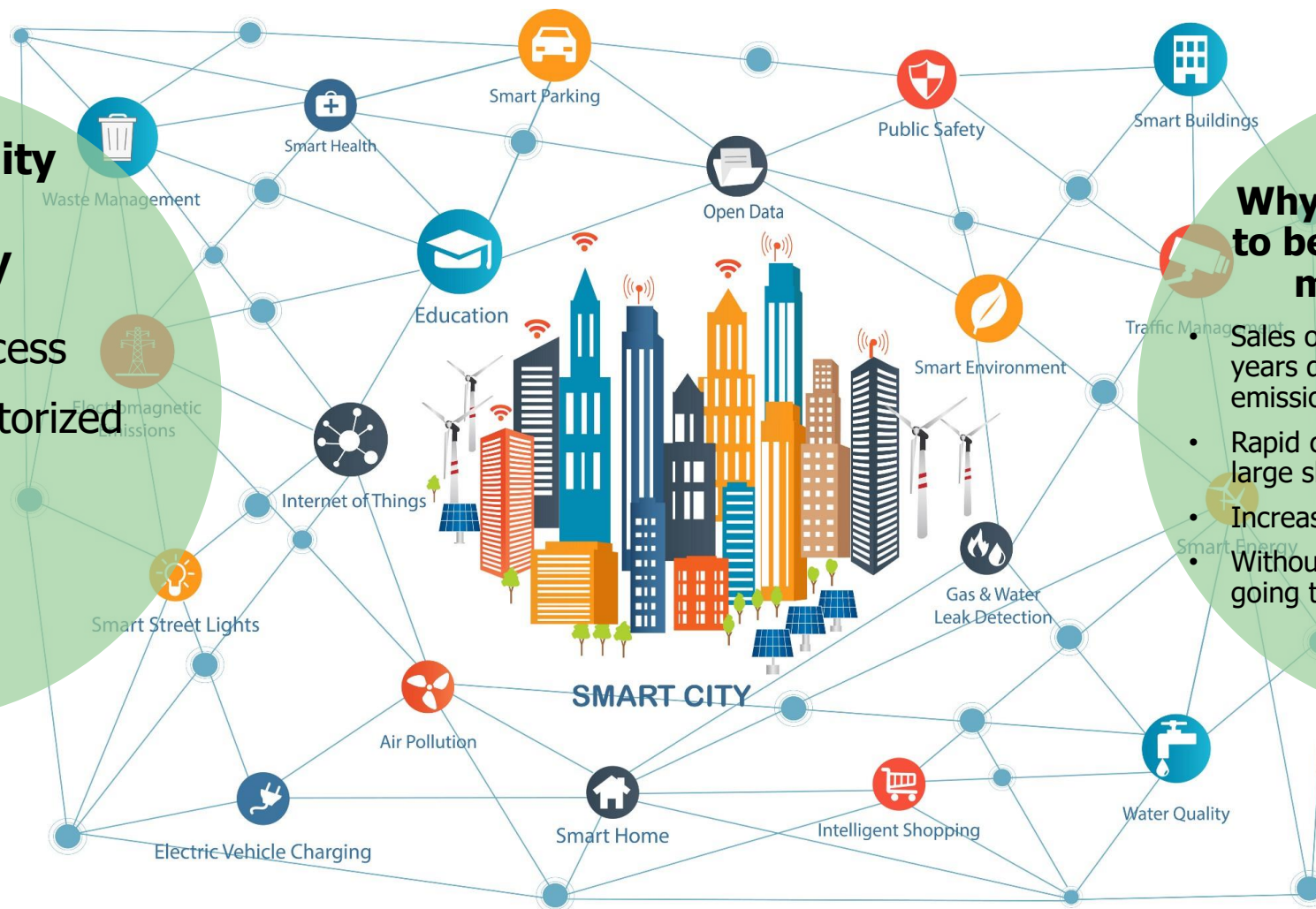
Units: tCO₂/TJ



Smart Mobility Concept for Smart City

Smart Mobility in Smart City

- Mixed-modal access
- Clean & non-motorized option
- Integrated ICT

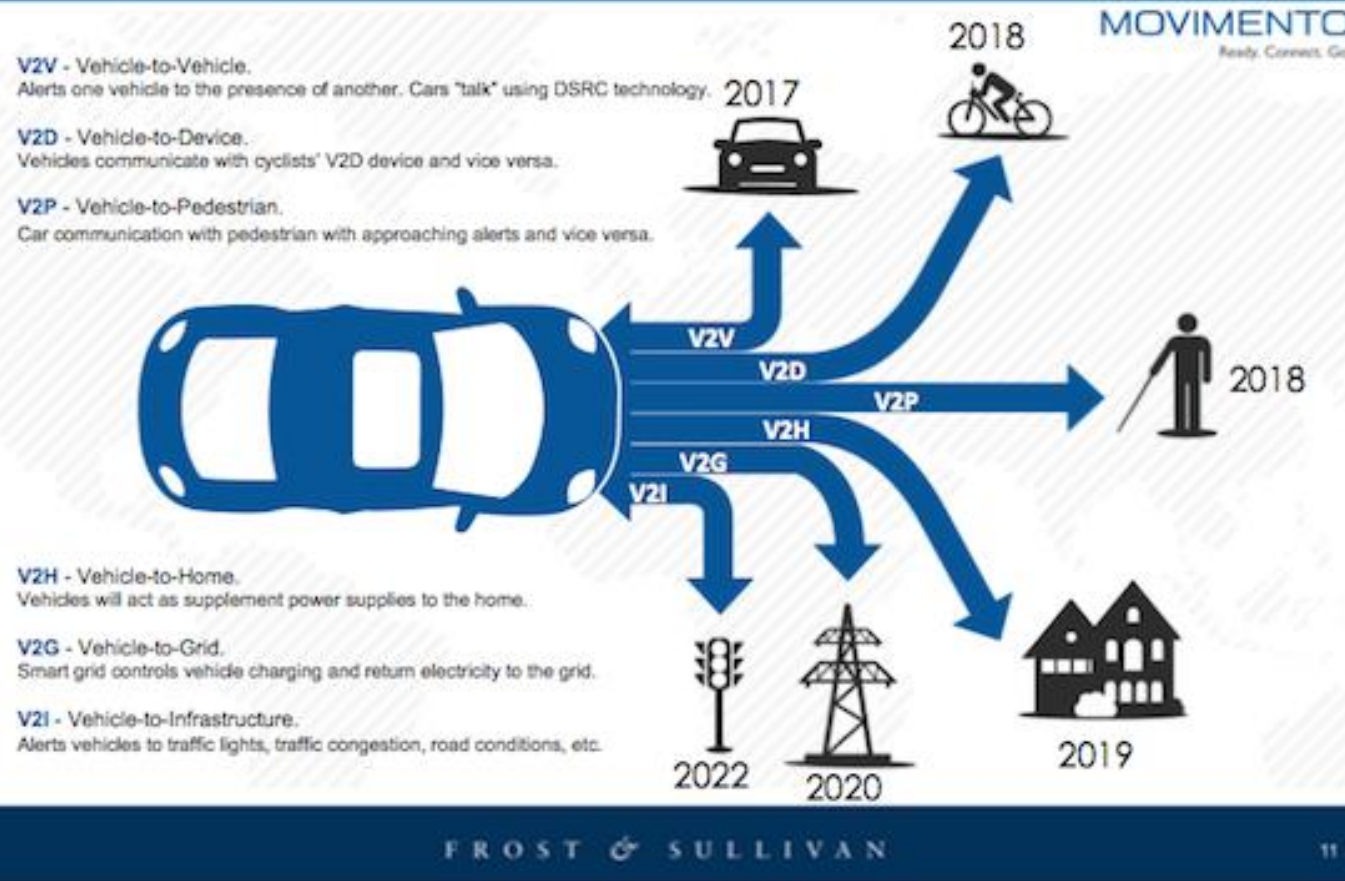


Why EV charging needs to be part of your smart mobility planning

- Sales of EV increased rapidly in recent years due to target to reduce Carbon emission and incentives.
- Rapid chargers make up an increasingly large share of the cars on the road.
- Increasing of charging station network.
- Without planning, cities and utilities are going to feel strain and chaotic.

EV Role in Smart City

Vehicle to Everything (V2X)



Source: Mahbubul Alam (2016) Vehicle-to-Everything (V2X) Technology Will Be a Literal Life Saver – But What Is It?

URL: <http://eecatalog.com/chipdesign/2016/05/19/vehicle-to-everything-v2x-technology-will-be-a-literal-life-saver-but-what-is-it/>

EV Role in Smart City

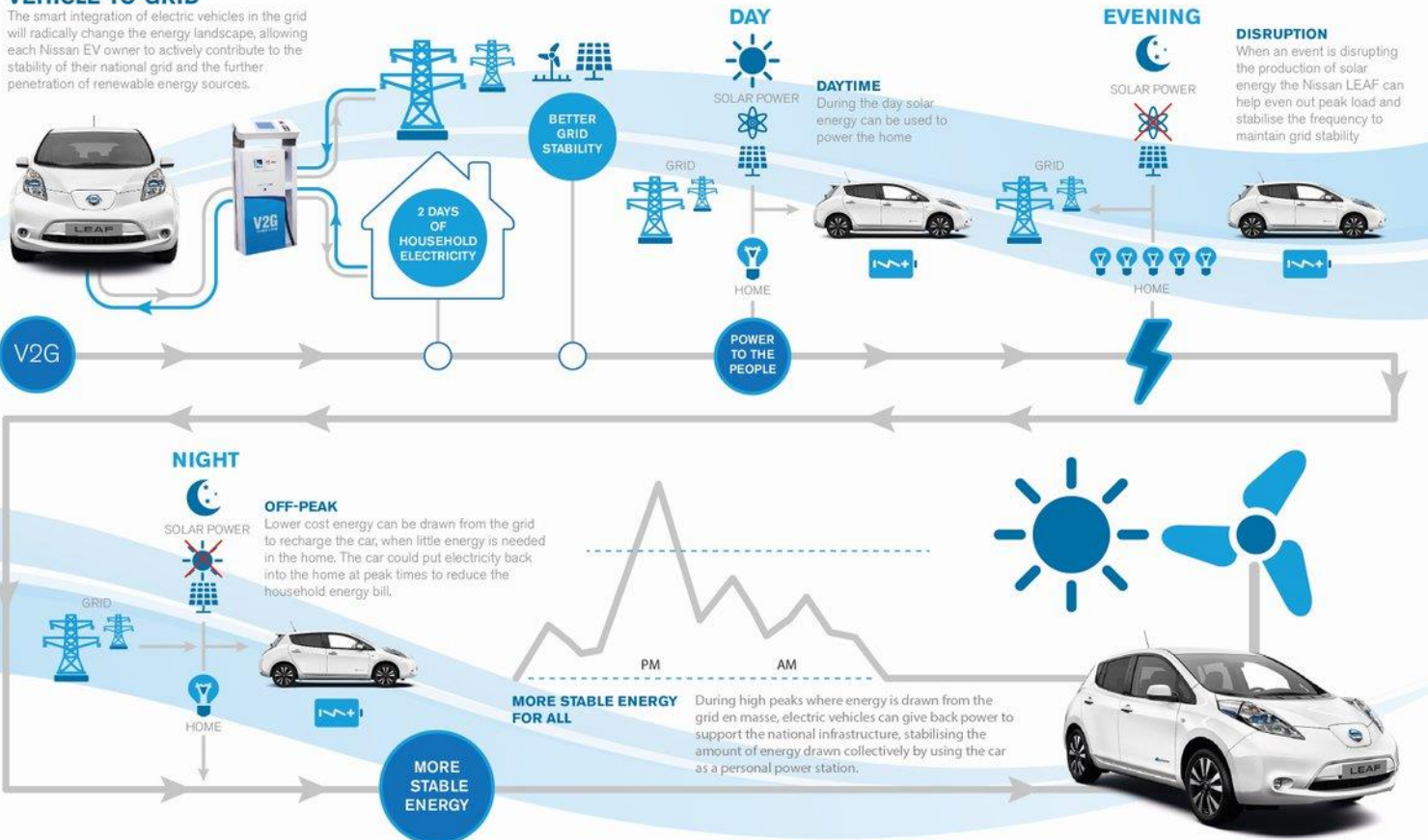


POWER TO THE PEOPLE

NISSAN'S VISION FOR THE ENERGY GRID PUTS THE POWER IN YOUR HANDS

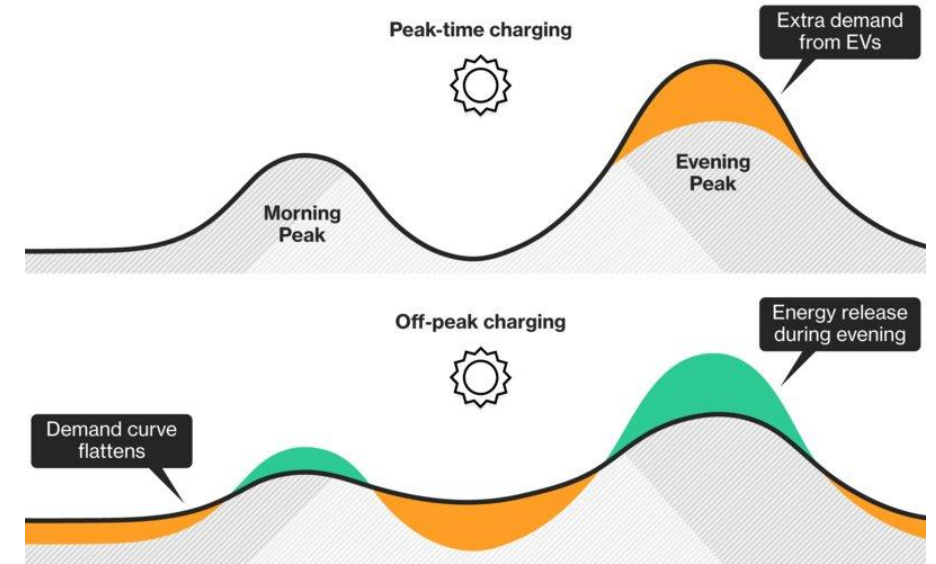
VEHICLE-TO-GRID

The smart integration of electric vehicles in the grid will radically change the energy landscape, allowing each Nissan EV owner to actively contribute to the stability of their national grid and the further penetration of renewable energy sources.



Giving Back

By charging during the day, EVs could help flatten demand curve



Note: Illustration shows theoretical future electric vehicle charging scenarios.

Source: Resourcefully and BMI Research

Bloomberg

With V2G technology

- Electricity demand can be controlled; therefore, higher efficiency in electricity production is realized.
- Used battery from EVs can be used as second-life energy storage for homes and buildings. Hence, more renewable energy sources can be utilized.

ASEAN Smart Cities Network

ASEAN SMART CITIES FRAMEWORK



SMART CITY STRATEGIC OUTCOMES



URBAN SYSTEMS

Integrated Master Planning and Development

Dynamic and Adaptive Urban Governance

DEVELOPMENT FOCUS AREAS



Civic and Social

Social Cohesion
Culture and Heritage
Tourism
Public and Municipal Services
Governance



Health and Well-being

Housing and Home
Healthcare
Education



Safety and Security

Resource Security
Cybersecurity
Public Safety, City Surveillance
and Crime Prevention



Quality Environment

Clean Environment
Resource Access and Management
Urban Resilience



Built Infrastructure

Utilities
Mobility and Transportation
Building and Construction



Industry and Innovation

Business and Entrepreneurship
Trade and Commerce
Upskilling
Technology Incubation
Research

ENABLERS

Digital Infrastructure and Applications

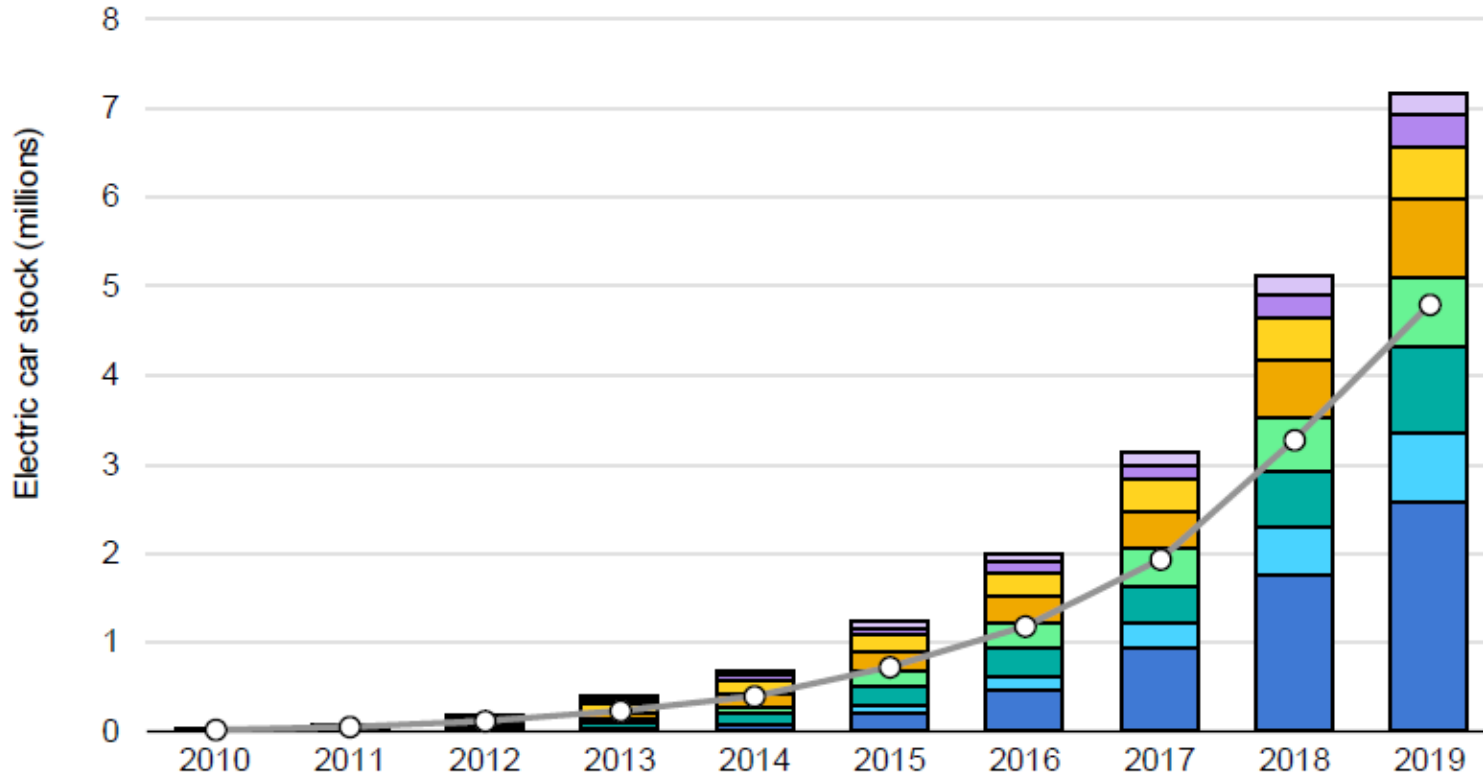
Partnership and Funding



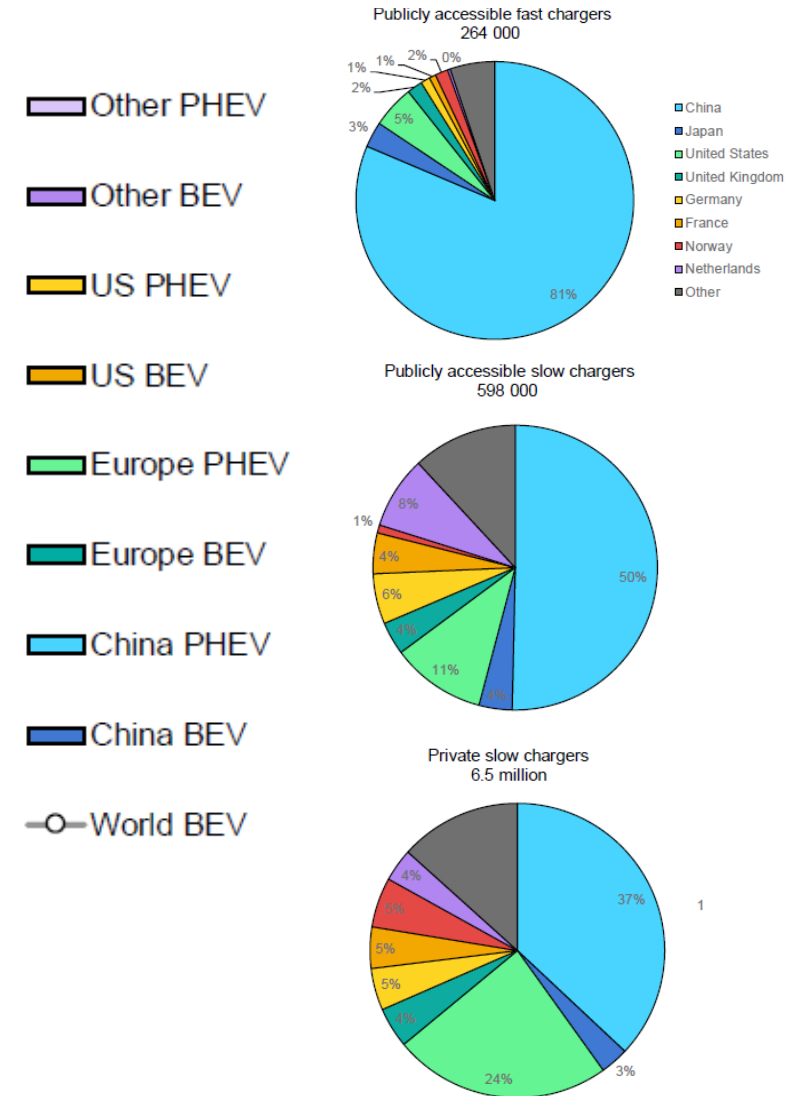
Source: www.asean2019.go.th

Global EV Status

Global electric car stock, 2010-19



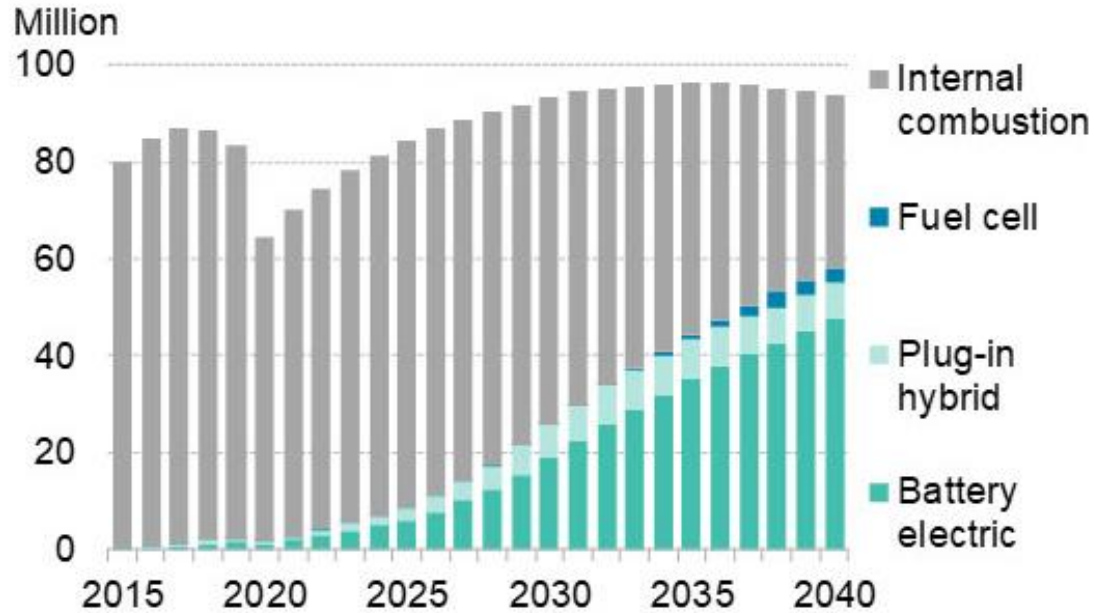
Private and publicly accessible chargers by country, 2019



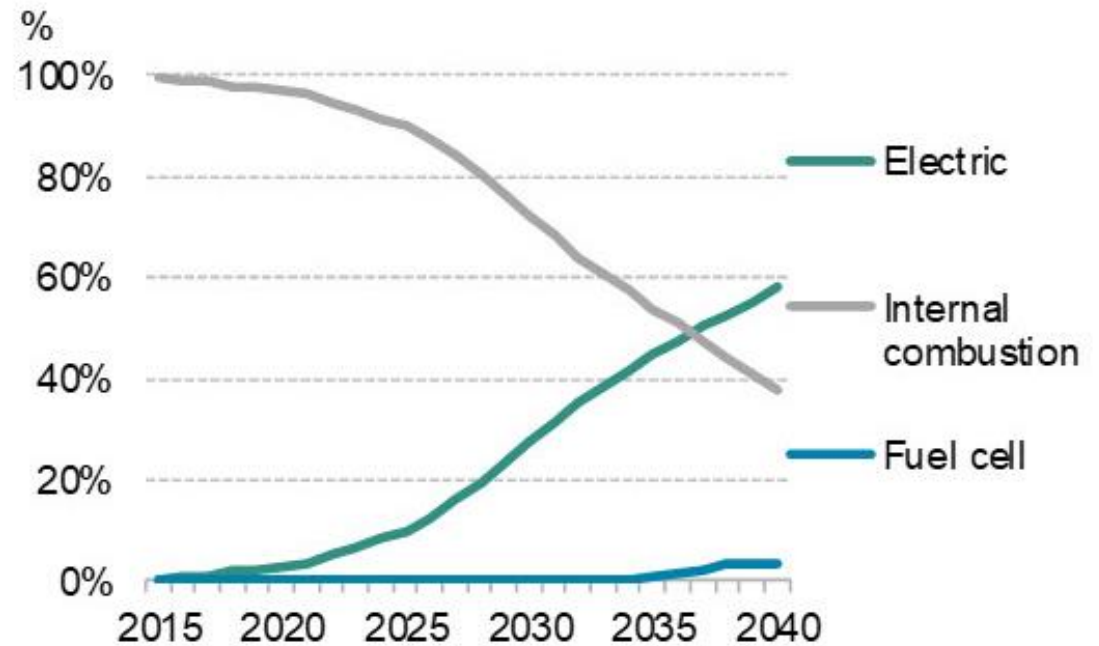
Source: International Energy Agency (IEA), Global EV Outlook 2020.

Global Electric Vehicle Markets

Global annual passenger vehicle sales by drivetrain



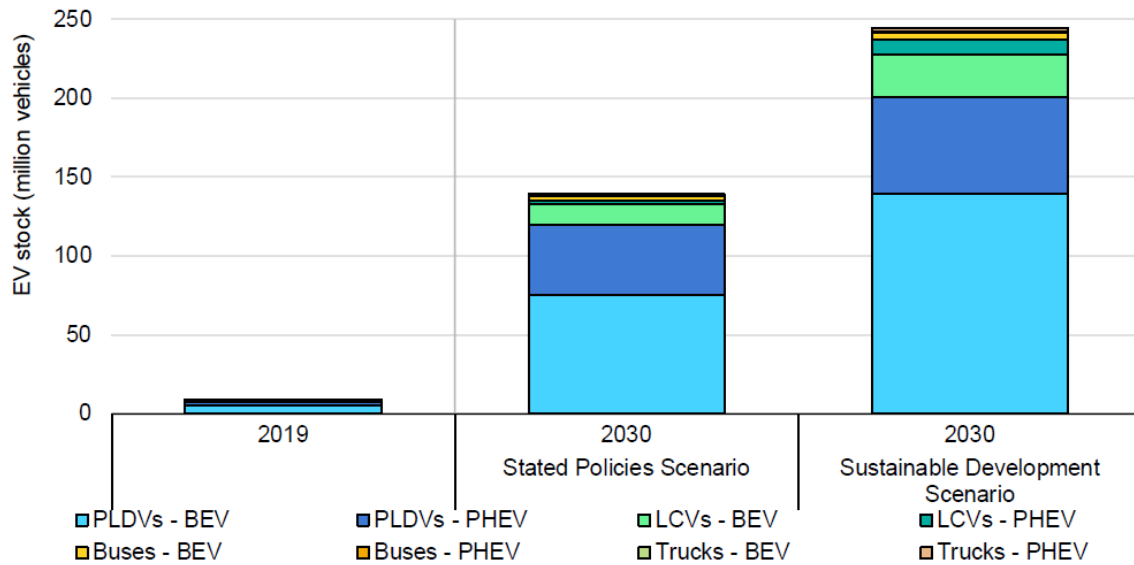
Global share of total annual passenger vehicle sales by drivetrain



Source: BNEF. Note: Electric share of annual sales includes battery electric and plug-in hybrid.

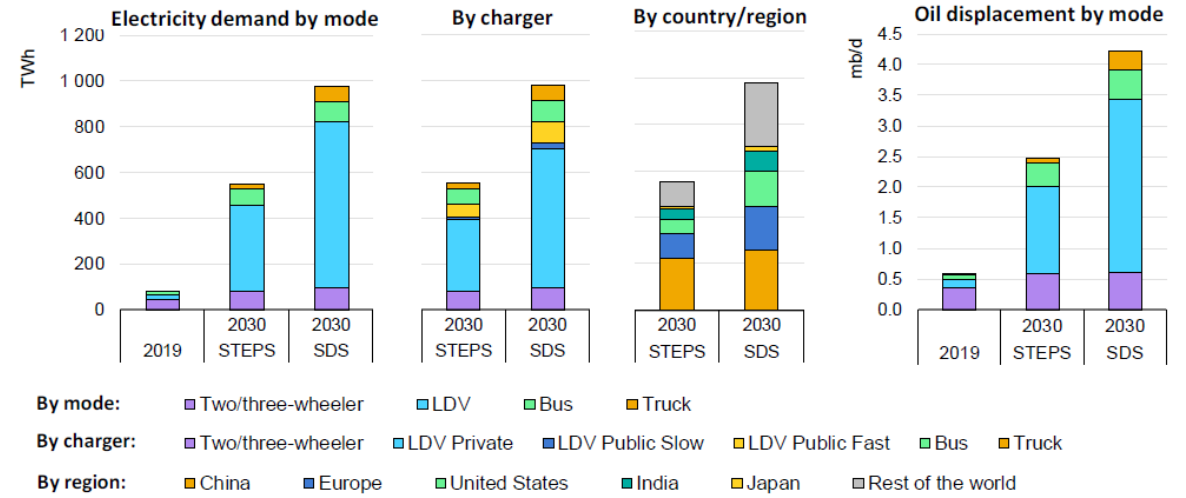
Electricity Demand

Global electric vehicle stock by scenario, 2019 and 2030



Notes: PLDVs = passenger light-duty vehicles; LCVs = light commercial vehicles; BEV = battery electric vehicle; PHEV = plug-in hybrid electric vehicle.

Electricity demand from the electric vehicle fleet by mode, charger type, country/region and oil displacement, 2019 and 2030



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Notes: Mb/d = million barrels of oil per day; STEPS = Stated Policies Scenario; SDS = Sustainable Development Scenario; LDV = light-duty vehicle. For more details, see figure 3.5 in the main report.

EV Deployment Target in Asia

Country	2021-22	2025	2030	2035	2040	2050
Colour code	Green: relative to vehicle sales		Blue: relative to vehicle stock		Yellow: full ICE phase out or 100% EV target	
Asia ^a						
China (EV30@30 signatory) ^b		25% NEVs (PHEV, BEV, FCEV)				
Indonesia		2 200 EVs				
Japan (EV30@30 signatory)			30-40% HEV, 20-30% BEV, PHEV, 3% FCEV			100% sales of HEV, PHEV, BEV, FCEV
Korea	430 000 BEVs 67 000 FCEVs (2022)		33% BEV, FCEV			
Malaysia			100 000 EVs			
Pakistan			30% EV		90% EV	
Sri Lanka					100% electric or hybrid vehicle stock	
Thailand				1.2 million EVs (2036)		

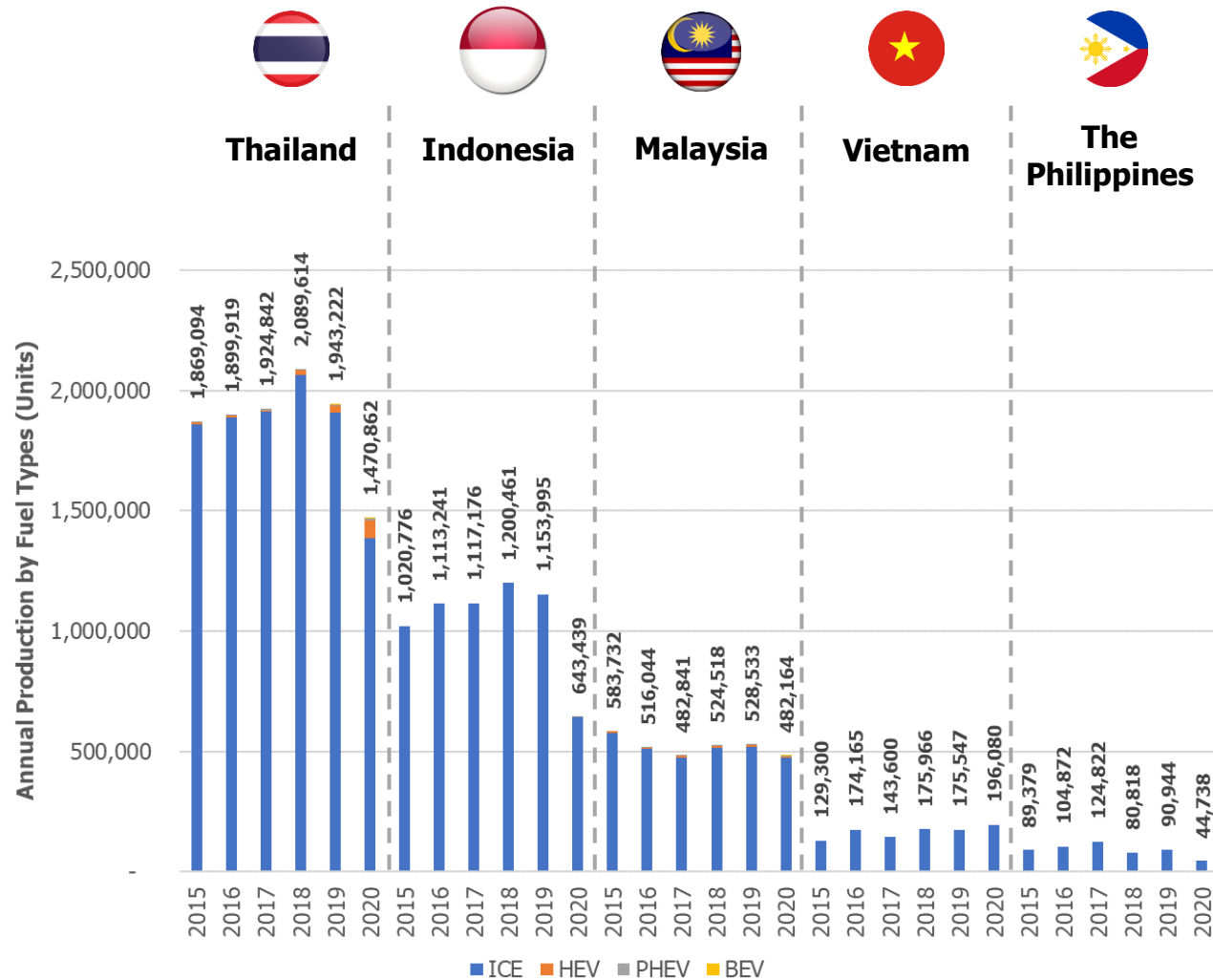
According to deployment target data, approximately

1.3 million EVs

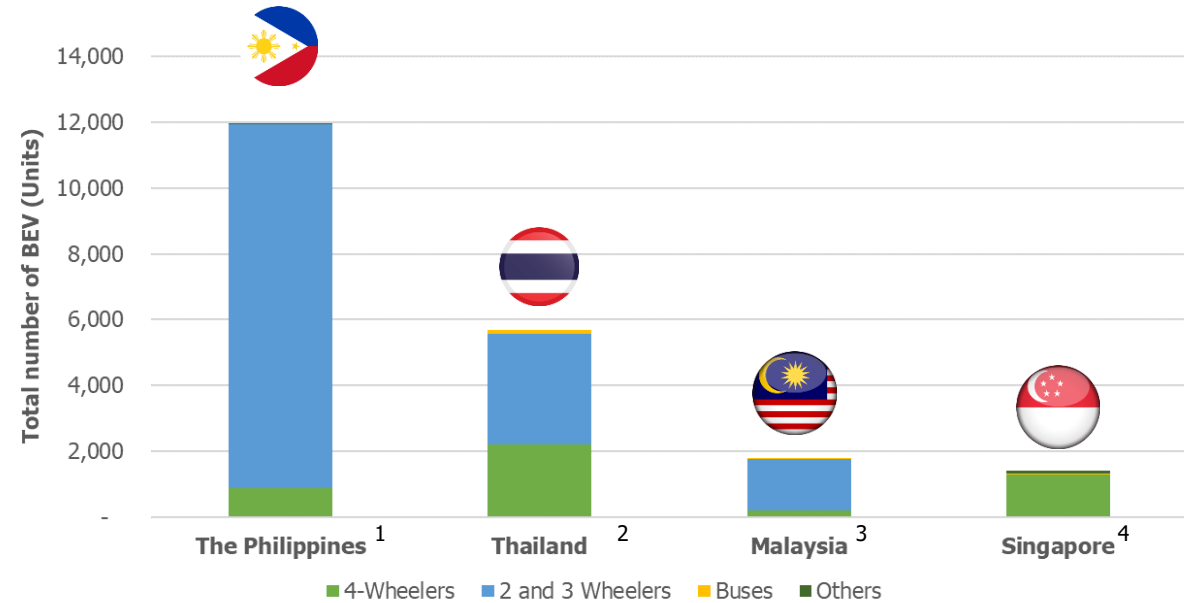
are expected in Southeast Asia by

2035

EV Status in Southeast Asia



Source: IHS Markit



Source:

- ¹ Land Transportation Office, as of 2019
- ² Department of Land Transport, as of December 2020
- ³ Electric Vehicle Association of Malaysia (EVAM), as of May 2019
- ⁴ Vehicle Population by Type of fuel used, as of June 2020

EV Policy and Regulatory Framework in Southeast Asia



Bureau of Philippine Standards (BPS) under Department of Trade and Industry created a new Technical Committee under TC 89 wherein it covers all EV related infrastructures, from EV units and its charging stations.

63 EV Related Standard Adopted

Government EV-related Initiatives

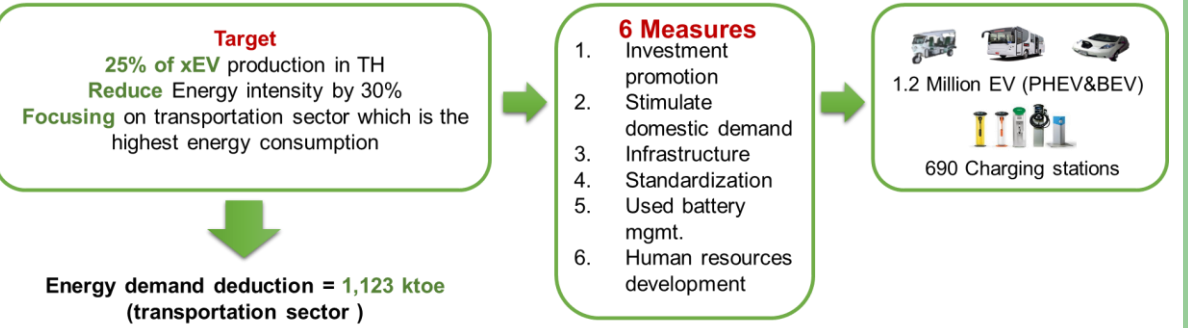
- DOTr-UNDP Low Carbon Urban Transport Project
- Public Utility Jeepney Modernization – Green Routes
- DOE E-Trike LGU Donations
- TESDA Training Regulations



Thailand Smart Mobility 30@30

Increase xEV production to 30% (BEV 15%) of expected total production of 2.5 million vehicles by 2030.

According to **Energy Blueprint**, in 2036



Complete phase-out of ICE vehicles by 2040 -> 100% EV sales by 2031

1. Diesel excise duty increased from S\$0.10 to S\$0.20 (2019)
2. Early EV Adoption Incentive with rebates of up to S\$20k introduced
3. Vehicles Emissions Scheme (VES)* with rebates of \$10k or \$20k is extended to commercial vehicles, previously only for private vehicles
4. Road Tax revision for EVs (estimated reduction of 30-50% for most models)
5. Supporting EV Charging Infrastructure from 1,600 -> 28,000 chargers by 2030

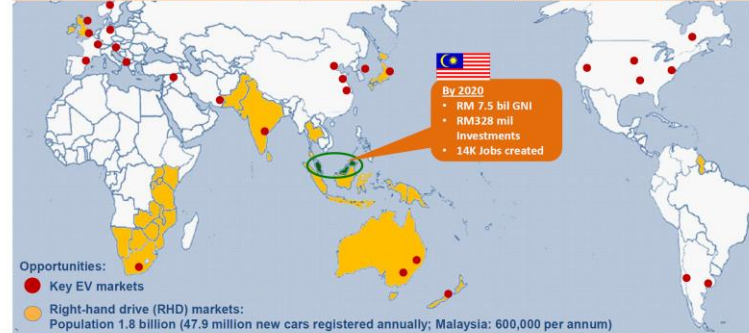
Effective on 1st Jan 2021



Positioning Malaysia as the 'Electric Mobility Marketplace' in the region

Accelerating deployment of:

- National Automotive Policy (NAP 2014): energy-efficient vehicles (EEV) and components localisation;
- NKEA Electrical & Electronics (EPP 18): Enabling Electric Vehicle Component Manufacturing.



Strategic Thrusts:

1. Promote use of electric public transportation, & encourage EV private ownerships;
2. Strengthen EM eco-system and charging infrastructure;
3. Accelerate EM technology localisation opportunities.

By 2020:

- 100,000 electric cars
- 100,000 electric motorcycles
- 2,000 electric buses
- 125,000 charging stations

Conclusion

1. ASEAN Smart Cities Network was established, which aims to improve quality of life, build competitive economy and promote sustainable environment in ASEAN.

2. An increasing trend of EV on the road around the world is observed. As a results, more public charging points and charging stations are installed.

3. In Southeast Asia, the target for EVs on the road is set to approximately 1.3 million units by 2035 with strong commitment in many countries through supportive policies.

4. V2G Concept is a promising technology to utilize EVs as virtual power plants in smart grid in order to stabilize electricity production and increase grid efficiency.



Thank You

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