



## Supercharging electric mobility in Southeast Asia

Market scorecard: Indonesia

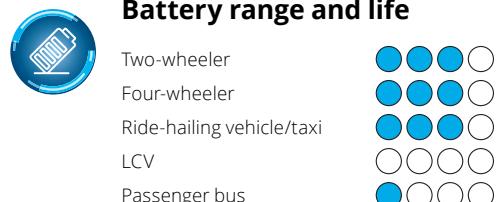
### Five enablers for electrification

#### Total cost of ownership



- The price of an average EV in Indonesia continues to remain higher than its ICEV counterpart despite the removal of the luxury tax, which was previously pegged at 30% of the purchase price.
- As the annual tax is calculated as a percentage of the initial purchase price, the annual tax for an average EV is also approximately 33% higher than the annual tax for an equivalent ICEV.

#### Battery range and life



- The LCV use case may be less viable in Indonesia, as the EVs are likely to require more than one charge per day to sustain average usage levels.
- This is a result of the significantly longer average distance that LCVs travel in Indonesia, which is approximately 57% higher than that in Vietnam, the next-highest market.

#### Charging networks



- Local power producers have been working on the expansion of public and fleet charging options, with charging tariffs regulated by the Ministry of Energy and Mineral Resources (MEMR).
- Battery swapping trials are also being carried out by several industry players for the two-wheeler use case.

#### Regulatory environment



- High import tariffs may continue to play a part in deterring EV adoption in Indonesia, although vehicles arriving from other ASEAN countries, China, and South Korea are tariff-exempt.
- Recent proposals by the Ministry of Finance also include suggestions to cut tariffs levied on EVs with fewer than nine seats from the current 70% to 50% in order to boost adoption.
- Indonesia is currently finalising a new EV policy that will offer fiscal incentives, such as tax cuts, to foreign automotive manufacturers as it ramps up its efforts to become a lithium-ion battery hub.

#### Value chain potential



- Indonesia is a hinterland for many of the raw materials essential for the manufacturing of EV batteries, including nickel, cobalt, and copper. To support the EV battery manufacturing sector, the government has put in place regulations to halt the exportation of unprocessed nickel ores.
- Furthermore, the government is committed to increasing the proportion of EVs to 20% of its total car production by 2025, and has been able to successfully attract investments from major EV players.
- While EV adoption is still in its early growth stage, ride-hailing operators have already begun adopting EVs, and public transport operators are also planning to procure EV passenger buses.

### Analysis of EV market opportunities

#### Private vehicles

Aspiring



#### Logistics fleets

Emerging



#### Ride-hailing vehicle/ taxi fleets

Aspiring



#### Public transport fleets

Aspiring



- While the EV adoption rate for private vehicles is currently low, an increased focus on local EV manufacturing, coupled with increased incentives – such as exemptions on luxury taxes – may help to push future demand.
- On the bright side, EVs are seeing greater adoption by ride-hailing operators, as well as public transport operators.
- However, the use case for logistics LCVs remains less clear. Currently, no known logistic companies have cited an interest in switching to EVs. This is likely due to the fact that the logistics sector in Indonesia travels an average daily mileage of 224 kilometres, and would therefore require more than one charge a day. To reduce range anxiety, logistics fleet operators could consider installing standardised on-route charging points for their trucks and fleets.
- Overall, an expansion in EV manufacturing and battery production capabilities would require Indonesia to make a broad-based shift towards high-value manufacturing, by investing in its Industry 4.0 capabilities and talent, as many of the technological processes are highly integrated.
- Indonesia would also need to scale up its power grid to support large-scale electrification plans, including the potential construction of solar-powered charging stations with energy storage that do not need to be powered by the grid, and installation of battery swapping outlets along travel routes for quick and easy battery replacement.

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## Supercharging electric mobility in Southeast Asia

Market scorecard: Malaysia

### Five enablers for electrification

#### Total cost of ownership



Vehicle cost



Taxes



Energy costs



- Overall, Malaysia has a high total cost of ownership as there is a lack of purchase incentives. However, vehicles in Malaysia are generally affordable, and the price differential between EVs and ICEVs is less stark as compared to other Southeast Asian markets.
- Furthermore, taxes are also generally affordable, and therefore the reduction in annual taxes for EVs does not present significant cost savings for consumers.
- Nevertheless, Malaysia's low cost of electricity enables its EV users to reap significant cost savings.

#### Battery range and life



Two-wheeler



Four-wheeler



Ride-hailing vehicle/taxi



LCV



Passenger bus



- With the exception of the passenger bus use case, vehicles in Malaysia are typically driven for longer average distances than other markets in Southeast Asia, and will therefore require a greater number of charges to fulfil their weekly usage needs..

#### Charging networks



Public charging networks



Fleet charging networks



Power grid



Battery swapping



- Malaysia has plans to build 25,000 public charging points and 100,000 private charging points by 2030.
- Currently, its power grid can support up to 10% electrification with uncontrolled charging, but full electrification will require cable resizing and coordinated smart charging.

#### Regulatory environment



Purchase incentives



Usage incentives



Trade regulations



- With high duties imposed on imported cars, the uptake of EVs continues to remain limited.
- However, the launch of Malaysia's Low Carbon Cities 2030 plan, which entails the establishment of 200 low carbon zones across the country, may bring about a greater push for green vehicle options, including EVs.

#### Value chain potential



R&D and design



Raw materials supply



Parts sourcing and integration



Assembly



Sales, marketing, and aftersales



- With the introduction of the National Automotive Policy 2020, Malaysia has been able to leverage its copper reserves to increase its momentum in the manufacturing of lithium-ion batteries and battery packs.
- While there are currently only three OEMs involved in the manufacturing of EVs, there has been a palpable shift towards EV production, including plans to build the first electric bus assembly plant in Malaysia.
- Although EV adoption is low across all use cases, fleet operators have been increasing their usage of EVs.

### Analysis of EV market opportunities

#### Private vehicles



Emerging

#### Logistics fleets

Emerging



#### Ride-hailing vehicle/ taxi fleets

Aspiring



#### Public transport fleets

Aspiring



- The EV adoption rate for private vehicles is currently low, as a result of limited regulatory incentives and high import duties, although ride-hailing and public transport fleet use cases may appear more promising.
- Few logistics companies have cited an interest in switching to EVs. One reason for this could be the fact that Malaysian users tend to travel further distances than their counterparts in other Southeast Asian markets, especially for fleet use cases. Range anxiety associated with the need for frequent charges is therefore a key barrier to adoption. To alleviate this issue, Malaysia would need to establish an integrated charging network across the country, and push for greater data transparency amongst charging network operators to achieve greater locational efficiency in the placement of chargers.
- In terms of the value chain, Malaysia should look to develop other segments where they have existing capabilities, such as in the production of lithium-ion batteries. This would enable local manufacturers to develop the know-how that could help pave their future transition to EV production.
- As Malaysia's grid is currently unable to fully support large-scale electrification, it should also consider the development of battery storage facilities that are able to charge and store power from the grid during periods when electricity costs are lower, to be used when demand is higher. This would help to balance the peak loads as it makes its transition to a more stable power grid.



## Supercharging electric mobility in Southeast Asia

Market scorecard: Philippines

### Five enablers for electrification

#### Total cost of ownership



Vehicle cost



Taxes



Energy costs



- EVs in the Philippines are about 155% more expensive than ICEVs in terms of the initial purchase price.
- Road taxes are calculated based on gross vehicle weight, and since EVs tend to be heavier than ICEVs on average, EVs are subject to taxes that are about 56% higher than ICEVs. In absolute terms, however, this difference translates to only about USD 45, which may not be significant for many users.

#### Battery range and life



Two-wheeler



Four-wheeler



Ride-hailing vehicle/taxi



LCV



Passenger bus



- With the lowest average daily distance for personal vehicles across all Southeast Asian markets, both the two-wheeler and four-wheeler use cases in Philippines will require less than one charge per week.
- However, Philippines has the highest average daily distance for taxis, which will require daily charges to sustain its usage. To facilitate this, fleet operators may require the use of a central depot for overnight charging.

#### Charging networks



Public charging networks



Fleet charging networks



Power grid



Battery swapping



- There are over 4,300 registered EVs in Philippines, but only 40 public charging stations as of 2018. To make EVs more attractive for users without access to private charging stations, an expansion of public charging networks will be required.
- In the fleet segment, over 200 charging stations have since been installed for e-trikes, e-jeepneys, and EV buses to support their increased adoption.

#### Regulatory environment



Purchase incentives



Usage incentives



Trade regulations



- To encourage the transition to e-trikes, the government has implemented several legislations, including a "no upfront cash" system that enables users to purchase e-trikes without the need to make down payments.
- With changes to the automotive tax structure under the Tax Reform for Acceleration and Inclusion Act (TRAIN), ICEVs are subject to an excise tax of between 4% and 50% of their initial purchase price. EVs, however, will be exempt from this tax.
- Other initiatives include a Public Utility Vehicle (PUV) modernisation plan to replace public transport vehicles that are 15 years or older with modern vehicles that are able to meet the low-emission Euro 4 standards – or produce no emissions at all, like e-jeepneys.

#### Value chain potential



R&D and design



Raw materials supply



Parts sourcing and integration



Assembly



Sales, marketing, and aftersales



- Home to 5% and 4% of global nickel and cobalt reserves respectively, Philippines has plans to participate more actively in the EV battery production value chain.
- Currently, there are 11 companies involved in the manufacturing of EV components, but no EV battery manufacturers.
- Philippines' activities in the assembly and sales of EVs are mostly centred around e-trikes and e-jeepneys that are used by fleet and public transport operators.

#### Analysis of EV market opportunities

##### Private vehicles



Aspiring

##### Logistics fleets



Emerging

##### Ride-hailing vehicle/ taxi fleets



Contender

##### Public transport fleets



Contender

- Currently, the EV adoption rate for private vehicles remains low, as many of the incentives have been focused on commercial and fleet use cases, such as e-jeepneys and e-trikes.
- There is therefore a need to increase usage incentives to improve the total cost of ownership, for example, with lower toll charges, or perhaps increase the convenience of using EVs by offering additional advantages, such as allowing EVs to use bus lanes.
- To support private jeepney operators in switching their large fleets of legacy ICEVs to e-jeepneys, the government could also explore ways to lease e-jeepneys to these operators during a transition phase.
- Furthermore, the Philippines should also consider how it can tap on its cobalt and nickel reserves to expand its EV battery manufacturing footprint to develop greater capabilities in the manufacturing of electric parts.

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## Supercharging electric mobility in Southeast Asia

Market scorecard: Singapore

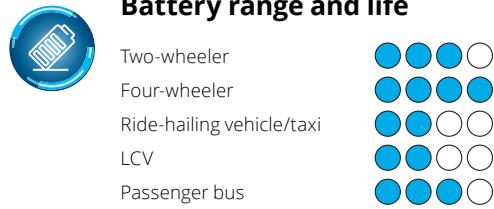
### Five enablers for electrification

#### Total cost of ownership



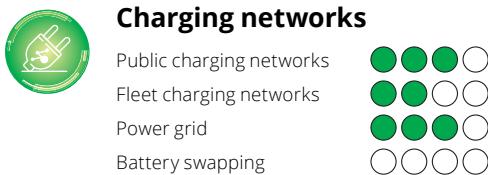
- Singapore has the highest purchase prices for both EVs and ICEVs in Southeast Asia. Despite multiple subsidies of up to SGD 45,000 offered by the government through the EV Early Adoption Initiative and Vehicle Emission Scheme, the price differential between EVs and ICEVs remains significant.
- As EV drivers will not be subject to petrol taxes, they will be required to pay an annual additional lump sum tax of SGD 700 from January 2023 onwards, which will significantly increase the overall one-time taxes.

#### Battery range and life



- With shorter distances travelled across all use cases, Singapore has a relatively good battery range coverage.
- In particular, the passenger bus use case requires only an average of 1.5 charges per week due to the short average distances that they cover.

#### Charging networks



- There are about 1,800 public charging points available across Singapore, with plans to install 60,000 charging points by 2030. However, most of these locations are close to high-traffic areas such as the central business district, rather than residential neighbourhoods.
- To address this issue, the government will be setting aside SGD 30 million between 2021 and 2025 for initiatives to promote the increased adoption of EVs, which includes increasing the number of chargers at private properties.
- Fleet operators have their own extensive charging networks.
- Although Singapore's power grid currently has excess capacity, it is also exploring renewable energy sources to ensure that it can sustainably support future EV charging requirements.

#### Regulatory environment



- In Singapore, the government has implemented the EV Early Adoption Incentive, which offers consumers purchasing fully electric cars a tax rebate of 45% for the additional registration fee (ARF), which is capped at SGD 20,000.
- The Vehicle Emission Scheme also offers EV buyers an additional rebate of up to SGD 25,000 depending on the EV model.
- Singapore is a fairly attractive location for EV manufacturing operations given its conducive trade regulations, and high number of FTAs.

#### Value chain potential



- Singapore's key competitive advantage lies in R&D. Although the high costs of labour and land continue to discourage OEMs from setting up parts sourcing and assembly facilities in Singapore, its overall nationwide push for innovation and digitisation is likely to entice EV players whose focus is on automation.
- While EV adoption is currently low, there has been a recent uptake on the back of government incentives, especially by fleet operators in the ride-hailing and public transport sectors.

#### Analysis of EV market opportunities

##### Private vehicles



Contender

##### Logistics fleets

Aspiring



##### Ride-hailing vehicle/ taxi fleets

Aspiring



##### Public transport fleets

Contender



- Although the EV adoption rate for private vehicles remains low, the introduction of attractive incentives and a strong public charging infrastructure could help to boost future demand.
- Across all fleet use cases, including ride-hailing and logistics, traction can be observed as government incentives have resulted in lower vehicle purchase prices and electricity cost savings.
- The public transport use case, in particular, is set to witness an increased uptake of EVs, as the government continues to procure electric and hybrid buses.
- Overall, Singapore's charging infrastructure is well-equipped to meet growing fleet sizes. However, public charging network providers have been working in silos thus far, leading to an inefficient distribution of charging stations. To overcome this, the government could consider streamlining inter-agency processes to facilitate greater data-sharing across network providers.
- Singapore has managed to successfully establish itself as an R&D leader, and should therefore work to anchor itself as the R&D epicentre for the Southeast Asia region's EV industry, for example, by facilitating investments from multinationals and start-ups to build a strong local EV talent pool.

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## Supercharging electric mobility in Southeast Asia

Market scorecard: Thailand

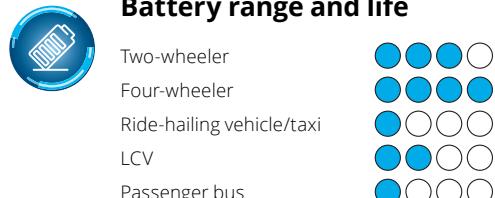
### Five enablers for electrification

#### Total cost of ownership



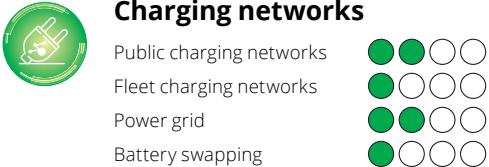
- Despite tax exemptions, the purchase price of an average EV is about twice that of its ICEV equivalent in Thailand.
- This is likely a result of the market saturation of ICEV OEMs: as many automotive players have located their manufacturing plants in Thailand, users do not need to pay any additional import fees, which helps to keep the relative cost of ICEVs low.

#### Battery range and life



- Thailand has the highest average daily usage for the passenger bus use case, which will require an estimated 6.6 charges per week.
- To facilitate this, fleet operators may require the use of a central depot for overnight charging.

#### Charging networks



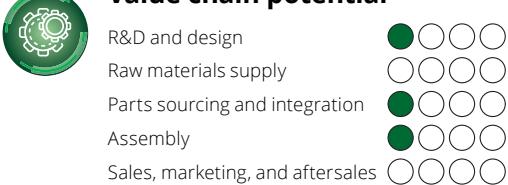
- Thailand has a relatively extensive public charging network, with about 1,000 charging stations installed throughout the country within 200 kilometres of one another for greater coverage. However, fleet charging networks remain limited, with only 30 charging stations in Bangkok for EV taxis.
- Thailand aims to obtain 25% of its power needs from renewable energy sources by 2021. To support its electrification needs, it will need to augment its existing grid with energy storage infrastructure.

#### Regulatory environment



- To promote its local EV industry, Thailand has lowered the vehicle excise tax from the usual 10% to 30% for conventional ICEVs to between 2% and 10% for domestically produced EVs.
- Apart from incentives to entice automotive investors, such as corporate income tax exemptions of up to 15 years and financial incentives for investments in R&D, innovation, or human resources development, the government has also committed to devoting parts of its budget to the purchase of EVs.

#### Value chain potential



- Despite recent efforts to scale up R&D, battery production, and other assembly activities in the EV value chain, Thailand's EV sector continues to be dominated by PHEVs rather than BEVs.
- As a result, adoption of BEVs remain low, although there are promising plans to increase adoption by fleet and public transport operators, as well as logistic providers.

#### Analysis of EV market opportunities

Private vehicles



Aspiring

Logistics fleets



Emerging

Ride-hailing vehicle/  
taxi fleets



Aspiring

Public transport  
fleets



Aspiring

- Although EV adoption for private vehicles has increased in recent years, it remains low. Overall, EVs in Thailand have significantly higher vehicle costs as compared to their ICEV equivalents. An increase in incentives, including lower excise taxes, as well as an increase in the convenience of EV usage, such as the introduction of EV-only lanes, may be required to stimulate greater demand.
- However, Thailand's limited fleet charging networks may pose a barrier to its fleet electrification plans. To overcome this, it will need to improve the stability of its charging infrastructure, for example, by implementing battery swapping systems for two-wheelers, and adapting its power grids for solar-powered chargers.
- Currently, Thailand's value chain capabilities and customer demand are mostly focused on PHEVs, rather than BEVs. Industry players should consider ways to leverage the initial interest in PHEVs to generate a stronger BEV network by integrating EV charging infrastructure at existing gas stations.



## Supercharging electric mobility in Southeast Asia

Market scorecard: Vietnam

### Five enablers for electrification

#### Total cost of ownership



Vehicle cost



Taxes



Energy costs



- In recent years, the government has been encouraging the purchase of locally manufactured vehicles over imported vehicles. The main determinant of a vehicle's total cost of ownership therefore depends more heavily on its country of origin than its fuel type, and as a result Vietnam currently has the lowest price differential between ICEVs and EVs.
- In terms of energy costs, Vietnam also has the most significant cost differential between fuel and electricity of about 67%.

#### Battery range and life



Two-wheeler



Four-wheeler



Ride-hailing vehicle/taxi



LCV



Passenger bus



- Across all Southeast Asian markets, the four-wheeler use case in Vietnam has the lowest average daily distance, and will therefore require only about one charge every two weeks to sustain its usage.
- However, the LCV and passenger bus use cases may require daily charges, which can be managed through use of a central depot for overnight charging.

#### Charging networks



Public charging networks



Fleet charging networks



Power grid



Battery swapping



- EV adoption continues to be hindered by a lack of public charging stations in Vietnam.
- Based on grid simulation exercises, Vietnam can expect to experience a 3% to 32% overload in selected transmission lines under normal operating conditions.

#### Regulatory environment



Purchase incentives



Usage incentives



Trade regulations



- To reduce traffic congestion, Vietnam has begun implementing city taxes on two-wheelers, with the objective of ultimately phasing out two-wheelers in city areas by 2030.
- Currently, ICEVs and EVs are subject to the same level of import taxes, as the focus is less on the specific fuel type, but more on supporting the local car manufacturing industry and encouraging the purchase of domestically produced vehicles.

#### Value chain potential



R&D and design



Raw materials supply



Parts sourcing and integration



Assembly



Sales, marketing, and aftersales



- Vietnam's EV sector is dominated by a single automotive manufacturer, VinFast, whose production covers electric two-wheelers, four-wheelers, and passenger buses. It also has plans to expand its EV manufacturing and research operations, as well as establish a supplier park, development complex, and battery manufacturing plant. To boost domestic demand, high levels of discounts are also offered on VinFast's EVs.
- Looking ahead, Vietnam is also well-positioned to become a low-cost nickel sulphate producer for the region's EV lithium-ion battery market given its endowment of nickel, cobalt, and other mineral ores.

### Analysis of EV market opportunities

Private vehicles



Aspiring

Logistics fleets



Emerging

Ride-hailing vehicle/  
taxi fleets



Emerging

Public transport  
fleets



Aspiring

- EV adoption for private vehicles is increasing in Vietnam, as a result of effective government subsidies that promote greater uptake of domestically produced EVs over imported ICEVs.
- While the fleet adoption of EVs is currently low, there is likely to be greater uptake by public transport and logistics fleets. Given the lack of charging stations to support full-scale electrification, however, current fleet use cases typically depend on chargers located in depots.
- To incentivise ride-hailing fleets and taxi operators to pilot EV programs, more efforts are required to reduce the total cost of ownership and increase the coverage of the charging network.
- Furthermore, Vietnam could also consider pushing for more industry partnerships between OEMs and charging network providers to expand the coverage of its public charging networks.