

End-of-Life Vehicles (ELVs) in Malaysia: Time for Action to Guarantee Vehicle Safety

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It is envisaged that by the end of 2020, the number of passenger cars ever registered will reach 9.97 million with further projection to 12.64 million by 2040. While most new cars sold in Malaysia have reached ASEAN NCAP's 4- or 5-star rating by improving their safety standards, we can still see aged cars on the road. If the ELV policy were to be enacted in Malaysia, not only the country's economy will flourish but also ASEAN NCAP's endeavours would surely be more fruitful. Nonetheless, the question remains; will there be any policies or regulations regarding old cars in Malaysia such as those implemented in developed countries? In the end, the public must be convinced that an old car with inferior safety features on the road can ultimately lead to a tragedy and should fundamentally outweigh the economic implications to the consumers.

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Keywords: End-of-life vehicle (ELV), vehicle safety, ASEAN NCAP, road safety

Article History:

Received
9 Apr 2020

Received in revised form
15 Jul 2020

Accepted
17 Jul 2020

Available online
1 Sep 2020

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Journal homepage: www.jsaem.saemalaysia.org.my

While most new cars sold in Southeast Asia have improved in vehicle safety standards and reached 4- or 5-Star rating by the New Car Assessment Program for Southeast Asian Countries (ASEAN NCAP), we can still see old vehicle models such as the Toyota Corolla E70, Nissan Sunny or Mazda 323 on Malaysian roads. In addition, we also find national car models (such as the Proton Saga, Wira, Iswara and even the Perodua Kancil – just to name a few) are still popular and being driven across the country. The abovementioned models fall into the category of passenger vehicles that have been around for more than 15 years. With proper maintenance, their owners claim that these vehicles can still be depended on for short distance travel.

However, findings from a recent study performed by a group of researchers from the Malaysian Institute of Road Safety Research (MIROS) revealed that the majority of respondents (79.8 percent) believed the age limit for a car should be between 5 to 10 years (Jawi et al., 2017). Further, a total of 268 respondents (55.4 percent) also agreed with the suggestion to introduce the end-of-life vehicle (ELV) policy with the inclusion of guideline on age limit for passenger vehicles.

Such a policy was debuted in Europe in the 1960s (Saman and Blount, 2006). In 1997, the European Commission announced the end-of-life vehicles directive as a mean to resolve issues involving automotive products (European Commission, 2000). Prior to its implementation, motor vehicles that reach the end of their life span have produced between 8 and 9 million tonnes of waste in the European Union. Meanwhile, Harraz and Galal (2011) stated that the ELV Recycling Law was passed in Japan in 2005 to deal with an estimated figure of 5 million ELVs produced each year. Similarly, according to the authors, Korea approved the Act for Resource Recycling of Electrical and Electronic Equipment and Vehicles on 2nd of April 2007. On the other hand, the end-of-life vehicles regulation is yet to be introduced in Malaysia (Mamat et al., 2014).

Based on the figures obtained from the Malaysia Automotive Association (MAA), the number of cars in Malaysia rose dramatically between 1983 and 2005. In 1983, when the country first embarked on its national car project, only 108,314 passenger cars were sold in Malaysia. By 2005, the total industry volume (TIV) had surged to 552,316; with about 90 percent of the market being dominated by passenger vehicles (Afiq Aziz, 2019a). Meanwhile, Azmi et al. (2013) posited that the total number of vehicles (including motorcycles, cars, buses, and goods vehicles) in Malaysia had reached a cumulative figure of over 20 million by the end of 2010.

In 2006, the Malaysian government launched the National Automotive Policy (NAP) that was later revised in 2009, 2014 and 2020 (Jawi et al., 2012; MITI, 2014; MITI, 2020). The policy focuses on the wellbeing of the automotive sector in the country. However, despite the impressive sales of new cars, aged cars that are less environmentally friendly and have inferior

safety features can still be spotted on the road. It is this factor that supports the motion for Malaysia to establish an end-of-life vehicle policy.

ELV Policy in Malaysia

By implementing an ELV regulation, people will no doubt be driving well-maintained and safer cars, therefore reducing atmospheric pollution as well as the risk of motor vehicle crashes. However, in Malaysia, the proposal for the introduction of ELV policy has often been a hotly debated topic (Eugene Mahalingam, 2017; Gerard Lye, 2018). For instance, many objections were expressed when MIROS highlighted the potential roadworthiness issues on passenger vehicles aged over 12 years (Murali, 2013; Ahmad Suhael Adnan, 2017).

To date, nearly 9.7 million saloon and non-saloon vehicles have been registered in the country. According to the latest statistics, more than four million of these vehicles are over 10 years (Jonathan Lee, 2017). It is envisaged that by the end of 2020, the number of passenger cars in Malaysia will reach 9.97 million while the number is projected to rise to 12.64 million by 2040. At the same time, Azmi and Tokai (2017) expect the number of ELVs to also climb significantly.

As a car-producing country, the Malaysian government has yet to announce any directives or legislations that is related to ELVs (Amelia et al., 2009; Jawi et al., 2017; Tarrence Tan, 2019). In fact, an ELV regulation was absent from the NAP launched in 2006 by the Ministry of International Trade and Industry (MITI) Malaysia (Jawi et al., 2012). This could also be seen as a sign that there was no demand from industry players for an ELV policy to be introduced although the TIV in the ten-year span between 2000 and 2010 had reached more than half a million vehicles.

By 2009, calls for the introduction of ELV policy started to gain traction. MITI was said to consider the gradual inclusion of the vehicle end-of-life regulation even though it was not contained in the original NAP. Among other things, the regulation would mandate an annual inspection of all vehicles over 15 years for road tax renewal purposes. However, due to protests from the general public, such proposal was later abandoned (Jawi et al., 2017). Yet, despite the decision to shelve the idea, an ELV policy was still being formulated by the Ministry of Transport (MOT) Malaysia.

In the revised version of the NAP in 2014, although there was no direct mention of the end-of life vehicle policy, the term Voluntary Vehicle Inspection (VVI) was instead inserted (Solah et al., 2017). This was seen as a softer move where the word “mandatory” was replaced with “voluntary”. Such a decision was also in line with Malaysia’s ambition to reduce 40 percent carbon intensity by 2020 under the Safety, Security and Environment thrust aimed at reducing vehicular carbon emissions, while simultaneously promoting vehicle fuel efficiency, protecting the environment and conserving natural resources (KETSA, 2017).

NAP 2014 also emphasized the roadworthiness of a vehicle for it to be safely driven. Further, NAP 2014 presented the Malaysia Automotive Remanufacturing Roadmap and Authorize Treatment Facilities Roadmap as part of its ELV future planning. In short, although the NAP 2014 did not explicitly present any ELV directive, the VVI introduced in the country’s automotive policy should serve as the starting point for driving an ELV initiative in the future.

Malaysia's Scrap Initiative Scheme

Compared to other countries, Malaysia registers a very low vehicle scrap rate and relatively high average age of vehicles (MITI, 2009). In an effort to encourage more car owners to exchange their old cars with more environment friendly and safe new cars, the Malaysian government had allocated nearly MYR 29 billion to implement a scrap initiative scheme (Mamat et al., 2016). The scheme, launched in 2009, allowed for car owners to claim cash vouchers when they trade their aged cars with new ones. However, the scheme was limited to the purchase of models from national car makers Proton and Perodua. For example, Proton Holdings Bhd. – through its “Proton Xchange” program – offered a cash rebate of MYR 5,000 for cars aged more than 10 years in exchange for a new Proton Saga or Proton Persona. Despite the favourable response from buyers, the scheme was halted (Afiq Aziz, 2019b). Once again, the desire for certain parties to see the introduction of an ELV initiative had to be put on hold.

Later, in August 2018, The Edge Markets cited the then Transport Minister, Mr. Loke Siew Fook, on the government's plan to relaunch its “cash-for-clunkers” program, which was another cash rebate system to reduce the number of old cars on the road. However, the Transport Minister emphasized that various issues would have to be deliberated before rolling out the program as it “could bring about many implications” (Sulhi Azman, 2018). Afterwards, the Deputy Minister of International Trade and Industry was quoted as saying that the government would instead ensure the roadworthiness of old vehicles so that they could be safely driven and would not pose any harm to other road users (NST, 2019).

Aside from the cash-for-clunkers program, the 4R2S project was also introduced in 2016 under the NAP 2014. The project represented the effort to “Reuse, Recycle, Remanufacture, & Repair Service and Spare Parts” and was successful in attracting the participation of 34 companies that attended the 4R2S training and were eligible for the Authorized Treatment Facilities (ATF) certificate (Yusop et al., 2012). The main objective of the project was to guide the automotive industry players toward achieving optimum standard for product and process quality, business sustainment, environment safeguarding as well as consumer safety and protection.

National Automotive Policy (NAP) 2020

According to Karagoz et al. (2020), the management of ELVs is highly dependent on a country's legislation and policy as embodied in the directive by the European Commission, the law on recycling of ELV in Japan, and the technical policy for the recovery and utilization of automobile products in China. Moreover, the ELV management shall incorporate the whole ecosystem, from the vehicle owners to the relevant centres and facilities for dismantling, recycling, remanufacturing, etc.

In February 2020, Malaysia unveiled its National Automotive Policy 2020 (NAP 2020) that is aimed at further developing the country towards becoming a regional leader in automotive manufacturing, engineering and technology (Anthony Lim, 2020). In summary, NAP 2020 comprises three directional thrusts and three strategies as well as seven roadmaps/blueprints, which will be implemented until 2030. The seven roadmaps in NAP 2020 comprise:

1. National Roadmap for Automotive & Mobility Value Chain (NRAMVC)
2. National Roadmap for Automotive & Mobility Technology (NRAMT)
3. National Roadmap for Automotive & Mobility Talent (NRAMTa)
4. National Roadmap for Automotive Aftermarket (NRAA)
5. National Blueprint for Automotive Mobility as a Service (NBAMaaS)
6. National Blueprint for Automotive Robotics (NBAR)
7. National Blueprint for Automotive Internet of Things (NBAIoT)

Although a specific directive on ELV has again been left out of the latest NAP, the inclusion of the National Roadmap for Automotive Aftermarket (NRAA) may provide a glimmer of hope. In essence, the NRAA outlines the detailed features of improvements in remanufacturing, standards and best practices that can be used by local automotive stakeholders to turn Malaysia into a hub for automotive remanufacturing in the Southeast Asia region. In addition, the roadmap provides detailed guidelines for optimizing the quality of recycled or reused components by emphasizing the functionality of digital technologies including Big Data Analytics (MITI, 2020).

Again, Malaysia seems to have set the criteria that can place the country on par with other developed nations through its newly unveiled NAP 2020. But the question remains, will there be policies or regulations regarding ELVs such as those implemented in developed countries come 2030? It is without doubt that any decisions by the government to introduce ELV-related policies require in-depth research, which bring us to the next question. How does Malaysia fare in comparison to other countries in terms of research on ELV management or strategies?

ELV Research in Malaysia

Comprehensive background search on ELV research in Malaysia discovers very few studies focussed on the management or strategies of implementing ELV policy. The research pertaining to end-of-life vehicles in the country dates back to the mid-2000s. The approach, however, was more inclined towards the automotive industry in general. In 2009, research on ELV management in Malaysia began to gain more attention. Most likely, this was due to the proposal to introduce a mandatory law regarding the annual inspection of all vehicles over 15 years as described earlier.

Saman and Blount (2006), for example, discussed the effects of the ELV Directive enacted by the European Commission. Their study focussed on the impact on the environment and product design practices. The researchers suggested several elements of vehicle design process, including design consideration, material used, economic aspects and directive requirements. On the other hand, Afrinaldi et al. (2008) reviewed the disassemblability assessment method for automotive components before concluding that recycling and assembly aspects should be considered at the vehicle design stage. Also, Saman and Blount (2006) proposed the use of a tool to derive the end-of-life value, that included two methods namely recycling function deployment and value analysis. In the meantime, Amelia et al. (2009) used an interview approach in their study to collect data from three automobile makers as well as automotive components manufacturers before suggesting several strategies that were needed to implement the reuse of automotive components that comprised formulating guidelines for ELV directive, implementing design for reuse and improving the reusability; aside from the economic advantages of the whole exercise.

Research on the reuse of automotive components in Malaysia also saw studies conducted by Go et al. (2010) on optimization of disassembly sequence while Eltayeb and Zailani (2009) adopted a survey questionnaire method to determine the effects of green supply chain initiatives implemented by manufacturing companies in Malaysia on their performance outcomes. Meanwhile, Zakuan et al. (2012) employed Confirmatory Factor Analysis (CFA) to conduct research on green design concept. The researchers proved that the success factor of green design implementation for the automotive industry in Malaysia depended on the selection of material, manufacturing practices, component design, legislation and International Organization for Standardization (ISO) compliance.

On the other hand, MIROS researchers revisited the automotive ecosystem in Malaysia before proposing a certain conceptual model (Jawi et al., 2012). They emphasized the importance of a proper ELV framework in the implementation of the NAP. Hamzah et al. (2012) looked at the existing automotive industry framework while suggesting a reverse supply chain framework covering four segments, namely pre-manufacturing, manufacturing, use and post-use. In the meantime, the ELV management frameworks implemented in Japan, Canada, Taiwan and Korea became the focal point of a study conducted by Azmi et al. (2013). Using Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis of the frameworks in these countries, the researchers identified several important factors that could be adopted by the Malaysian automotive industry.

Later, Wahab and Fadzil (2014) used a survey questionnaire method to obtain information from the general public in Shah Alam, which is a motor city in Malaysia. The researchers found that the level of knowledge and awareness of ELV recycling among the respondents was low. Several measures were therefore identified to raise knowledge and awareness of the issue, including the introduction of ELV directive by the Malaysian government, establishment of collection centres, and provision of ELV recycling incentives.

Recently, Yusop et al. (2016) conducted a study on remanufacturing implementation in the automotive industry in Malaysia. The researchers distributed a set of questionnaires to collect data from three key industry players (including government related agencies, automobile manufacturers and enforcement agencies). They found that the understanding of product design was still at a low level. Therefore, recyclability and disassemblability were proposed during the research design process, in addition to the emphasis on ELV processing strategies and green concepts in the automotive industry. Aside from that, the researchers also emphasized the automotive supply chain as well as the development of the ELV recycling framework (Sorge, 1994; Yusop et al., 2016).

The trends of the studies described above are not statistically analysed and are introduced as stand-alone research irrespective of the impacts of one research to another. Nevertheless, a major part of these studies on ELV is the term “remanufacturing” that requires a proper green framework for concept cars. In other words, the desired ELV concept has to start from the very beginning, i.e., from design. Among the important form design concepts include Design for Recycling (DfR), Design for Disassembly (DfD) and Design for Remanufacturing (DfReman) (Yusop et al., 2012).

Evidently, these are the methods used in the ELV recovery strategy. Due to the lack of a clear policy regarding ELVs in Malaysia, manufacturers are given the freedom to employ their own methods (which may or may not be practised). Hence, the remanufacturing process as part of ELV recovery practice in Malaysia may not be immediately put into place. In view

of this situation, any proposal shall instead provide an alternative way to initiate a regulation or policy related to ELVs, as opposed to considering practices that have been successfully implemented in other countries. In other words, an ELV regulation in Malaysia can be proposed using its own distinctive mould.

ASEAN NCAP's Role in Malaysia's Automotive Ecosystem

Since its establishment in late 2011, ASEAN NCAP has been mandated to elevate the safety levels of new passenger cars in the Southeast Asia region. The program's assessment is done in compliance with the United Nations (UN) regulations for crashworthiness tests (Regulations No. 94 & 95 – frontal offset and lateral tests; UN R94 and UN R95). The ASEAN NCAP frontal crash test is carried out using two dummies (Hybrid III 50th percentile – male) placed in the driver and front passenger seats, and two child dummies (P3 and P1.5) strapped to the Child Restraint System (CRS) in a test car moving at a speed of 64 km/h before hitting a crushable aluminium barrier and coming to a halt (ASEAN NCAP, 2018).

Ultimately, the purpose of the crash tests is to provide consumers in the ASEAN region with information pertaining to a new car safety rating in a systematic manner and acknowledge efforts of manufacturers in producing safer cars beyond the current legislation, including Malaysia's Vehicle Type Approval (VTA) (Jawi et al., 2013; Wahab et al., 2017). To date, ASEAN NCAP has tested almost 90 percent – while releasing over 100 ratings – of new passenger cars sold in Southeast Asia from various car makers comprising Proton, Perodua, Toyota, BMW, Honda, Renault, Chevrolet and so on (Abu Kassim et al., 2017; Abu Kassim et al., 2019a). Due to ASEAN NCAP's series of crash tests, the safety aspects of passenger vehicles have clearly witnessed tremendous improvements as opposed to 15 or 20 years ago.

ASEAN NCAP's efforts to improve car safety in the Southeast Asian region are however faced with challenges as there are still many old cars that do not meet the required standards in the ASEAN automotive ecosystem, including in Malaysia (Abu Kassim et al., 2017). Obviously, these old cars have not been fitted with safety features such as the Electronic Stability Control (ESC), Blind Spot Technology (BST), advanced rear-view mirror or Seatbelt Reminder (SBR) (Md Isa et al., 2015; Abu Kassim et al., 2019b). According to the statistics on Paultan.org (Jonathan Lee, 2017), there were 9.7 million saloon and non-saloon vehicles registered in Malaysia as of December 2017. Of these, 2.7 million (27.8 percent) were vehicles aged less than five years. Saloon and non-saloon vehicles aged 6 to 10 years totalled 2.9 million (29.9 percent), while vehicles aged 11 to 20 years totalled 4 million (41.2 percent). The detailed distribution is shown in Table 1.

If ELV policies or regulations were to be enacted in Malaysia, ASEAN NCAP's endeavours would surely be more fruitful as there would be fewer unsafe cars plying the road. However, the initial steps to introduce such policies in the country have never been easy, where public acceptance and social awareness are two important matters to consider for effective ELV policy implementation. Moreover, economic implications to the consumers may further withhold the realisation of ELV implementation in Malaysia.

Table 1: Number of active vehicles by type and age until Dec. 2017 (Jonathan Lee, 2017)

Types of Vehicle	Age				
	<5	6 - 10	11 - 15	16 - 20	Total
Motorcycle	3,120,661	2,646,794	2,087,475	1,184,928	9,039,858
Saloon vehicle	2,619,383	2,119,488	1,886,848	1,412,249	8,037,968
Non-saloon vehicle	119,037	788,631	532,221	262,061	1,701,950
Bus	7,120	7,066	7,232	3,600	25,018
Taxi / rental car	16,622	20,127	17,660	6,772	61,181
Self-drive rental car	27,124	1,173	301	133	28,731
Goods vehicle	235,494	200,553	165,869	95,451	697,367
Others	111,041	101,628	68,598	43,580	324,847
TOTAL	6,256,482	5,885,460	4,766,204	3,008,774	19,916,920

Conclusion

In summary, various works conducted in the area of end-of-life vehicles are often aimed on automotive waste management. However, there is also a need to look at the issue of end-of-life vehicles from a car safety standpoint. In fact, when looked at in depth, the first type of vehicles to be targeted by an end-of-life regulation should rightly be the passenger vehicles. Thus, the ELV initiative must be started with a push towards improving the safety of passenger cars on Malaysian roads.

The safety of passenger vehicles in Malaysia has had a long history. The decision of the Malaysian government in ratifying the UN R94 and R95 should be seen as the right step towards increasing the country's population of passenger cars equipped with safety features that meet international standards. National car manufacturer Proton should also be commended for its continuous efforts to improve the safety of its vehicle models. For example, Proton started installing airbags on the Wira model in the mid-1990s. These airbags were imported from Sweden. Proton then produced its own design starting with the Waja in the year 2000. The model was equipped with a Supplemental Restraint System (SRS) system developed by a local talent through collaboration between Proton and Autoliv Hirotako Sdn. Bhd.

Nevertheless, because at that time there was no specific law for the installation of vehicle airbags, the volume of Proton cars with airbags was only 20 percent of the total production number. Aside from Proton, Perodua is also seen as emphasizing the safety features of its cars. Its 2007 model the Viva – released before the arrival of ASEAN NCAP – could be considered the last 'unsafe' car produced by Perodua. Since then, all Perodua products have been fitted with airbags, although there are some versions of certain models that do not come with the airbag.

For road safety researchers and crash investigators alike, the involvement of passenger vehicles with low safety standards (not equipped with airbags and so on) in a road traffic crash may increase the probability of death among car occupants. Based on this argument, the writer believes that the time has come for Malaysia to roll out a plan to rid our roads of cars that compromise on safety features, especially those that are over 15 years, to alleviate the risk of fatal road accidents. Passenger vehicles beyond 15 years must be subjected to stricter

requirements for road tax renewals, and should they fail to meet these requirements, they must not be allowed on the road.

However, various efforts must be made to gain public acceptance of the ELV policy. In the end, the people must be convinced that the measures taken to reduce the risk of road accidents and loss of life are as equally important as the economy; and that an old car with inferior safety features on our road can ultimately lead to a tragedy thus should fundamentally outweigh the economic implications to the consumers. A good compromise must be made to ensure the realisation of ELV implementation in Malaysia.

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