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THE FUTURE OF ELECTRIC VEHICLES IN SOUTH EAST ASIA

POSITION PAPER

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SOUTH EAST ASIA: AN OVERVIEW

South East Asia comprises a diverse group of largely developing countries characterized by growing population and increasing urbanization and urban density. Despite a common heritage, and in some cases, a shared past, South East Asian countries are economically, politically and culturally different from each other. The population of the region is 645 million and with a combined GDP is USD2.7 trillion, the average per capita GDP at an estimated USD4,200.¹

However, these averages hide certain economic disparities of the region. On one hand, there is Singapore with per capita GDP of approximately USD54,000, while on the other, Myanmar with a per capita GDP of USD1,300, is among the poorest countries in the world.²

From an automotive standpoint, South East Asia or ASEAN is one of the most dynamic regions globally. The five major motor vehicle "producers" – Indonesia, Thailand, Malaysia, the Philippines, and Vietnam, account for over 4 million units in production.³ The entire region itself is a growing market of over 3 million vehicles.⁴

When considered as a single region, South East Asia is the fifth largest market in the world ahead of Russia and Brazil. While Asia is currently the growth engine of the global automotive demand, after China and India, the next wave of growth is going to come from South East Asia.

Another factor that makes this region attractive is its integrated supply chain spread across all automotive-producing countries. As the global competition heats up with countries competing for investments in new capacities, South East Asia nations need to foster further co-operation and integration among each other to flourish.

The next wave of integration has to come from common specifications, approvals, integrated customs procedures, and eventually a harmonized taxation system that will truly unleash the power of the ASEAN Economic Community (AEC).

"There is a significant societal, economic and environmental upside for South East Asia if public support can match the private interest in electrification. Strong public-private collaboration is vital to create a greener, cleaner future."

Yutaka Sanada
Regional Senior Vice President
Nissan Motor Asia Pacific

¹International Monetary Fund October 2017 estimates

²International Monetary Fund October 2017 estimates

³ASEAN Automotive Federation

⁴ASEAN Automotive Federation

THE ELECTRIC VEHICLE IMPERATIVE

EV development can also provide an opportunity for the region to leapfrog in terms of technology adoption and allow further diversification of locally-available fuels such as CNG, biodiesel, and ethanol.

Congestion and deteriorating urban air quality are acute challenges faced by many South East Asia cities. With increasing urbanization and growing mobility needs, the demand for conventional fuel is expected to go through the roof as well, putting severe pressure on fuel import bills.

EVs therefore, appear to be in the sweet spot of alleviating a slew of mobility issues. They have zero tailpipe emission, are virtually noiseless, and can reduce dependence on oil and utilize greener or locally available fuels. EVs are an important piece in solving the smart city puzzle. Zero tailpipe emission can have a profound impact on air quality in cities; and better air quality results in higher productivity and lower healthcare costs.

Petrol and diesel are undoubtedly the most popular fuels in the world. However, they do come with their own share of challenges. Deterioration of urban air quality is the most obvious concern alongside extremely high import bills for oil-importing countries. Alternate fuels, on the other hand, are cheaper, bi-products of local products, and cleaner.

In addition, EV development can also provide an opportunity for the region to leapfrog in terms of technology adoption and allow further diversification of locally-available fuels such as CNG, biodiesel, and ethanol. Renewable energy sources such as wind and solar could be used to run EVs.

Innovative fuels such as hydrogen have the potential to assist in the transition toward zero-emission EV technologies, completely transforming mobility as we know it.

Apart from being a mode of mobility, cars have always been regarded as an extension of one's personality. Ubiquitous connectivity is an expectation of car consumers as an extension of their work and personal devices. Technology trends are everywhere with mobility and the "bring your own device" phenomenon extending to vehicles.

The networking of cars, individuals, and social infrastructure could eventually lead to reduced traffic jams, more efficient car sharing, remote vehicle operation, and improved energy management. Electric vehicles are pivotal in making this happen.

THE REGULATORY ENVIRONMENT

Despite the virtues of EVs, and outlook of a long-term upward trend, the so-called "electrification" of the region has been slow to take off. Penetration remains minuscule. For EV adoption to make considerable progress and spur demand, governments in South East Asia need to play a more crucial role in providing incentives, adopting standards, aligning taxation norms, and most importantly, facilitating the set-up of charging infrastructure.

The Big 3 – Thailand, Malaysia, and Indonesia – have established comprehensive EV policies that take a holistic approach to developing the entire EV ecosystem by promoting consumer demand and incentivizing private investments across the value chain.

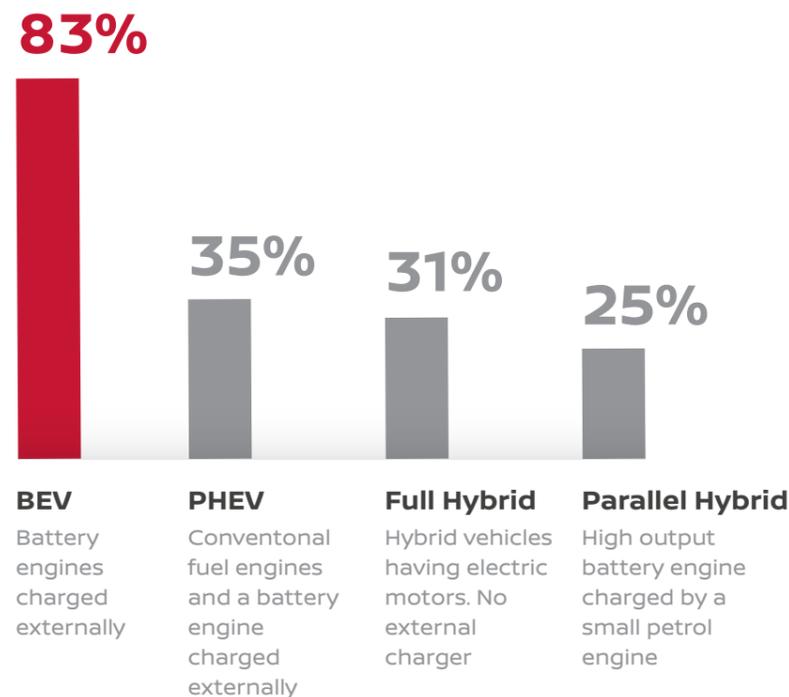
Smaller markets like the Philippines and Singapore do not have integrated roadmaps; they are, nevertheless, pushing the EV agenda through various automotive policies.

For example, the Philippines has taken the modernization of its Jeepneys as the focus project to promote its EV program. Almost all governments in South East Asia realize that large-scale EV adoption is unlikely without ensuring the availability of charging infrastructure and are cognizant of the challenges therein, both in terms of time and costs. This presents a unique opportunity for private collaboration and participation at a massive scale, which could fast-track EV penetration.

AWARENESS ABOUT ELECTRIC VEHICLES



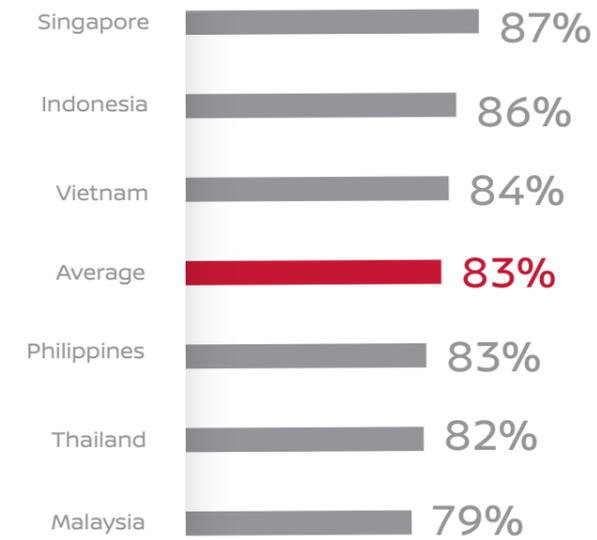
Fig. 1: Technology Association of EVs



Frost & Sullivan, a global growth consulting company, recently conducted a study titled "Future of Electric Vehicles in South East Asia". The study was commissioned by Nissan and based on 1,800 customer interviews across six countries in ASEAN.

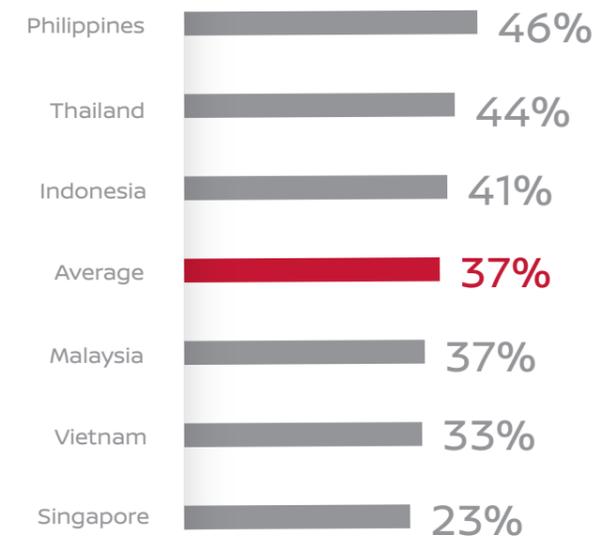
The study revealed that although EV uptake across South East Asia remains comparatively low, consumers are aware of the differences in various EV technologies such as Battery Electric Vehicles (BEVs), Plug-in Hybrid Vehicles (PHEVs), Full Hybrid, and Nissan e-POWER vehicles. The highest association of EVs is for BEVs at 83% (Fig. 1).

Fig. 2: Association of EVs with BEVs, by Country

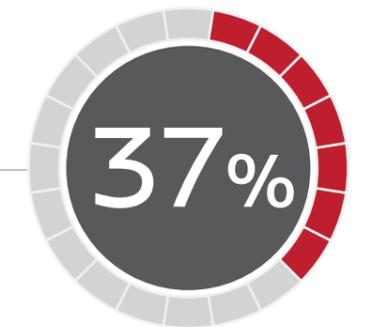


That stated, the association with BEVs is relatively weak in Thailand and Malaysia (Fig. 2). This could be mainly due to the significant presence of full hybrids in Malaysia and Thailand which skews consumers' association of EVs with Hybrids. On the other hand, respondents in Singapore, Indonesia, and Vietnam are more evolved in their association with BEVs.

Fig. 3: Intention to Buy an EV as the Next Purchase



There is significant latent demand for EVs across the markets. However, the current uptake rate is not a true reflection of this underlying demand. Of the 1,800 new car intenders surveyed, 37% revealed that they would certainly consider EVs when they make their next purchase decision (Fig. 3). Respondents in the Philippines, Thailand, and Indonesia are the most eager to buy EVs.



37% of respondents are open to purchasing an EV as their next car, with respondents in the Philippines, Thailand, and Indonesia the most eager

KEY FACTORS DRIVING THE ADOPTION OF ELECTRIC VEHICLES

Fig.4: Motivating Factors for EV Purchase

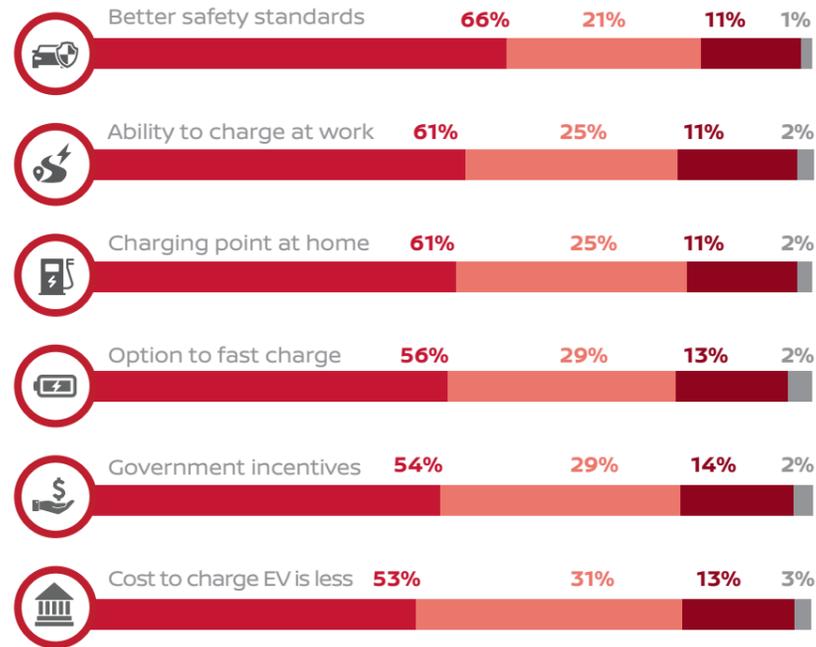


Fig.5: Motivating Factors for EV Purchase, by Country

INDONESIA	MALAYSIA	PHILIPPINES
Better Safety Standards	Better Safety Standards	Better Safety Standards
Charging Flexibility & Convenience	Charging Flexibility & Convenience	Charging Flexibility & Convenience
Environmental Awareness	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

Despite the low EV uptake in the region, the customer base in the region is surprisingly evolved. Contrary to popular belief that the high cost of EV is an impediment, the survey reveals that safety and charging concerns run high on customers' minds (Fig. 4). In fact, customers are ready to pay up to 50% higher than the comparable conventional car to own an EV.

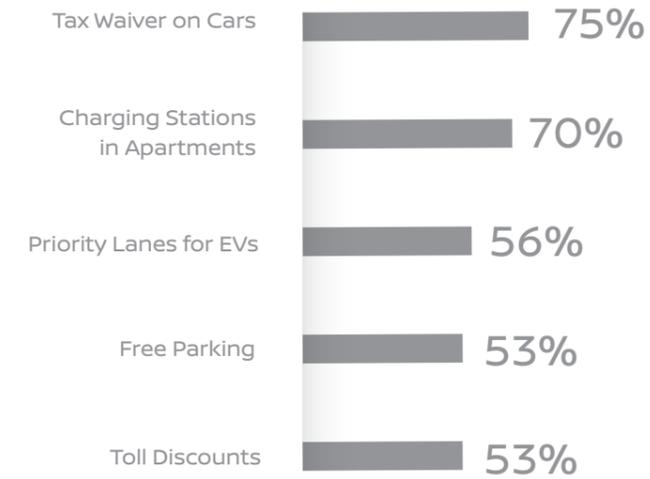
- Very Important
- Somewhat Important
- Slightly Important
- Slightly Not Important

In Singapore, customers rate government incentives as a key motivator, while in Indonesia and Vietnam, environmental awareness is rated higher. In Malaysia and Thailand, lower operating costs of EVs is a more critical motivating factor than government incentives (Fig. 5).

"Electric vehicles are much more than a transportation method to get you from A to B. We see them as clean, connected mobile energy units - representing a new type of ownership - and providing an exciting driving experience."

Vincent Wijnen
Head of Sales & Marketing,
Nissan Group of Asia & Oceania

Fig. 6: Incentives Influencing Switch from Conventional Cars to Electric Vehicles

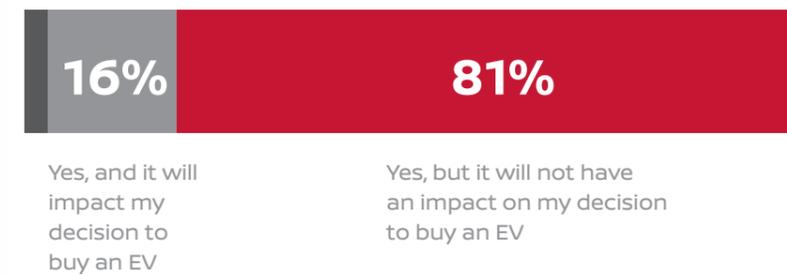


There are a significant number of customers who care about the environment and are willing to pay a premium for a "greener" product.

Findings indicate that governments have a critical role to play in promoting EV usage. Three in four respondents are ready to switch from conventional cars to EVs if taxes are waived.

Other (non-financial) incentives that would motivate customers include installation of charging stations in apartment buildings (70%), priority lanes for EVs (56%), and free parking (53%) (Fig. 6).

Fig.7: Impact of Fuel Source on Electric Vehicle Purchase Decision



It is quite evident that without proactive participation from the government, EV demand may not really take off. Strong latent demand can only be translated into tremendous growth potential if the right incentives are provided. The study further shows that customers in South East Asia are quite evolved.

While making a purchase decision for an EV, they also take into consideration the source of power, and whether it is renewable. In fact, 81% (out of 1,800) respondents surveyed mentioned that their choice would be significantly influenced by the source of power (Fig.7).

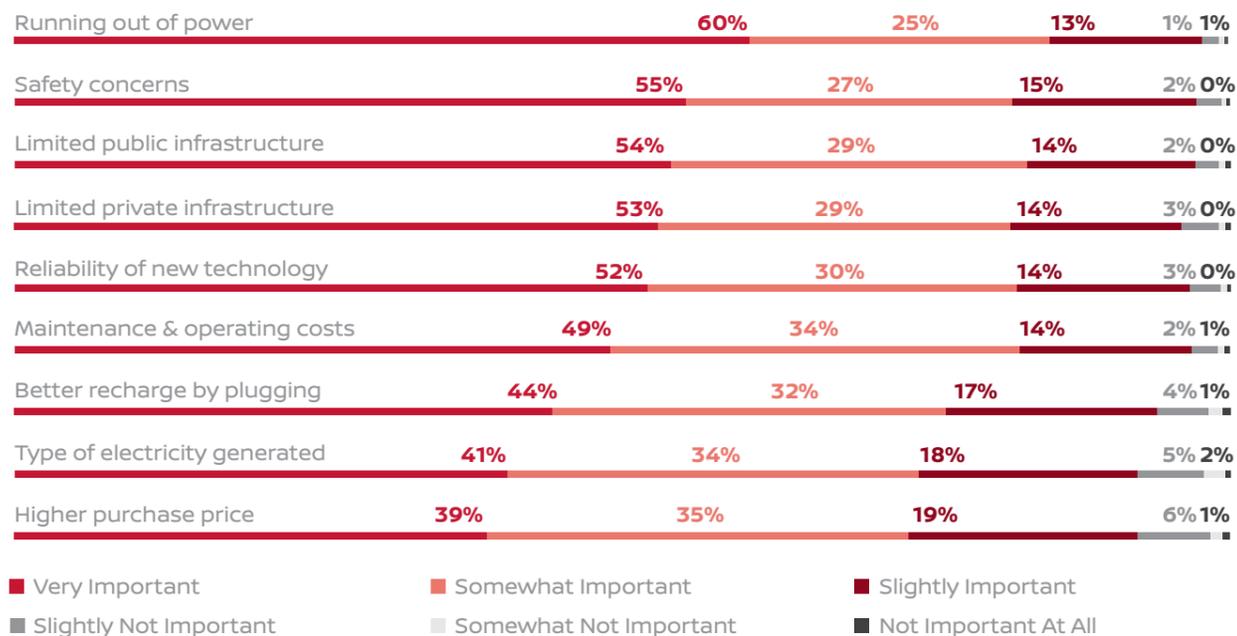
This concern for the environment was found to be more important to customers in the Philippines, Vietnam, and Indonesia. Adoption of any alternate fuel, EVs, or hydrogen is essential, but requires a mind-shift at all levels.

The national mindset needs to change to recognize the perils of conventional fuels and chart out a vision for cleaner, greener energy. This also requires a change in customer habits and usage of cars.



BARRIERS TO THE ADOPTION OF ELECTRIC VEHICLES

Fig. 8: Adoption Barriers for Electric Vehicles



While there is significant demand potential for EVs, there are adoption barriers as well. Lack of requisite knowledge underlies the slow uptake of EVs in recent years. Range anxiety is the main drawback for the adoption of EVs. Customers are also unsure about the safety standards EVs adhere to.

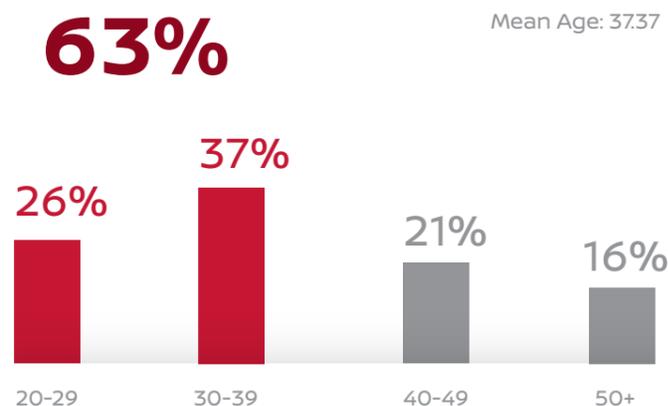
The onus is on the manufacturers to demonstrate and convince customers about the safety of their vehicles in varying weather and usage conditions. For example, since 2010 Nissan has sold more than 300,000 units of the Nissan LEAF, the world's best-selling EV,

without critical incidents with the batteries. Other adoption barriers include limited public and private infrastructure for charging and reliability of technology for EVs (Fig. 8).

PROFILING THE EV CUSTOMER

With a strong belief in EVs and their capabilities, 60% of likely intenders are relatively young, less than 40 years old (Fig. 9).

Fig. 9: Age Distribution of Likely EV Buyers



While consumer attitudes behind driving habits and what driving represents differ, they correlate with three major profile groups comprising EV intenders: (1) Environmentalists, (2) Basic Utility Drivers, and (3) Trendy Enthusiasts. The features of EVs, the value these potential buyers expect, and the prices they are willing to pay depend on their attitude toward EVs.

Nearly 34% of the EV customer base comprises environmentalists, consumers driven by strong environmental awareness. They are concerned by ongoing climate change and view EVs as the right solution to do their bit for the environment.

Approximately 27% of the intender customer base consists of basic utility drivers who are looking for an inexpensive means

of transport with the lowest running cost. For them, a vehicle is simply a means of transportation rather than a source of pleasure and the EV fits the bill in the medium to long-term.

The third and largest group consists of the trendy enthusiasts. They are interested in high-performance vehicles, representing a sense of luxury and premiumness. This group of consumers are trendy, dislike "old-fashioned" cars, and look for innovative models.

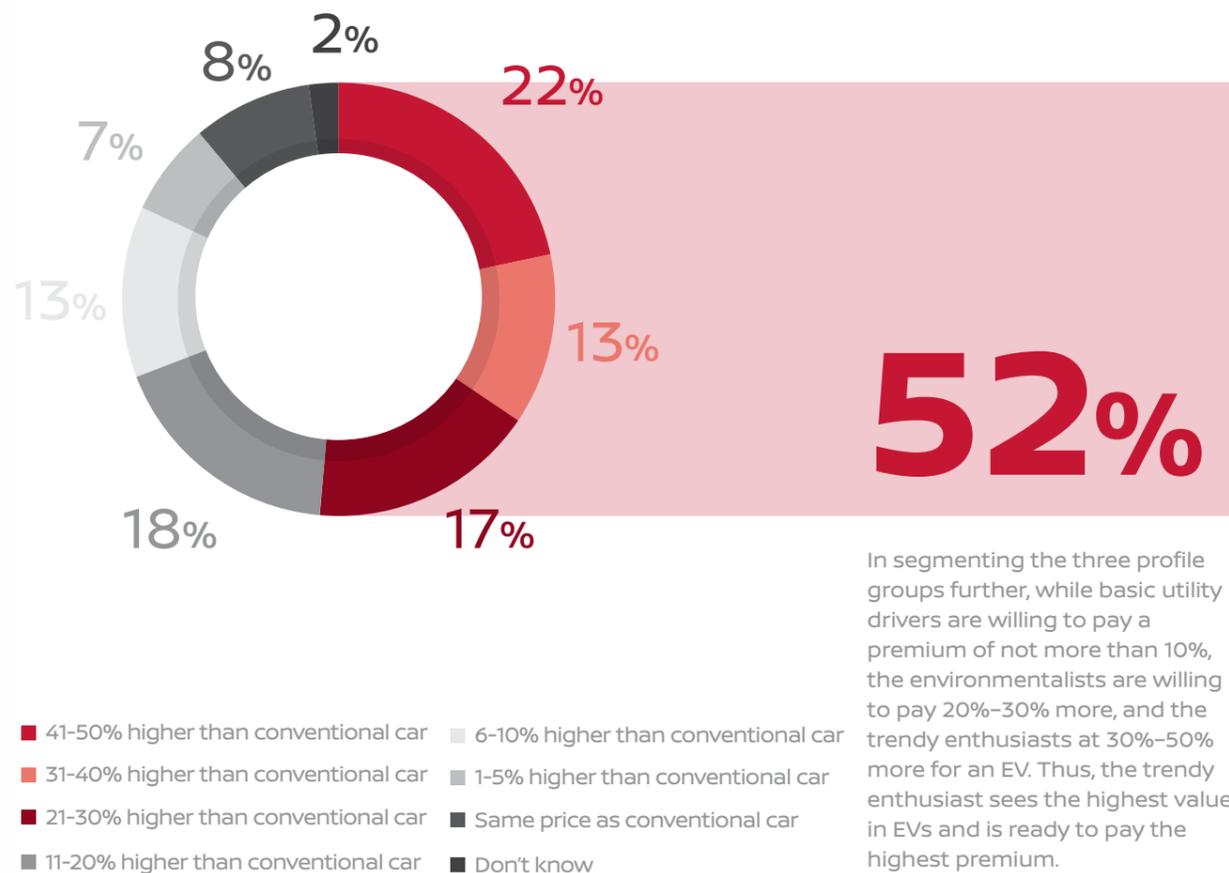
Their focus is on advanced features, user-friendly displays, and connectivity options. Considering themselves trendsetters, this group views an EV as a product, which helps project that image.

For an equivalent specification and/or similar performance, more than 50% of EV intenders are willing to pay 20%–30% more for a conventional car, while over 20% of EV intenders are ready to pay up to 50% more than a conventional car (Fig. 10).

"The trend of urbanization all throughout the region will continue driving the growth of cities. Hence, it becomes even more urgent to address this challenges through making ingenious and intelligent solutions widely available."

Yutaka Sanada
Regional Senior Vice President
Nissan Motor Asia Pacific

Fig.10: Premium for Electric Vehicles, by % of Intenders



In segmenting the three profile groups further, while basic utility drivers are willing to pay a premium of not more than 10%, the environmentalists are willing to pay 20%–30% more, and the trendy enthusiasts at 30%–50% more for an EV. Thus, the trendy enthusiast sees the highest value in EVs and is ready to pay the highest premium.

THE FINAL WORD

South East Asia is in the midst of exciting times. The future of mobility in the region is electric and greener. However, leapfrogging in EV requires strong collaboration between public and private parties, and devising a long-term approach tailored to address each market's unique situation.

Through steady penetration of EVs, the automotive industry is undergoing a virtual transformation of sorts. Nissan is at the forefront of making this transformation happen through the Nissan Intelligent Mobility portfolio. It is a vision to deliver more electrification, more connectivity, and ultimately more autonomy, to move people to a better world.

A1: List of Acronyms

AEC	ASEAN Economic Community
ASEAN	Association of South East Asian Nations
BEV	Battery Electric Vehicle
CNG	Compressed Natural Gas
EV	Electric Vehicle
GDP	Gross Domestic Product
PHEV	Plug-in Hybrid Vehicle
USD	US Dollar

A2: List of Charts

Fig.1	Technology Association with
Fig. 2	Association of EVs with BEVs by Country
Fig. 3	Intention to buy EV as Next
Fig. 4	Motivating Factors for EV
Fig. 5	Motivating Factors for EV Purchase, by
Fig. 6	Incentives Influencing Switch from Conventional Cars to Electric Vehicles
Fig. 7	Impact of Fuel Source on Electric Vehicle Purchase
Fig. 8	Adoption Barriers for Electric Vehicles
Fig. 9	Age Distribution of likely EV
Fig. 10	Premium for Electric

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