# Malaysia Automotive Industry: Moving Toward Energy Efficient Vehicle Era

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## Abstract

Throughout the globe, humankind is facing several environmental problems such as climate change, resources depletion loss of biodiversity and much more. Transportation has become one of the important human essentials and among the major contributors to the overall environment degradation. To overcome these issues, both international and interdisciplinary measures needs to be implemented. Beginning 2014, national car producers have launched the Energy Efficient Vehicle (EEV) in an effort to react on both the declining environmental and fluctuating economical scenarios. Thus, this paper provides insights and reviews on the automotive market for ASEAN and Malaysia today. There is an increasing awareness by car producers and governments on the impacts of EEV; hence, actions have been make to promote Malaysia to become ASEAN regional EEV hub.

Keywords: Green Marketing, Malaysia Automotive Industry, Energy Efficient Vehicle

## 1. Overview of Automotive Industry

In 2015, the total vehicle produced globally was 90 million units, while the total sales of vehicle globally amounted to 89.6 million units. China, United States of America and Japan were the top three countries with the most number of vehicle produced and sold. Malaysia ranked 24th for vehicle produced and 26th for vehicle sold.

Table 1: Overview of ASEAN Automotive Industry for 2014 (des Constructeurs d'Automobiles, 2016)

| | Population (Million) | GDP per capita (US $) | Vehicle Production | Vehicle Sales | Product Champion |
|---|---|---|---|---|---|
| Southeast Asian | 619 | 3,695 | 3.88 M | 3.14 M | - |
| Cambodia | 15 | 1,085 | - | 4,100 | Motorcycle |
| Indonesia | 225 | 3,513 | 1.3 M | 1.21 M | SUV, MPV, Big Truck |
| Laos | 7 | 1,666 | - | 14,700 | Motorcycle |
| Malaysia | 30 | 10,934 | 600,000 | 679,000 | Passenger Car |
| Myanmar | 53 | 1,480 | 4,325 | 1,800 | Motorcycle |
| Philippines | 99 | 2,855 | 60,000 | 230,000 | - |
| Thailand | 68 | 6,022 | 1.8 M | 880,000 | 1 ton Pick Up |
| Vietnam | 92 | 2,007 | 40,000 | 130,000 | Motorcycle |

- Singapore and Brunei were not included in the study
- Vehicle sales and vehicle production refer to total passenger and commercial vehicles

Throughout Association of South East Asian Nations (ASEAN) region, 3.14 million units of the total

number of vehicle sold for the year 2014 and 3.88 million units of total production capacity as shown in Table 1. This automotive industry in this region been dominated by Indonesia with 1.21 million units where it is the highest vehicle produced. While the main player of this industry is Japanese automotive company with average 80 percent of the supply chain (des Constructeurs d'Automobiles, 2016).

Malaysia is a member of ASEAN, where regional trading block with combined annual vehicle sales of 670 000 units in 2014 was the highest Gross Domestic Product per Capita for ASEAN. The product champion for Malaysia market is passenger car, which is one of main contributor for GHG emission Malaysia is a developing and middle-income country with 3.3 billion populations. Since 1970s, Malaysia has transformed to an emerging multi-sector economy from a producer of raw material's economy. This had led to establishment of Perusahaan Otomobil Nasional Berhad, PROTON as the first automotive manufacturer in Malaysia and first national car, Proton Saga was born in 1985. In 1993, Perusahaan Otomobil Kedua Berhad (PERODUA), Malaysia's second automotive manufacturer was born which had launched second national car, Perodua Kancil where it was launched commercially in 1994.

Table 2: Top Ten of Passenger Cars and Commercial Vehicle's Sales in Malaysia for 2016 (Mohamed, 2015, Malaysia Automotive Association, 2014)

| Ranking | Brand | 2016 Annual Sales (Unit) | Market share (percent) |
|---|---|---|---|
| 1 | Perodua | 207,110 | 35.7 |
| 2 | Honda | 91,830 | 15.8 |
| 3 | Proton | 72,290 | 12.5 |
| 4 | Toyota | 63,757 | 11 |
| 5 | Nissan | 40,706 | 7 |
| 6 | Isuzu | 12,818 | 2.2 |
| 7 | Mazda | 12,493 | 2.2 |
| 8 | Mercedes-Benz | 11,798 | 2.0 |
| 9 | Mitsubishi | 9,395 | 1.6 |
| 10 | BMW | 9,000 | 1.6 |
| Total Vehicles Sales in 2016 | | | 580,124 |

Table 2 shown that Proton and Perodua only accounted 48.36 percent of the vehicle sold and the remaining 51.64 percent were contributed by 54 other automotive manufacturers in 2016. Despite influence of international brands, the national brands still maintain as the first and second place in the market. However, these market is dominated by 51.64 percent by the foreign manufacturer .Honda top the list with 13.84 percent of sales followed by Toyota and Nissan with 13.14 percent and 7.11 percent of sales respectively as show in Table 1.2 (Malaysia Automotive Association, 2014).
From the statement above, it can be concluded that automotive industry is blooming domestically and globally. ASEAN, which has a population of over 600 million, mostly concentrated in dense urban centres, had become one of the factors for growth in automotive industry (Chua and Oh, 2011). This number will continue to grow at the rate of 0.85 percent per annum (Ong et al., 2011). One of essential need of human being is transportation from one point to another. Unfortunately, transportation has accounted for between 20 percent and 25 percent of worldwide energy consumption and carbon emissions.

## 2. Automotive Industry's Effect Toward Environment

While automotive industry continues to blossom, and grow from year to year, there was a sequence of environmental effect from this industry. Transportation had contributed around 14 percent to greenhouse gas emission that cause global warming. This situation has worsen when world's carbon dioxide emissions from the fuel consumption had shown increasing pattern from 2009 to 2013 (Stocker et al., 2013) as shown in Figure 1 below:

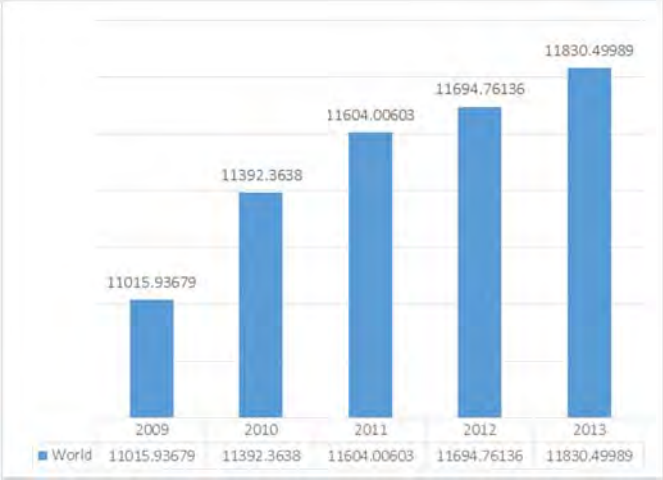


Figure 1: World's Carbon Dioxide Emissions from the Consumption of Petroleum (Million Metric Tons) (Stocker et al., 2013).

The transportation sector is the one of the biggest contributors for the global greenhouse gases (GHG) emission. The conventional motor vehicle operates through internal combustion engine(ICE) from fossil fuels which are gasoline or diesel (Tie and Tan, 2013). This sector stands contribute approximately 27 percent for global total energy consumption which is second highest consumption of energy and 33.7 percent GHG emission, highest emission compare to another sector in 2012.

Figure 2 below shows percentage of transportation emission over year for the year end 2006. The highest emission was from light duty vehicle and passenger car that contribute 65 percent and 45 percent of transportation's emission respectively. The Emission from transportation sector should be highlighted and deserved serious attention. Mahlia et al. (2012), Shafie et al. (2011) believe transportation as the major sources of atmospheric pollutions, one of largest cause of environmental degradation and human-related problems such as climate change, increase in sea water level, noise and air pollution.

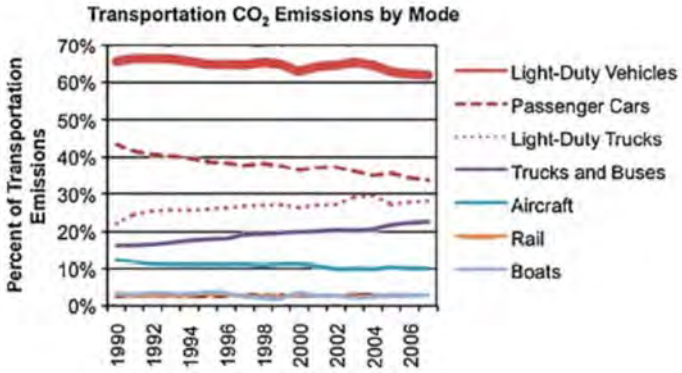

Figure 2: Historical $CO_2$ emissions from the transportation sector (United States Environmental Protection Agency, 2016)

Besides that, at high combustion temperatures, atmospheric nitrogen ($N_2$) is oxidized to nitric oxide ($NO_x$) and small quantities of nitrogen dioxide ($NO_2$), in addition to smaller quantities of nitrogen-containing impurities in the fuel. This had harm human as fuel combustion are highly associated with diseases pharyngitis, bronchitis, tonsillitis, colds and sore throat. Other than that, motorized vehicle also emitted few harmful ultra-airborne particles such as black carbon soot that range from 0.04 to 0.06 *u*m. This small particle can penetrate and harm human's lung. Researchers had shown even (< 0.1*u*m) of airborne can affect human's health . (Mahlia et al., 2012).

Within the past decade, inclining rate of world population had led to the increasing need and demand for transportation (Mahlia et al., 2010, Mahlia et al., 2012). Malaysia as emerging economy market is not exempted from rapid environmental decline caused by rapid growth in motor vehicle usage that correlate with increasing income per capita It been forecasted that it will continue to grow in the future with the rates of 9 percent or more. Apparently, this scenario will also increase rate of growth in the demand for petroleum. Unfortunately, Malaysia's economic growth has merely increase compare to growth for petroleum demand. This present opportunity for Malaysia to promote and introduce EEV as a solution to reduce dependency on petroleum. The automotive industry is highly competitive and price sensitive market that significantly influences the economic, environmental and human health (Department of Statistic Malaysia, 2016a, Malaysia Automotive Association, 2017, Malaysia Automotive Association, 2014, Department of Statistic Malaysia, 2016b).

## 3. Environmental Initiatives by Automotive Industry

The increasing usage of petroleum and shortage of resources has leading concern of car manufacturer to create innovative solutions toward better environment by minimising petroleum usage and carbon dioxide emission. Energy Efficient Vehicle has been a great and most innovative improvement in automotive industry. EEV includes fuel-efficient internal combustion engine (ICE) vehicles, hybrid, electric vehicles (EV) and alternative fuelled vehicles such as Compressed Natural Gas (CNG), Liquefied Petroleum Gas (LPG), Biodiesel, Ethanol, Hydrogen and Fuel Cell (Malaysia Automotive Association, 2014).

However, adopting EEV will depend heavily on the way customer perceived them. Consumers have tended to be sceptical when they are to expose the new technologies like EEV. Plus, this technology also seen novel as the mass-markets consumers have little exposure (Schuitema et al., 2013). Based on environmental issue mentioned before, EEV has been perceived as premium and luxury buying (Mohd Suki, 2015, Suki, 2013, Ramayah et al., 2010, Yusof et al., 2012).

Currently, approximately 20.2 million vehicles in this country. Malaysia has become one of highest vehicle users in Asia region which contributed to higher dependency toward fossil fuel within short period. 89 percent of motor vehicles fuelled by petroleum and 11 percent of motor vehicles fuelled by diesel. Malaysia was declared as having one of the highest carbon emissions per capita in the world at 12.3 tons per capita compared to world average of 7.9 tons per capita in 2011 (Malaysia Energy Commission, 2015)

## 4. Environmental Initiatives by Government

There is an growing demand for green products in Malaysia (Ramayah et al., 2010).However, there is a low-level of actual purchase behaviour in Malaysia. Although EEV such as hybrid car sales increased year by year, hybrid car only took up three percent (from 2008, approximately fifty thousand units sold)

of market share in the automotive industry. While others ASEAN partner such as Thailand, the ASEAN automotive market leader, 37,530 units of hybrid car registered. However, Malaysia only sold 18,967 units hybrid car in 2013 (Malaysia Automotive Association, 2014, Mohamed, 2015). On the other hands, in contrast to the western countries, especially in the US market, hybrid car was available for more than 15 years, in 2004; the hybrid car sales was at 88,000 units. For the year 2013, 36,155 units of hybrid car sold in the US (des Constructeurs d'Automobiles, 2016).

Malaysia Automotive Association (2017) projected approximately 6 million units will be sold in ASEAN in 2020. Hence, Malaysia must begin to introduce to attract potential initiatives to meet catalyst local automotive industry by introducing few initiatives. One of the initiative is promoting and cultivating Malaysia as the regional hub for Energy Efficient Vehicles (EEV) through strategic investments and adaptation of high technology for domestic market and to penetrate regional and global markets by 2020.

Malaysia aims to simultaneously promote investments in green automotive technologies and continuously develop local automotive industry toward futuristic technology such as lower fuel consumption and lower carbon emission. The automotive industry is moving towards bring down the environmental degradation from energy consumption and moderating the effects of global warming. Therefore, few policies to encourage EEV movement in the industry had been launched. One of the policies is motor vehicle energy labelling standard in Malaysia.

Besides that, international technical benchmarking for EEV had been develop and regulated over the year based on few developed countries (i.e Europe, United States of America, China, Japan, South Korea, Thailand and Taiwan. By establishing this benchmarking, Malaysia can ensure continuous investment for developing new technology in the local market. The employment of EEV in local market is based on fuel consumption specification according to the segment and kerb weight (Malaysia Automotive Association, 2014).

## 5. Conclusion

Despites the blooming rate of environmental degradation, automakers have started to take action in reducing carbon emission that is highly related to this industry. New Many innovations in EEV may change the future of this industry. However, current study by Majláth (2016), Budinsky and Bryant (2013) has showed that some automakers are taking advantage of this issue as an opportunity to mislead their consumers in purchasing green vehicles with unclear and unverified ecological status. Ministry of International Trade and Industry had launched NAP 2014 as a guidance in identifying any EEV as an authentic green vehicle. NAP 2014 is designed based on the international benchmark. Based on the current market trend, Malaysian consumers had started to adopt the idea of EEV. In 2016, the newly launched Perodua Bezza had been declared as the first bestselling model in the A segment since its launch in July 2016 (Lye, 2017)

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