

## Executive Summary

It is predicted that about 2.4 million motor vehicles will be discarded in the Association of Southeast Asian Nations (ASEAN) by 2020. End-of-Life Vehicle (ELV) recycling and disposal are expected to become more serious challenges for Asian countries in the near future. As the automobile markets in Asia keep accelerating, the markets for used vehicles and recycled parts are also expected to keep expanding in Asia. Used cars and parts are very important to accelerate the motorisation in each country. However, if they are not appropriately maintained before they are sold, they may cause safety problems. In Asia, problems such as improper disposal of ELVs and environmental pollution, among others, have become obvious. Thus, the development of the vehicle recycling system, including the development of industrial infrastructure which becomes the saucer of ELVs, is becoming a pressing issue. Simultaneously, a proper and firm institutional system should be established for vehicle recycling.

The aim of this study is to identify the current status and challenges of current ELV recycling in Asian countries and to propose policy recommendations for addressing these problems. Target countries under this study include ASEAN countries such as Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Thailand, and Viet Nam, and major Asian countries such as India and Japan. The study was conducted using the following approach: literature review, interview of stakeholders, and field survey. Two working group meetings were convened to review the results of the study. Additional feedback about the status, challenges, and policy direction of ELV recycle and disposal systems were provided by the participants.

In least developed countries (LDCs) in the ASEAN such as Cambodia, Lao PDR, and Myanmar, the design for recycling (DfR) of ELV is currently premature since no automobile manufacturing DfR framework exists in these countries. In middle-income countries such as Viet Nam, Thailand, Indonesia, and Philippines, the major manufacturing companies are promoting DfR according to the global standard. However, DfR is designed mainly in the headquarters of the companies located outside these countries. In Malaysia, manufacturing companies are promoting DfR by their own capacity to achieve the requirements of the European Union (EU) ELV directive. In Japan, all manufacturing companies are promoting DfR according to their standard. Most ASEAN countries have no regulations on DfR for automobiles.

On the dismantling process, dismantlers in Cambodia, Lao PDR, and Myanmar tend to utilise used cars as second-hand cars by repairing rather than dismantling them. The very old cars that cannot be repaired are dismantled in rural areas, and steel and wires are removed from ELVs. ELVs generated in Viet Nam are dismantled by the informal sector in recycling villages, as there is no officially registered ELV dismantling facility. These dismantlers, as well as the non-ferrous metal recycling companies dismantle ELVs. In India, vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity.

Mechanical processes such as shredders are not introduced in most of the target countries such as Cambodia, Lao PDR, Viet Nam, Indonesia, Philippines, and India. Myanmar has recently introduced a shredding facility while Thailand has a local shredding company that shreds automobile scraps. In Malaysia, a steel manufacturing company introduced the shredding process.

In Cambodia, Lao PDR, Philippines, and India, little treatment is being done for hazardous materials, resulting in air, water, and soil pollution. The pollution from the dismantling process in Myanmar and Indonesia does not seem to be properly controlled due to the lack of capacity building. Most of dismantling factories in Viet Nam also do not introduce appropriate pollution control measures. In Japan, ELV dismantlers implement the pollution control measures in compliance with relevant environmental regulations. Dismantlers conduct dismantling in compliance with the recycling requirement in the ELV Recycling Act<sup>1</sup>.

Resources recovered from ELVs are recycled and utilised in various ways or exported by the target countries. Cambodia, Myanmar, and Viet Nam retrieve wire harnesses and half-cut bodies and reuse these. In Lao PDR, waste and plastics, in addition to domestic recycling, are exported to China or Viet Nam, and aluminium and copper are exported to Viet Nam. Scraps dismantled in Myanmar are utilised by domestic steel manufacturing facilities. However, there are no government-related recycling facilities for copper and aluminium recycling in Myanmar. In Viet Nam, ELV steel scraps are brought not only to the 'Craft Village'<sup>2</sup> but also to areas where relatively modern large-scale steel plants are integrated. Recycling of non-ferrous metals is carried out in 'Craft Villages' which have specific resources. In Indonesia, Malaysia, and Thailand, steel scraps are recycled in steel manufacturing companies.

During the working group meetings, various challenges in ELV recycling and disposal were presented. The challenges include illegal importation and exportation of ELVs and used cars and parts, unclear ELV generation, safety and environmental issues caused by continuous use of very old vehicles and used parts, illegal dumping of ELVs, insufficient labour safety and environmental protection measures, difficulty of introduction of advanced technologies, illegal dumping of Automobile Shredder Residues (ASRs), immature network of distribution and promotion of used parts and recycled materials, low quality of recycled resources, and many more.

Based on the result of study, the following policy recommendations were identified. Raising awareness on ELV recycling and collaboration among stakeholders such as car owners, automobile dismantlers, used cars and parts dealers, recyclers of material, waste treatment/disposal facilities, government, and local municipalities, among others, is necessary to upgrade the ELV recycling system. An appropriate data collection is fundamental for further policy development to prevent used parts from entering the market. The introduction, upgrading, and proper management of the registration system and

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<sup>1</sup> Act on Recycling of End-of-Life Vehicles, 2002.

<sup>2</sup> The area where many small recyclers recycle various scraps. Most of them are from the informal sector. A specific craft village deals with a specific resource. For example, in some craft villages, recyclers recycle only steel scraps.

deregistration system is essential and will contribute to capture the ELV flow. The government and local municipalities should strengthen the monitoring of environmental pollution from the ELV recycling process, and at the same time introduce and promote safety measures that avoid poor occupational health of workers. The capability of workers in handling the ELV recycling technologies needs to be scaled up, followed by strict control of ELV generation and its flow. The governments should introduce several policy measures such as strict implementation of car inspection schemes or introduce the maximum lifetime of old cars. Networking of used parts distribution is indispensable for promoting the utilisation of used parts and the remanufacturing of parts. Developing quality standards of used parts and remanufacturing parts as well as raising awareness of car owners are all important. Stakeholders should exert more efforts in the introduction, development, and transfer of ELV recycling technologies such as setting up of demonstration centres for dismantling facilities with appropriate environmental and occupational health measures, and the establishment of a controlled final disposal site. Stakeholders need to be responsible for advancing the ELV recycling system, while it is recommended that the government consider policy measures on the development of ELV-specific regulations or laws, the adoption of recycling technology for Automobile Shredder Residue (ASR) treatment, as well as in the promotion of the reduce, reuse, and recycle (3R) measures.