Industry Focus:
ELECTRIC VEHICLES (EVs)

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Bersama Hentikan Wabak COVID-19

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MINISTRY OF ENTREPRENEUR DEVELOPMENT AND COOPERATIVES

DKN 2030 Dasar Keusahawanan Nasional "Negara Keusahawanan Unggul 2030"

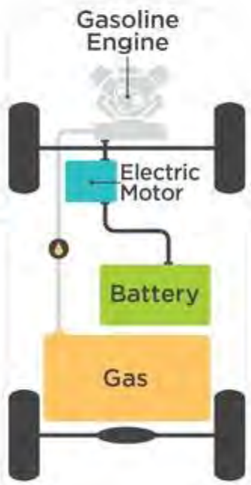
Industry Focus: Electric Vehicles (EVs) (1/11)

- **EV is seen as the future, in line with efforts to reduce climate change risks – CAGR of 24.5% between 2022 and 2028.**
- **Europe countries are leading in EVs adoption, followed vigorously by China while ASEAN countries are gradually progressing.**
- **Nonetheless, there are some significant barriers for a faster adoption of EVs e.g. long charging time, low availability of charging infrastructure.**
- **Malaysia seems to have a long way to a comprehensive EV environment as policies and incentives are nascent at this juncture.**

Types of EV

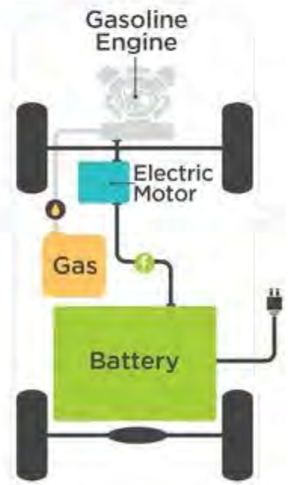
Hybrid Electric Vehicles (HEVs)

Fuel: Gasoline



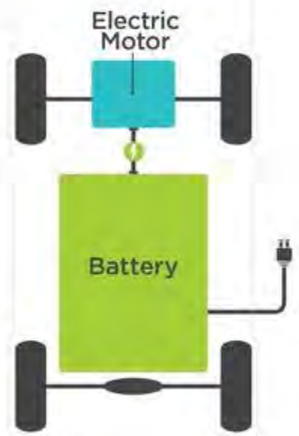
Plug-in Hybrid Electric Vehicles (PHEVs)

Fuel: Gasoline and/or electricity from grid



Battery Electric Vehicles (BEVs)

Fuel: 100% electricity from grid



Fuel Cell Electric Vehicles (FCEVs) – hydrogen-powered

Pros/ Opportunities

+ No/less CO2 emissions.
+ **High efficiency –** electric motor (90% use of energy into motion) vs combustion engine (40%)
+ **Lower cost** & more environmentally friendly. **Electricity is less expensive** than gasoline. Able to generate own electricity from solar panels.
+ Lower maintenance.
+ Other industries to benefit (e.g. **battery providers, transport, utility providers**).

Cons/ Challenges

– **Long charging time** – DC fast charging (30 minutes to 80%).

Purdue engineers have invented a sub-5-minute charging station cable which will be tested on EVs within the next 2 years.

– Range anxiety & **low availability of charging infrastructure.**
– Grid capacity issue to cater the surge in electricity demand.
– **High EV prices** (cushioned by Govt incentives) & insurance costs
– Inconsistent pricing schemes for charging.

Sources: Facts & Factors, The Harris Poll, SME Bank Economic Research and various

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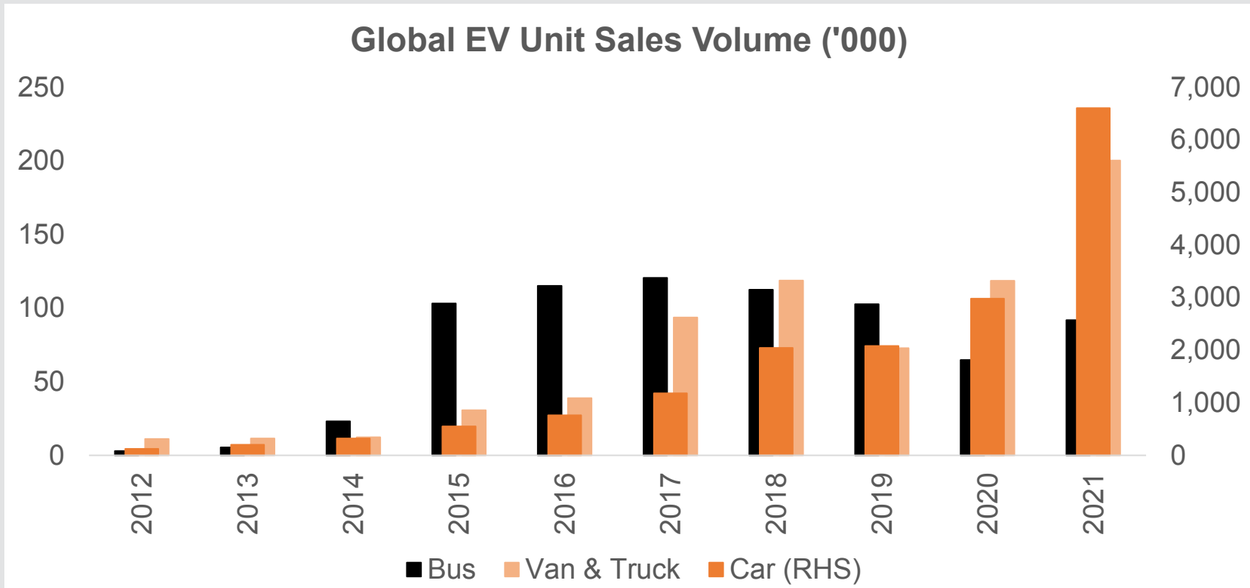
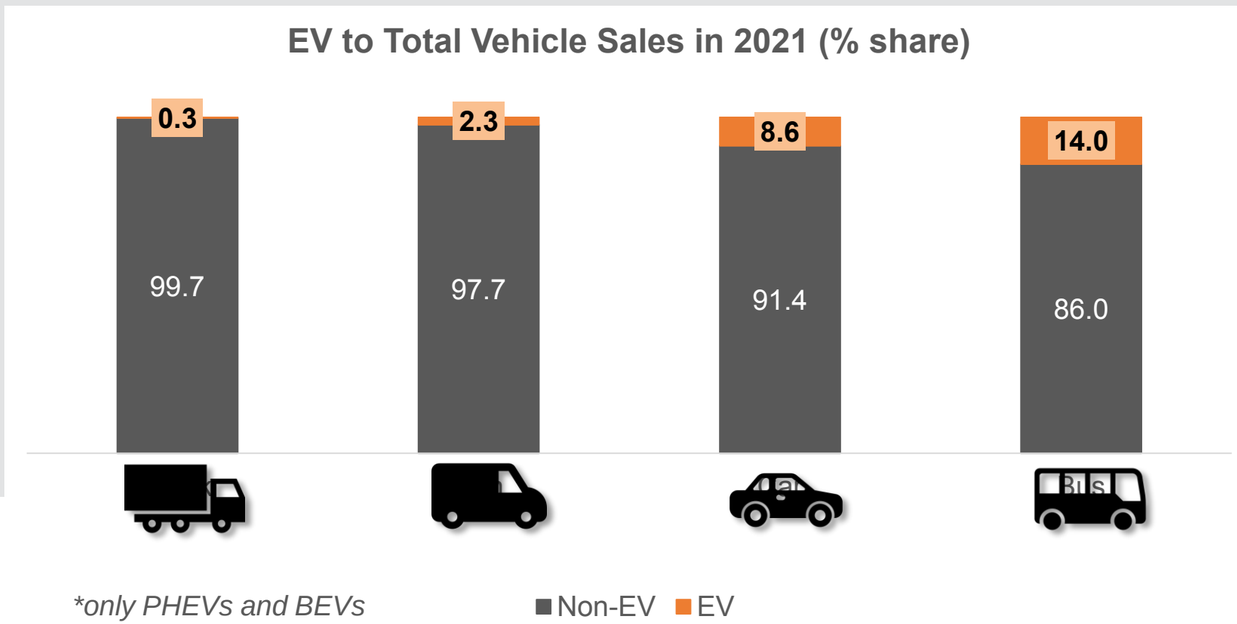
Industry Focus: EVs (2/11)





Upward trend in global EV sales driven by cars...

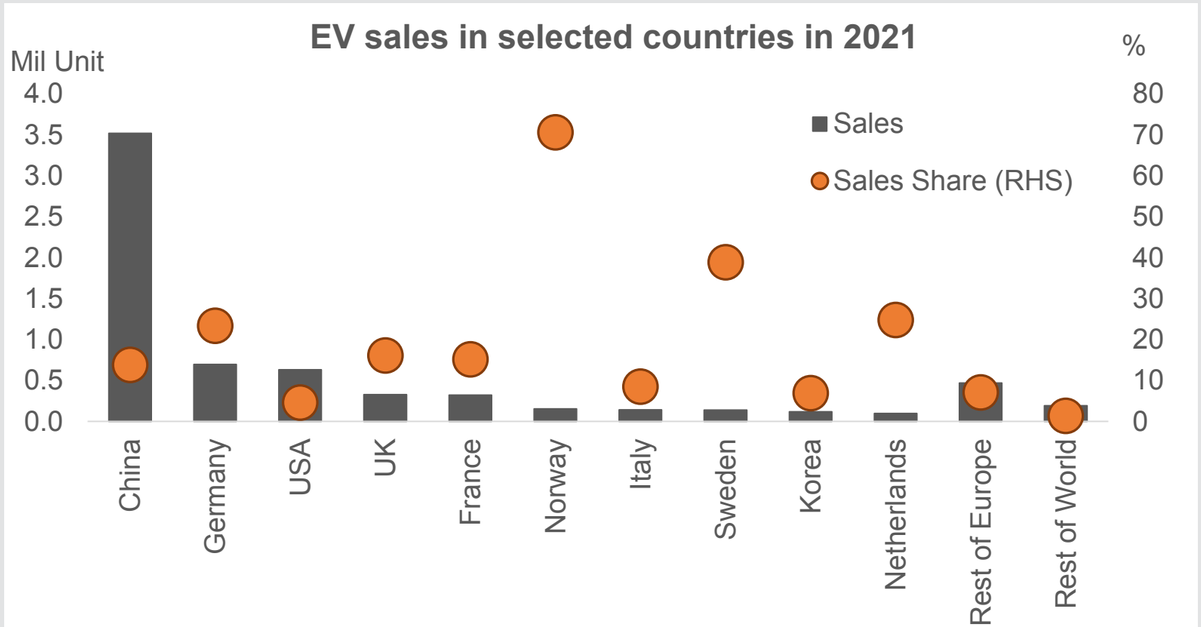
- In 2021, total EV sales more than doubled (118% YoY) to about 6.9 mil units.
- Sales of **EV cars** in particular seem to be immune with the ongoing Covid-19 pandemic as reflected by its continuous growth momentum (2021: 121.5% YoY; 2020: 43.4%)…
- …due to 1) **strong policy support** (e.g. purchase incentives, regulatory instruments); 2) declines in battery costs; 3) various model choices & performance offered; 4) enthusiasm of EV buyers (often affluent households less affected by the economic downturn).

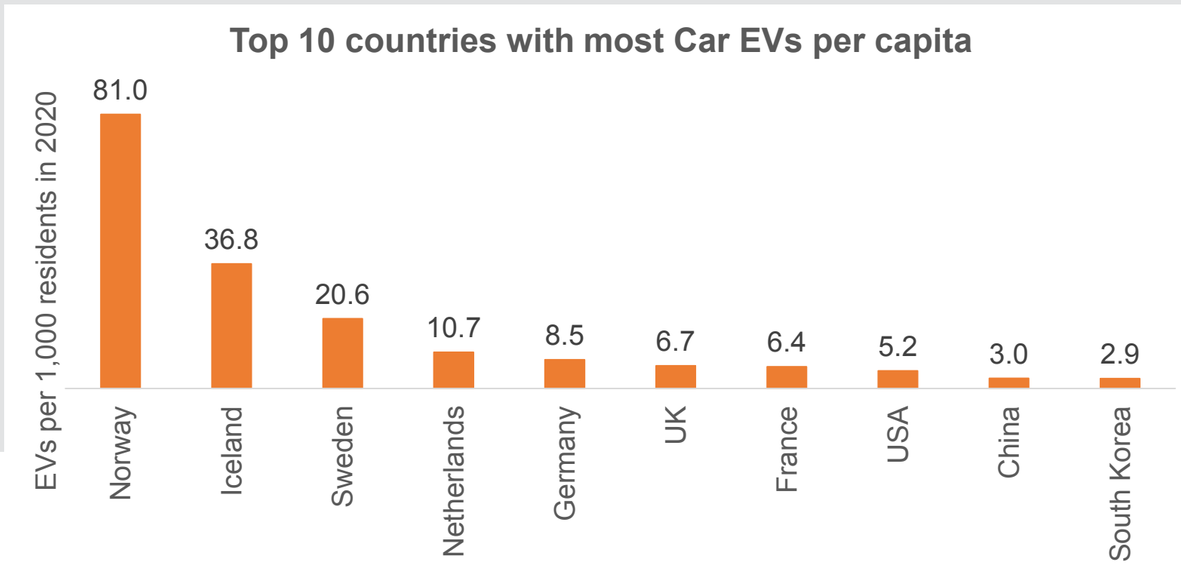
…but its share to the total market is < buses

- EV cars share to total car market in 2021 stood at 8.6% < buses (14%).
- In 2012, the share of EV cars and buses to the total market sales were almost similar. However, within 3 years, EV buses rose >10% of the total share, growing at significantly higher level than EV cars.
- Reasons for the rapid shift towards EV buses – 1) the availability & wide choices; 2) the environmental & cost reduction driven mindset of city officials – bus companies have to deliver on.

Sources: SmartCitiesWorld, International Energy Agency (IEA), SME Bank Economic Research

Industry Focus: EVs (3/11)





*only PHEVs and BEVs

China propels the global EV sales growth…

- In 2021, China sold more EVs (3.5 mil units) than the rest of the world combined (3.3 mil).
- Moreover, China's EV market share in 2021 stood at 13.8% of the total vehicles sold in the country, an impressive progress from just 4.8% in 2020.
- EV market is one of the most promising industries in China – As per McKinsey, **adoption rate is forecasted to be at 60% by 2030...**
- …contributed by 2 major factors: 1) **Heavy Chinese government investment** in EV technology (e.g. purchase-tax exemptions, investments in charging stations); 2) China's **strong position in the battery industry** (battery account for 40% of the EV's total cost).

…but Norway leads in most EVs per capita

- **Europe's EV market share is significantly > China,** suggesting a relatively faster progress towards their carbon emission target.
- **Norway** has become world's 1st country with **EV sales > conventional ones**. In 2021, EVs controlled circa 70% of the Norway's vehicle market (Norway targets selling only zero-emission cars by 2025).

Sources: International Energy Agency (IEA), McKinsey, Statista, SME Bank Economic Research

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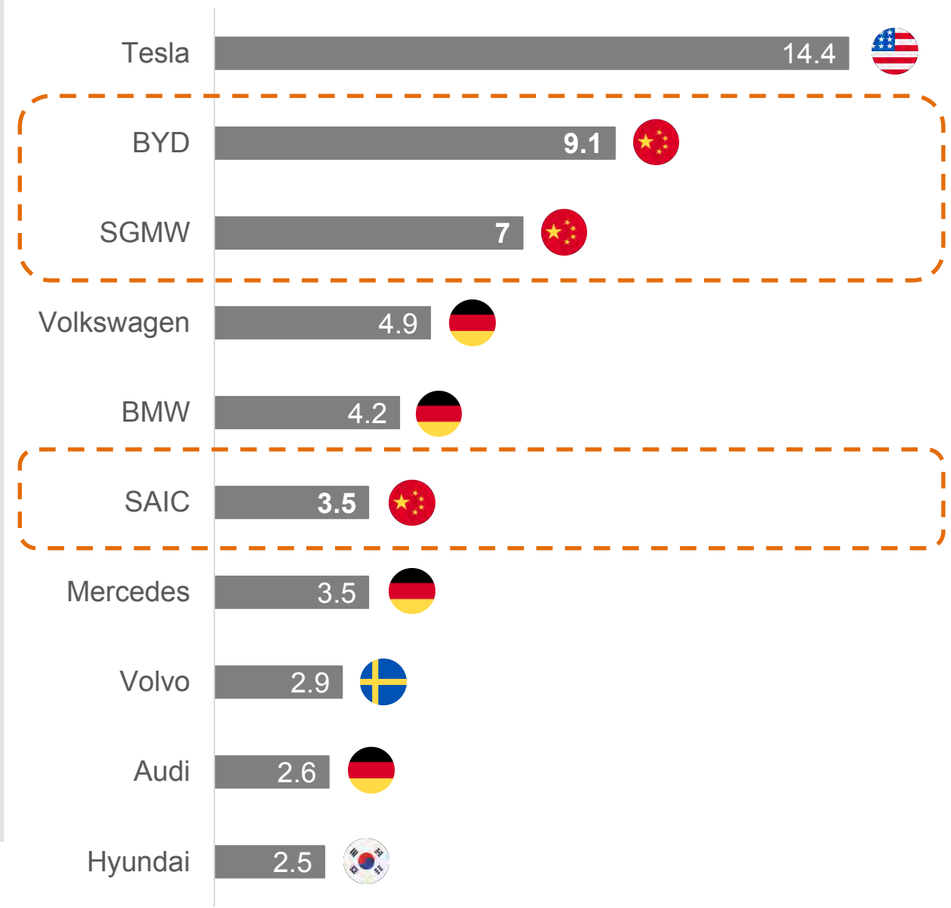
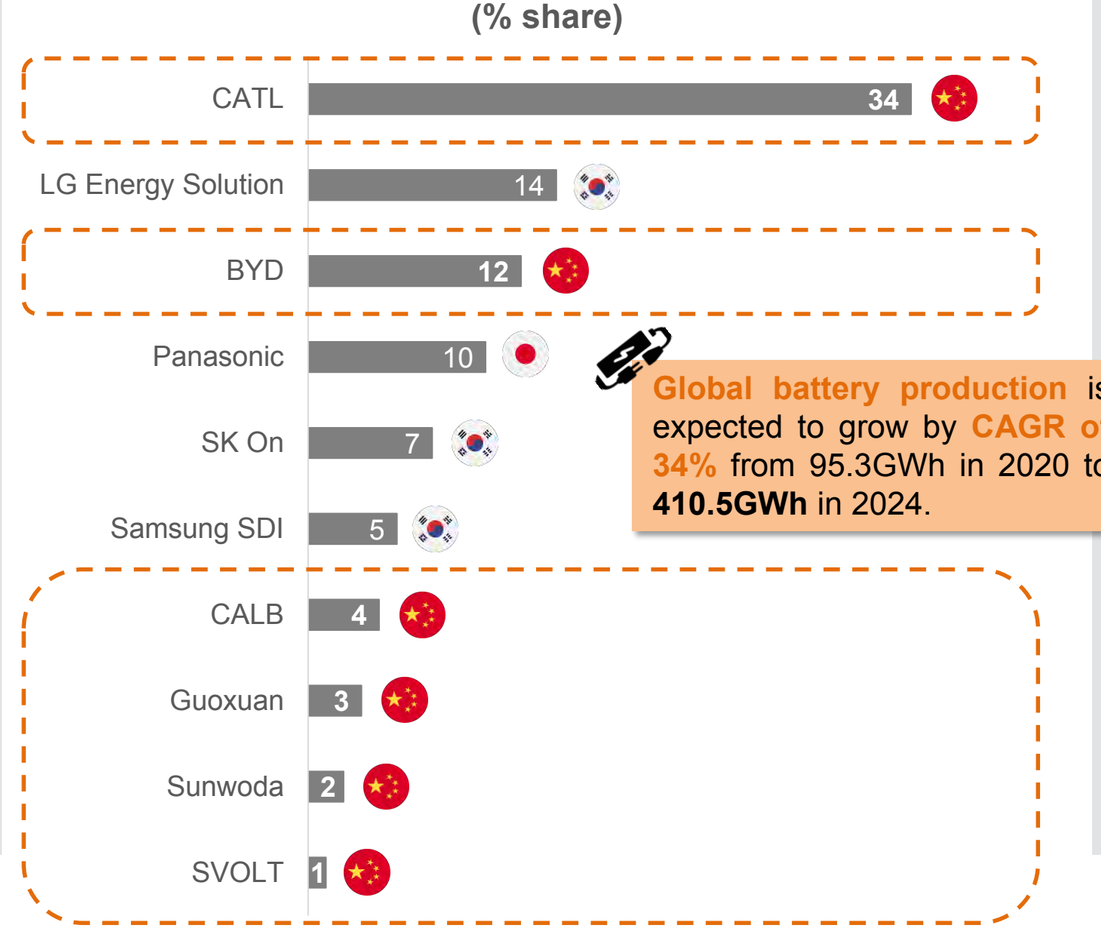
Industry Focus: EVs (4/11)

US Tesla is the first in global EVs sales but China's key brands combined, has greater dominance…



**only PHEVs and BEVs*

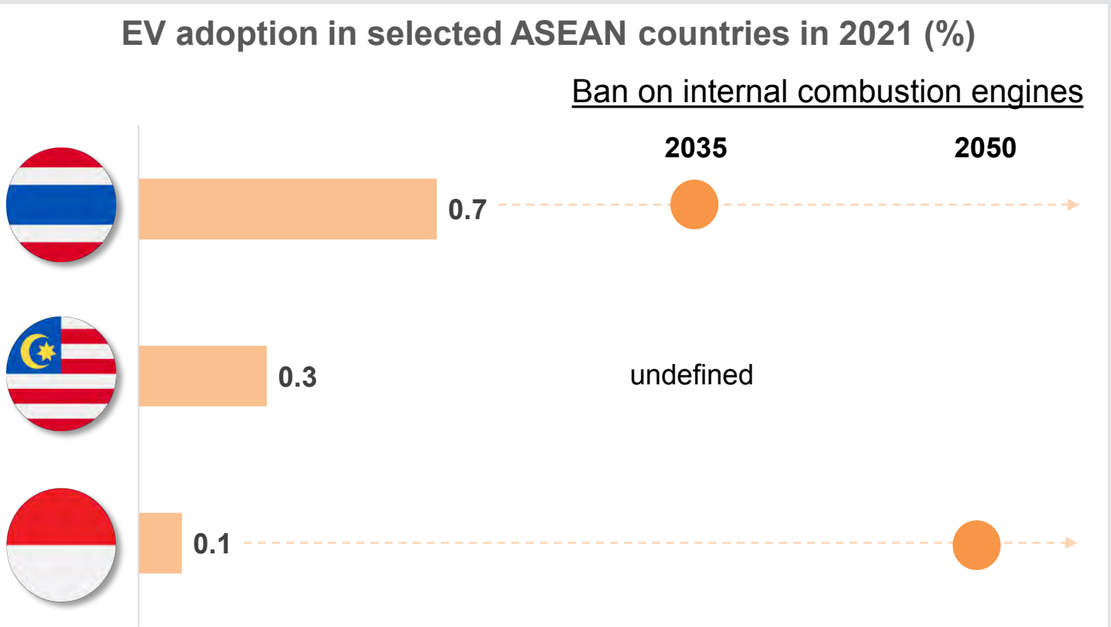
…in line with its strong position in the EV battery industry – which also supplies to Tesla

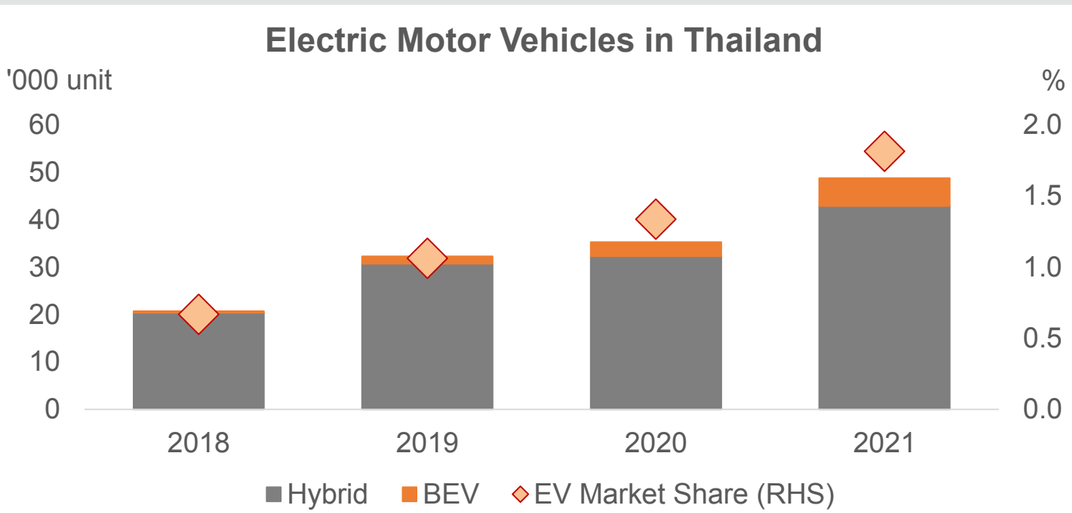


Global battery production is expected to grow by **CAGR of 34%** from 95.3GWh in 2020 to **410.5GWh** in 2024.

Sources: CleanTechnica, SNE Research, GlobalData, SME Bank Economic Research

Industry Focus: EVs (5/11)





*include motorcycles & tricycles

Thailand has a relatively ambitious EVs target

- ASEAN EVs market is expected to register a **CAGR of 32.7%** for the period of **2022 to 2027**.
- Based on McKinsey, EVs accounted for approximately 0.7% of the automotive market in Thailand followed by Malaysia (0.3%) and Indonesia (0.1%).
- According to Singapore's Minister of Transport, EVs adoption rate in the country for the 1st 5 months of this year stood at 8.4% (2021:3.8%).
- **EVs sold in Thailand have been increasing over the past few years despite a decline in the overall motor vehicles sales** in 2019 (-1.8% YoY) and 2020 (-13.2% YoY).
- In 2021, Thailand's total motor vehicle sales grew by 1.9% YoY with EVs expanded 38.2% YoY i.e. BEV (96.1% YoY) & hybrids (32.8%).
- Thailand and Indonesia has target of **100% new vehicle sales to be electric by 2035** and **2050** respectively. **Singapore aims to have 100% cleaner energy vehicles by 2040** while **Malaysia seems to be lagging behind**. (*refer next slide*)

Indonesia – world's biggest nickel-producing country

- **Signs of growth are imminent** – 1) has strong supply of Nickel – a critical ingredient in the lithium-ion batteries used in EVs; 2) EVs are becoming more popular (e.g. ride-hailing companies expanding fleet charging infrastructure & public transportation operators increasing electric bus fleet.

Sources: CEIC, Mordor Intelligence, McKinsey, SME Bank Economic Research

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Industry Focus: EVs in Malaysia (6/11)

EV Adoption Scenario in Malaysia

1995
The 1st KTM Komuter trains to be run on electricity

1997*
Perusahaan Otomobil Elektrik (Malaysia) launched 1st national BEV called Eleksuria

1998
The 1st LRT line, named STAR LRT

2007
The country's 1st Hybrid car on the road - Honda Civic Hybrid

2012
1st Hybrid CKD in Malaysia – Honda Jazz Hybrid.

2013
BEV's Mitsubishi i-MiEV entered the market

2015
The 1st introduction of EV buses. Gemilang supplied 15 units of electric buses to Sunway's Bus Rapid Transit (BRT)

2020
Honda opened Malaysia's 1st hybrid vehicle battery assembly plant

2021
1st CKD – Toyota Corolla Cross Hybrid.

2022
First CKD BEV in Malaysia (Plant at Shah Alam) –Volvo XC40 Recharge EV

2022
Samsung SDI opened first EV battery facility in Seremban

2023
EV taxis are coming to Malaysia – partnership between TNB & TeksiKu

2022
Mercedes-Benz sells BEVs in Malaysia (EQA, EQB, EQC & EQS)

2022
Perodua introduced Ativa Hybrid

- Even though private EVs are getting more attention lately, public transports were the first to introduce EVs in Malaysia.
- The **1st EV in Malaysia was KTM Komuter trains** launched in 1995.
- With the global rush for EVs, Malaysia also jumps into the bandwagon for both private & public segments. In 2021, 7 out of 10 Malaysians have a motor vehicle.
- With such a strong dependency on vehicles on top of commitment made to reduce emissions by 45% by 2030 and reach net zero by 2050 (Paris Agreement), **Malaysia aims to grow EV market share to 38% (2019: <3%) through National Energy Policy 2022-2040.**
- Government also plans to install **10,000 EV charging stations by 2025.** (YTD: 570). According to TNB, there will be an estimated 18,000 charging points to serve about 524.4k EVs by 2030.

*By the mid-2000s, Perusahaan Otomobil Elektrik (Malaysia) had effectively stalled and the company became a dormant entity.

Sources: JPJ, MOT, and SME Bank Economic Research

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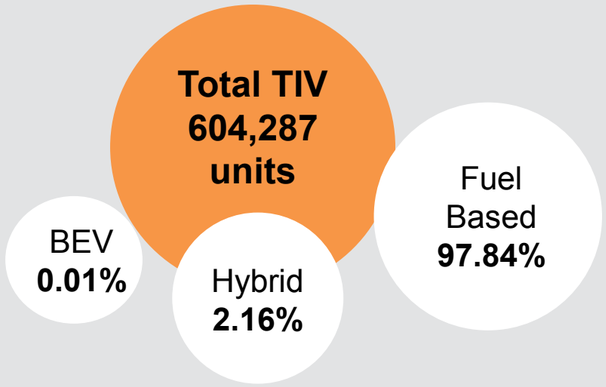
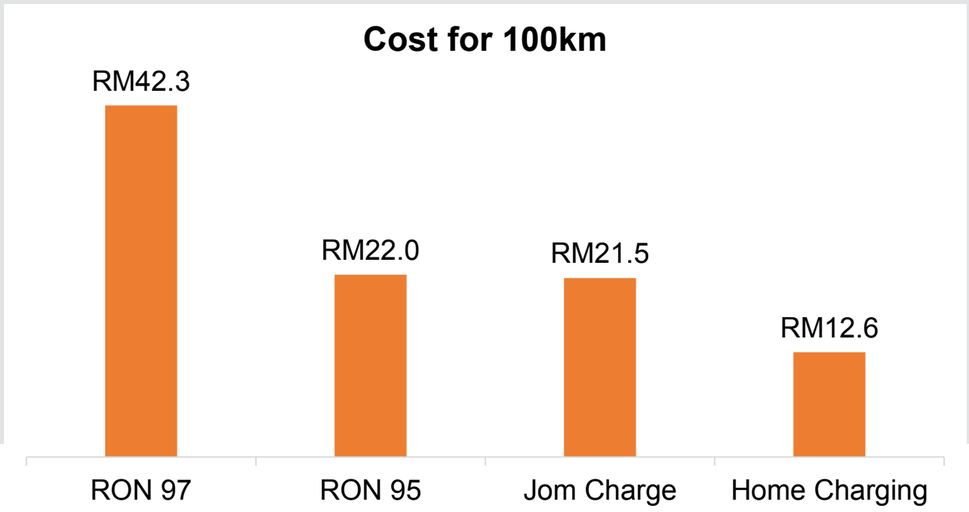
Industry Focus: EVs in Malaysia (7/11)

EV market share < 3% in 2019

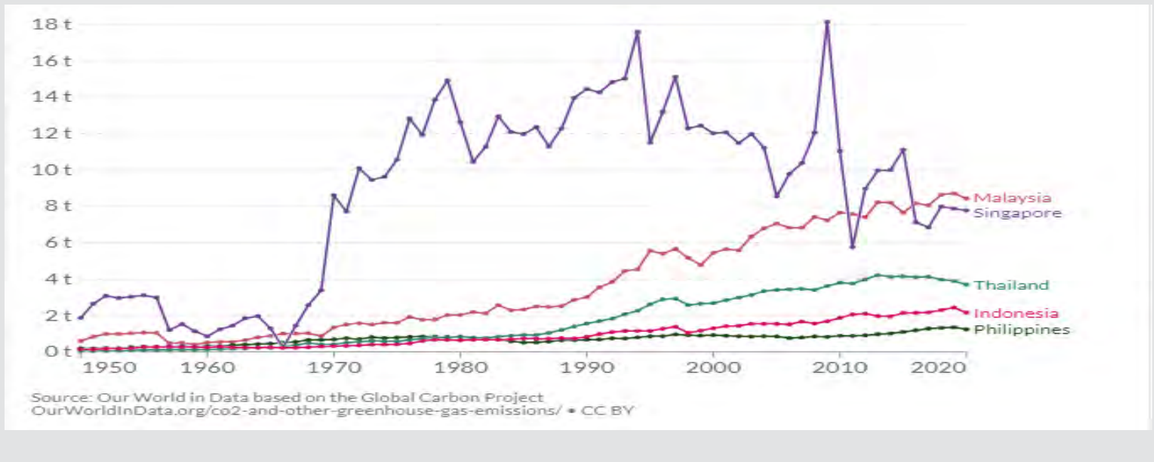


EV's charging cost is still relatively cheaper than fuel

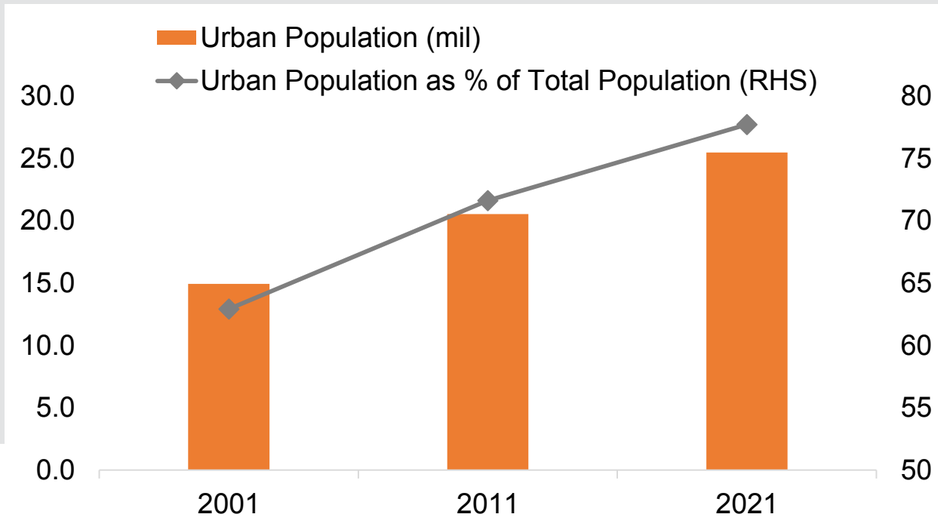


**using Volvo C40 as benchmark*

Malaysia has the highest per capita CO_2 emissions among ASEAN 5



Uptrend in urban population may push EV adoption

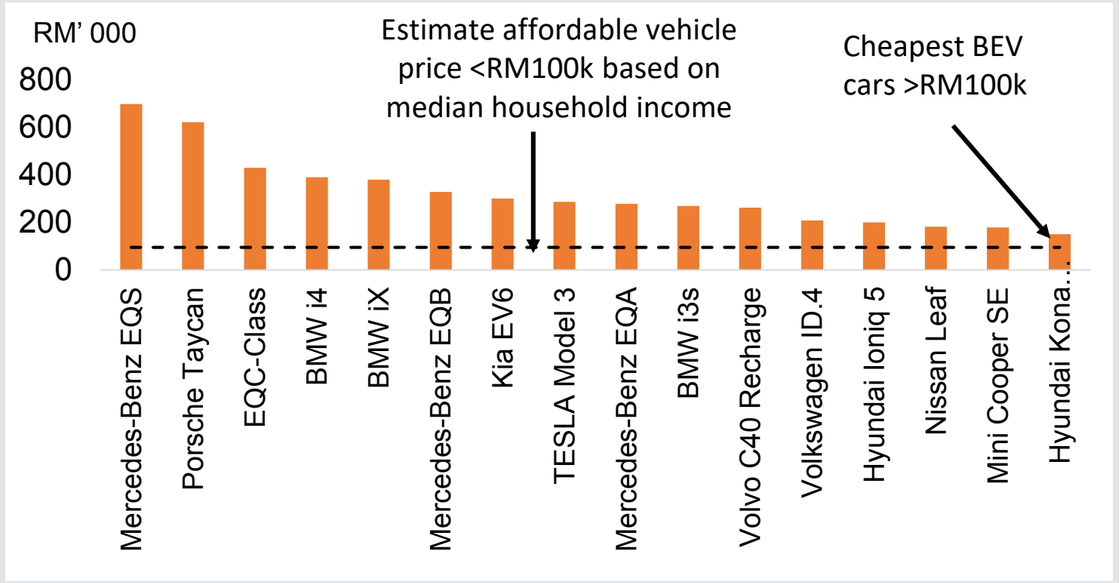


According to UN Habitat, cities produce >60% of greenhouse gas emissions globally.

Sources: ourworldindata, CEIC, MOF, theEdge, TNB, and SME Bank Economic Research

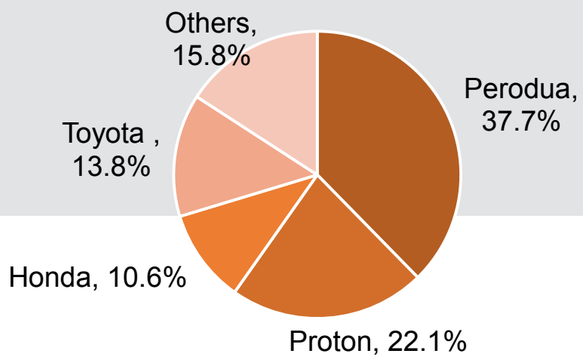
Industry Focus: EVs in Malaysia (8/11)

>50% of Malaysians cannot afford to own BEV cars



National automakers need to expedite affordable EVs line-up

Total Vehicle Market Share 2021



Despite almost 60% of combined market share, Perodua has only **1 EV's model**, while Proton has **none.**

Sources: CEIC, MAA, Reuters, MyEvoc, Carlist, Wapcar, and SME Bank Economic Research

Charging availability is a main concern

- Home charging on top of the availability of charging stations in the urban areas are deemed to be sufficient for a daily usage of EVs with the average driving range of 50 to 70 km per day (e.g. Hyundai Kona Electric has a 305 to 484 km range for fully charged).
- However, the main concern arises when **travelling out of the urban area where charging stations are limited. 60% of total charging station in Malaysia are located in Selangor & KL.** (*refer next slide*).
- Moreover, **some charging stations have limited operation hours** especially those located within the dealership premises.

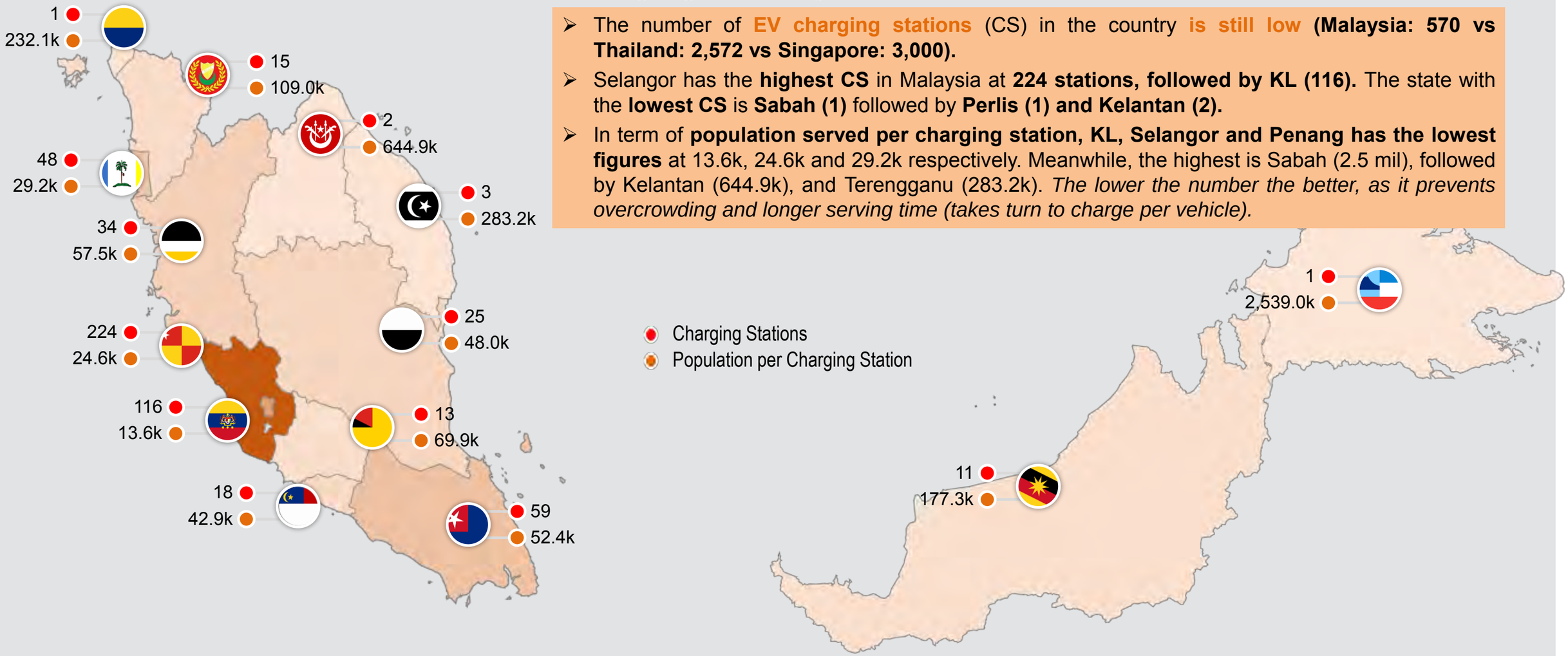
Ideally, at least **1 charger** is needed **for every 10 to 15 EVs** → For Malaysia to achieve **38% of EV shares by 2040…** → **…Need around 119k to 179k charging points** (current: 570 stations)

	EV share of annual TIV	Estimated EV share of total outstanding
2022e	0.9%	0.2%
↓	↓	↓
2040f	**38%**	**3.4%**

Industry Focus: EVs in Malaysia (9/11)

Charging Ports by States

- The number of **EV charging stations** (CS) in the country **is still low (Malaysia: 570 vs Thailand: 2,572 vs Singapore: 3,000).**
- Selangor has the **highest CS** in Malaysia at **224 stations, followed by KL (116).** The state with the **lowest CS** is **Sabah (1)** followed by **Perlis (1) and Kelantan (2).**
- In term of **population served per charging station, KL, Selangor and Penang has the lowest figures** at 13.6k, 24.6k and 29.2k respectively. Meanwhile, the highest is Sabah (2.5 mil), followed by Kelantan (644.9k), and Terengganu (283.2k). *The lower the number the better, as it prevents overcrowding and longer serving time (takes turn to charge per vehicle).*



Sources: Plugshare and SME Bank Economic Research

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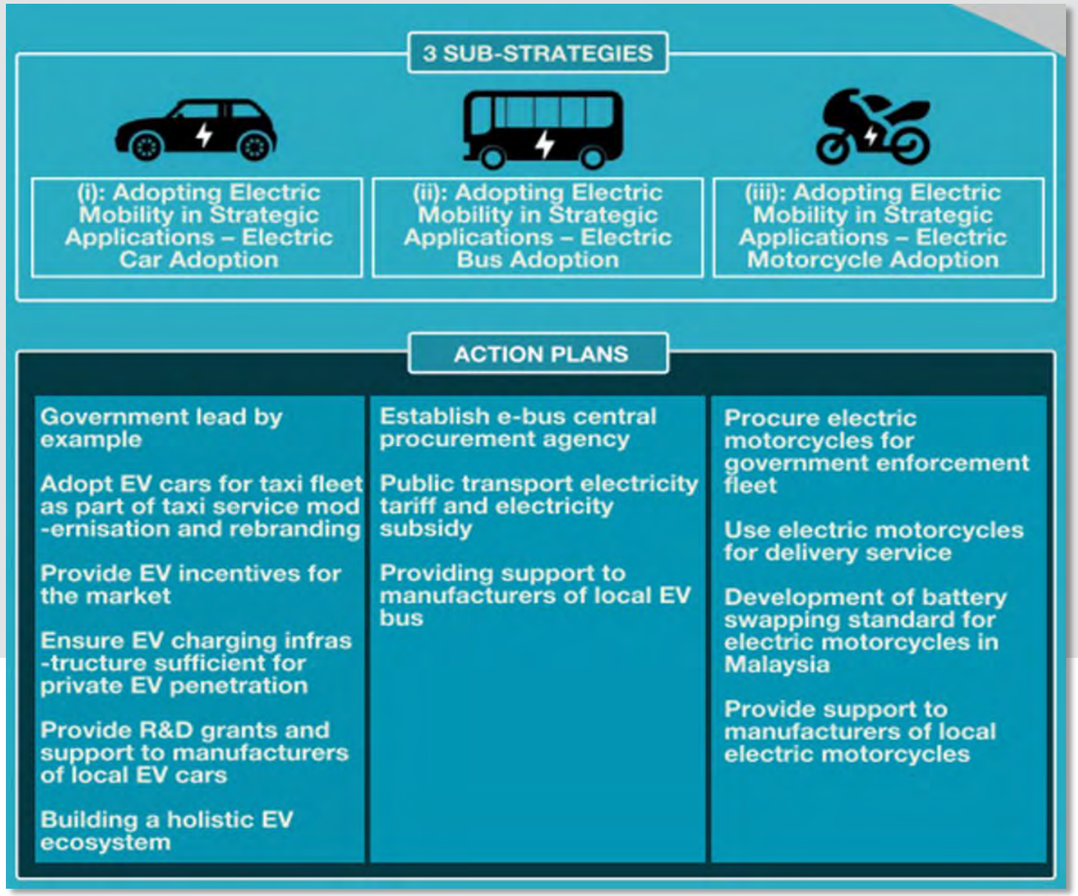
Industry Focus: EVs in Malaysia (10/11)

Malaysia to achieve net-zero emission by 2050: Activities to reduce Greenhouse Gas Emissions is already in the pipeline.

Related policies

- Paris Agreement
- National Automotive Policy (NAP 2020 - 2030)
- 12th Malaysian Plan
- Low Carbon Mobility Blueprint 2021 - 2030
- National Low Carbon Cities Masterplan
- National Energy Policy 2022-2040
- Environmental Quality Bill (Amendment) 2022

- A **policy focusing on automotive manufacturing** which aims to propel Malaysia to become a regional leader and to contribute RM104 bil to the economy by 2030 (2019: RM61.2 bil).
- **Centered on digital industrial transformation**, while continuing the effort to reduce carbon emissions through **energy-efficient vehicles (EEV)** development (minimise & efficient use of fossil fuel).
- An enhancement of the previous policy, NAP 2014, with additional **3 new key objectives**: **1) Next Generation Vehicles/autonomous vehicles, 2) Mobility as a service,** and **3) Industrial Revolution 4.0.**
- Plans to tap into EV market through the establishment of EV Smart Grid Interoperability Centre & development of crucial components (e.g. battery pack, EV chassis & body)



Notes: Click bubbles for further explanations

 Sources: United Nations (UN), KASA, EPU, MITI and SME Bank Economic Research

Industry Focus: EVs in Malaysia (11/11)

Ongoing & Upcoming (Budget 2023) EV incentives

+ **Exemption for approved permit (AP) fee** will be given for EVs imports in 2023.
+ **Import and excise duty exemption** on imported complete built-up (CBU) type of EVs will be extended until Dec 31, 2024.
+ TNB investing **RM165 mil** by 2025 to provide **EV charging facilities.**
+ EV charging equipment manufacturers are given **100% income tax exemption on statutory income** from assessment year 2023 to 2032 and **100% Investment Tax Allowance**.
+ Green Technology Financing Scheme (GTFS) will be improved, with the **guarantee value increased to RM3 bil until 2025**, while the financing scope is extended specifically to the EV sector with a guarantee limit of up to 60%, and the financing of the waste sector will be increased to 80%.
+ Green Investment Tax Allowance (GITA) and Green Income Tax Exemption (GITE) until Dec 31, 2025.

National Energy Policy 2022-2040

Selected Targets	2018	Low Carbon Nation Aspiration 2040
1. Percentage of urban public transport modal share	20%	50%
2. Percentage of electric vehicle (EV) share	<1%	38%
3. Alternative fuel standard for heavy transport	B5	B30
4. Percentage of Liquefied Natural Gas (LNG) as alternative fuel for marine transport	0%	25%
5. Percentage of industrial and commercial energy efficiency savings	<1%	11%
6. Percentage of residential energy efficiency savings	<1%	10%
7. Total installed capacity of RE	7,597 MW	18,431 MW
8. Percentage of coal in installed capacity	31.4%	18.6%
9. Percentage of RE in TPES	7.2%	17%

Legend: Energy security, Energy affordability, Environmental sustainability

- Complement by Low Carbon Mobility Blueprint 2021 – 2030 and National Low Carbon Cities Masterplan.
- Public transports will switch to EV (LRT, MRT, EV buses, BRT etc)
- Suggesting a rather long journey to completely phase out fuel-powered vehicles.

Sources: EPU, MOF, and SME Bank Economic Research

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