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Vehicle Recycling in the ASEAN and other Asian Countries

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List of Acronyms and Abbreivations

ADB	Asian Development Bank
AIS 129	Automotive Industry Standards 129
ASEAN	Association of Southeast Asian Nations
ASR	Automobile Shredder Residue
ATFs	Authorised treatment facilities
CFCs	Chlorofluorocarbons
DfR	Design for Recycling
DLT	Department of Land Transport
ELV	End-of-Life Vehicle
GVW	Gross vehicle weight
LKM	Road Tax
LTO	Land Transportation Office
MAARA	Malaysia Automotive Recyclers Association
MEC	Myanmar Economic Corporation
MITI	Ministry of International Trade and Industry
MOI	Ministry of Industry
MONRE	Ministry of Natural Resources and Environment
NAP	National Automotive Policy
RA	Republic Act
Rp	Indonesia rupiah

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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[1].

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 are 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[2]' 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

[1] Act on Recycling of End-of-Life Vehicles, 2002.

[2] 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.

CHAPTER 1

Background and Objective of the Study

1. Background

As Asian countries develop rapidly, a huge automobile market and society emerges in these Asian countries. In line with this expansion of automobile market and society, a huge amount of End-of-Life Vehicles (ELVs) is expected to be generated in Asia. It is predicted that about 2.4 million motor vehicles will be discarded by 2020 in the Association of Southeast Asian Nations (ASEAN), and that ELV recycling and disposal will become more serious challenges for Asian countries in the near future.

Moreover, as the automobile market in Asia keeps growing, the markets for used vehicles and recycled parts will keep expanding in Asia. Used cars and parts are very important to accelerate motorisation in each country, but if they are not appropriately maintained before they are sold in the market, they may cause safety problems. Thus, securing the minimum quality of used cars and parts are indispensable for preventing road safety. Sometimes, automobile manufacturing companies and genuine new parts manufacturing companies oppose the importation of used cars and parts because these compete with their genuine new products. The control of used cars and parts, including their importation and exportation, is also an important consideration to foster automobile industries in each country.

The legislations and institutional systems for recycling and disposal are yet to be developed in a number of ASEAN countries. The improper treatment and disposal of ELVs without appropriate equipment and facilities are causing environmental pollution and health problems for workers and residents in many countries. Thus, the development of the vehicle recycling system, including the development of industrial infrastructure and the capacity building for appropriate ELV recycling and disposal, should be urgently promoted.

2. Objectives of the Study

The objectives of this study is to understand the situation, identify the challenges, and provide recommendations relevant to used cars and parts, automobile recycling, and disposal.

Understanding the current status and challenges of current automobile recycling in Asian countries is the first step. Identifying and presenting them to the government officials and industry stakeholders of the respective countries will encourage them to develop automobile recycling systems.

Furthermore, understanding the current statuses in the respective countries will enable experts to develop recommendations on how to build suitable institutional systems that are in harmony with the industrial structures, required policy measures for capacity building, technical assistance, and knowledge sharing.

3. Approach of the Research

The research tried to collect information on and analyse the following points:

1. The current status of automobile recycling in the targeted countries:
   - *1.1 The status of trade of used cars and used parts (import and export situation) in the ASEAN region, plans and regulations relative to the import regulations and vehicle registration in the ASEAN region, and how imported used cars or cars that have figured in accidents are actually handled, among others.*
   - *1.2 The volumes, distribution, flow, model years, sale prices, processing situation and check items on trading, among others, of ELVs, recycled parts, and resources (iron, non-ferrous metals, catalysts and the like.).*
   - *1.3 The distribution volume, flow, model years, sale prices and processing method of the products that are generated during dismantling (battery, tire, and waste fluid, among others). Types of parts or components, materials that are difficult to be processed and may cause environmental pollution.*
   - *1.4 Factual survey of end-of-life two-wheeled vehicles (motorcycles).*
   - *1.5 Types of operation and number of recycling-related companies (penetration status of Japanese, European and American recycling companies) and their management situation (annual quantity of processing, technological level, number of employees, annual sales, sales portfolio and the like)*

2. The challenges in automobile recycling legislations and institutional systems in vehicle recycling systems:
   - *2.1 Challenges in vehicle recycling systems (illegal dumping, inappropriate processing of waste [pouring of waste fluid and fluorocarbon emissions to the atmosphere, and the like], capacity shortage of final disposal sites, dismantling technology, safety, efficiency, recycling rates, and the like)*
   - *2.2 Trends in automobile recycling policies and automobile recycling legislations, including road transportation regulations, waste treatment and disposal methods, among others, and their implementation, including information on institutional structures of executive agencies:*

- *Consideration of institutional systems for preventing improper processing of parts containing hazardous waste such as fluorocarbon, air-bags, and automobile shredder residues (ASRs), tires, waste fluids, and the like[1].*
- *Demarcation of roles (role, obligation, economic burden, among others) among manufacturers, importers, vehicle users, government agencies (including local governments), and other stakeholders.*
- *Target of recycling/recovery.*

In addition, related environmental regulations on landfills and incineration bans, and heavy metals use bans were surveyed.

3. The opinions and cooperation/collaboration systems of automobile recycling stakeholders (parliament, administration, industry, and citizens) in target countries.

The target countries in this study are listed in Table 1. Cambodia, Lao PDR, Myanmar, Viet Nam, Thailand, Malaysia, Indonesia and India, were analysed in detail.

[1] In Japan, fluorocarbon, airbags, and ASRs are categorised as special items whose treatment costs are covered by deposit on sales, in accordance with the Automobile Recycling Law of Japan and other related legislations. Batteries, tires, and waste fluids are also defined as special items that should be taken off before dismantling.

Table 1. Target countries

Target countries	Coverage of the research points[*2]							
	1.					2.		3.
	1.1	1.2.	1.3.	1.4.	1.5.	2.1	2.2	
Cambodia	✓[*1]	✓[*1]	✓[*1]	✓[*1]	✓[*1]	✓[*1]	✓[*1]	✓[*1]
Lao PDR	✓[*1]	✓[*1]	✓[*1]	✓[*1]	✓[*1]	✓[*1]	✓[*1]	✓[*1]
Myanmar	✓	✓	✓	✓	✓	✓	✓	✓
Viet Nam	✓	✓	✓	✓	✓	✓	✓	✓
Thailand	✓	✓	✓	✓	✓	✓	✓	✓
Malaysia	✓	✓	✓	✓	✓	✓	✓	✓
Indonesia	✓	✓	✓	✓	✓	✓	✓	✓
India	✓	✓	✓	✓	✓	✓	✓	✓
China	✓[*1]	✓[*1]						
Republic of Korea (South Korea)	✓[*1]	✓[*1]						
Taiwan	✓[*1]	✓[*1]						
Singapore	✓[*1]							
Philippines	✓[*1]							
Brunei	✓[*1]							
Mongolia	✓[*1]							
Bangladesh	✓[*1]							
Sri Lanka	✓[*1]							
Pakistan	✓[*1]							
Russia	✓[*1]							
UAE	✓[*1]							

UAE = United Arab Emirates, Lao PDR = Lao People's Democratic Republic.

[*1] Results of survey are summarised in the country report (Annex II).

[*2] Coverage of the research points indicate the points covered for the countries (e.g. 1. is '1.The current status of automobile recycling in the targeted countries').

The research conducted i) literature review, ii) interview survey, and iii) field survey in the target countries visited.

i. Literature review: Literature review, analysis of existing survey results and interviews, general overview of the countries surveyed, economic and social conditions, current status and problems related to automobile recycling, the status of the establishment of related laws and regulations, and the presence or absence of data were surveyed.

ii. Interview survey: The research team interviewed stakeholders such as experts and automobile manufacturers, recycling-related industries trading used cars and used parts, and automobile recycling companies.

iii. Field surveys: The study group conducted field surveys in Malaysia, Indonesia, Thailand, Myanmar and Viet Nam. Based on the information obtained through prior investigation in Japan, information about the following issues were collected through interviews of administrations/agencies/institutions in charge and related industries: the current state of automotive recycling such as automobile recycling-related businesses, and policies and legal systems in the target countries. The actual situation of automobile recycling, the enforcement of regulations (if there are laws), and the dissemination status of automobile recycling parts were investigated. Issues and problems in each country were also identified. The results of field surveys are provided in Annex III.

Two working group meetings were convened to review the results of the research as well as solicit feedbacks, including the current status, challenges, and policy direction of ELV systems. The first working group meeting on Asian ELV recycling was held on 2 April 2015 in Jakarta, Indonesia. During the first meeting, information on the current status of ELV recycling of member countries and the results of the preliminary survey of current status of ELV recycling in the target countries were shared. The second working group meeting on Asian ELV recycling was held on 21 August 2015 in Putrajaya, Malaysia. The second meeting provided supplementary information for discussion on ASEAN ELV recycling. The working group members discussed the challenges and expected measures, and proposed policy recommendations for ASEAN and the other Asian countries on expected measures to promote ELV recycling. Working group members shared the results of the studies and exchanged opinions about the future direction of ELV recycling systems in the Asian region. The working group members are government officials and experts with relevant knowledge on ELV in Asian countries. Representatives from relevant stakeholders such as industrial organisations also attended as observers. The reports of the first and second working group meetings are in Annex I.

CHAPTER 2

Current status of automobile recycling in the targeted countries

1. Overview of the current status of End-of-Life Vehicle recycling in the targeted member countries of the Association of Southeast Asian Nations

This chapter presents the current status of automobile recycling in Myanmar, Viet Nam, Thailand, Malaysia, Indonesia, Philippines, India, and Japan. The discussion will focus on (1) the design for recycling (DfR) and regulations; (2) end-of-life vehicle (ELV)/service of vehicle, including inspection systems relating to the state of use of old cars, disposal of ELVs, and registration and deregistration; (3) ELV dismantling facilities relating to the current status of dismantling, shredding, and pollution control; (4) reuse of vehicle parts associated with the sales and usage of used parts, regulation on import and export as well as licensing and quality management; and (5) downstream recycling and treatment facility concerning the current status resource utilisation, waste treatment, and regulation on licensing and waste treatment.

1.1 Design for recycling in targeted countries

In Viet Nam, Thailand, Indonesia, Philippines, and Japan, DfR is promoted by major manufacturing companies according to their global standard developed in the countries where their headquarters are located. In Malaysia, Proton is promoting DfR by themselves to achieve the requirement of the European Union (EU) ELV directive[1]. Multinational companies in India are promoting DfR as per their global standards. Two major Indian car companies also design and produce their vehicles for export in compliance with EU standards. The entire production of Maruti Suzuki Limited complies with DfR standards. In Japan, major manufacturing companies are promoting DfR not only according to their global standards but also according to their domestic initiatives, in accordance to Article 3 of the Japanese ELV law, which requires manufacturing companies to adopt measures to promote DfR.

Most Association of Southeast Asian Nations (ASEAN) member countries have no regulations on DfR on ELVs. In Japan, the Law for Promotion of Effective Utilization of Resources specifies the responsibility of business entities for implementing 3R – reduce, reuse, and recycle – measures. Manufacturing companies are required by the Japanese ELV law to adopt DfR measures in car design and selection of recyclable components and materials, and to provide relevant information to relevant parties.

[1] Based on the result of our interview.

1.2 End-of-Life/Service of Vehicle

End-of-Life/Service of Vehicle and generation of ELVs

Table 2 shows the number of ELVs disposed in targeted countries. Many countries do not have official statistics on the number of ELV disposals. Therefore, the study group mainly used the estimates of the private consulting firm.

Table 1. Disposal of ELVs

	Cambodia	Lao PDR	Myanmar	Viet Nam	Thailand
Total estimated number of ELVs	No information	No information	138,184 (2014)	6,000 (2012)	164,934 (2014)
	Malaysia	Indonesia	Philippines	India	Japan
Total estimated number of ELVs	61,430 (2013)	124,002 (2013)	17,866 (2013)	5,047,205 (2013)	3,430,000 (2013)

ELV = End-of-Life Vehicle.
Source: Yano Research Institute.

Car owners in most of the ASEAN countries continue to use old cars for as long as possible. In many countries such as Thailand, Malaysia, and Indonesia, cars likely circulate from urban to rural areas or they are exported to neighbouring countries. While most countries have inspection systems, the systems do not work successfully. For example, in India, inspection and maintenance systems are not effective. Vehicle owners continue to use old vehicles for much longer than the term of safety use.

When cars are used for a long time and cannot be repaired, cars are considered as ELVs, treated, and disposed. Cars that have figured in accidents are sold to auction companies and auction companies sell them by auction. Some imported used cars and accident cars are sold by insurance companies and broken up for parts to be taken off by vehicle dismantlers.

In Indonesia, there are small-scale car repair shops called 'bengkel'. They repair cars to be used as long as possible by using used parts.

In Malaysia, old cars in the city area generally tend to be sent to rural areas where they continue to be utilised. In case cars cannot be repaired, they are sent to recycling companies. When accident cars cannot be repaired, the ownership of the car is transferred to the insurance company and then the car owner receives the insurance payment. The insurance company sells accident cars to the junk shops through auctions.

In Yangon, Myanmar, if a car owner sends a used car older than 20 years to ELV facilities, the car owner can receive permission to import a new car[2]. This programme provides incentives to stop using too old cars. Hence, the number disposed ELVs increased recently.

[2] This information was confirmed during the field survey.

In the Philippines, ELVs would first flow to repair shops where usable parts are taken out. Then, along with accident cars, they would be sent to junk shops. In case cars cannot be repaired, parts are removed and bodies are sold to junk shops as scrap.

In Thailand, in case cars cannot be repaired, parts are removed from the cars and the bodies are sold as scrap to waste traders. In case of accident cars that cannot be repaired, the ownership of the car is transferred to the insurance company and then car owner receives the insurance payment. The insurance company sells accident cars to the repair shops or car dealers through auctions.

In Viet Nam, car owners tend to use their vehicles until they are broken[3]. Consequently, the number of ELV is low. In case cars cannot be repaired, parts are removed and other automobile parts are sold to recycling villages such as the village called 'Te Lo village' located in the north of Hanoi.

In India, parts are removed from cars that cannot be repaired and their bodies are sold as scrap to waste traders. Accident cars are sold to auction companies that in turn sell these cars. Currently, small informal sectors are taking in ELV recycling.

In Japan, in accordance with the existing Japanese ELV law, car owners cannot continue to use too old cars since there are strict safety provisions in the inspection system. An e-manifest scheme is introduced for preventing ELVs to be handed to improper traders and to be used as second-hand cars illegally. Japan has a deregistration system. After being deregistered, ELVs are sent to dismantling companies. There is also a nation-wide auction system in Japan. Most ELVs, including accident cars, are sold at auctions.

Regulations on ELVs and service of vehicle

Most ASEAN countries have inspection and deregulation systems. However, many of these inspection systems do not work properly and many vehicles that fall short of the standard continue to be used. Regulations on service of vehicle are implemented in some countries. Viet Nam introduced the regulation on service of vehicles to prevent the use of too old cars. Expiration periods (end-of-service of vehicles) are set by regulation: 25 years for private cars and 22 years for commercial vehicles. In Thailand, taxis that are more than 10 years old are not allowed to be used for taxi service.

1.3 ELV dismantling

Manual dismantling

Dismantling activities in most of the target countries are conducted manually. Generally, the informal sector plays a central role in the operation of waste collection/recycling. These activities threaten occupational health and labour safety.

For example, in Indonesia, small companies, mainly those in informal sectors, manually dismantle car parts using gas burners. Non-ferrous metal is sent to aluminium product

[3] This information was confirmed during the field survey.

manufacturers. '*Lapak*', the intermediaries between collectors and informal dealers, collect, select, separate, cleanse, and pre-treat these metals.

In Viet Nam, ELVs generated near Hanoi are dismantled by the informal sector in recycling villages. There is no registered ELV dismantling facility in the country. Steel scraps are sent to steel recycling plants in recycling villages while non-ferrous metals and plastics are sent to plants in recycling villages.

In the Philippines, vehicle dismantling is mainly conducted by repair shops and junk shops. Steel scraps, aluminium, catalysers inside mufflers, including rare metals and plastics, are sent to specialised collectors.

In Thailand, ELVs generated domestically and imported vehicles are dismantled in dismantling companies. Steel scraps are sent to recyclers and catalysers inside mufflers, including rare metals, are sold to recyclers.

In India, vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity. The working condition is quite poor for the estimated 100,000 recycling workers who face severe health threat. There is not enough space for facilities and the facilities are located in residential areas/city centres. An estimated 410,700 tons of scrap (metal, aluminium and plastic) are sent to scrap dealers, while around 7,800 tons of rubber and plastics that cannot be recycled are dumped in open dumping sites.

The situations in Cambodia and Lao PDR seem to be the same and dismantling activities are generally conducted manually in rural areas.

Shredding

Most countries in ASEAN such as Cambodia, Lao PDR, Viet Nam, Indonesia, Philippines, and India have no shredding processes. However, some advanced countries have introduced shredders.

In Myanmar, the Myanmar Economic Committee (MEC) operates two dismantling facilities. One is located in Thilawa, which is in the south of Yangon, and the other is located in Myingyen, which is southwest of Mandaley. ELVs generated in Yangon, Myanmar are sent to these MEC dismantling facilities. Used auto parts are taken off and their bodies are dismantled manually by gas burners, pressed by guillotine shear, and shredded. The steel is sent to a steel plant of MEC. We could not get information on where the Automobile Shredder Residue (ASR) from the shredding process is disposed.

In Malaysia, the existing shredding and sorting plant is added to authorised treatment facilities (ATFs). ASRs are sent to ASR incinerators. Amsteel Mills, which is a private steel manufacturing company in Malaysia, installed shredding facilities to treat soft press imported from other countries. However, it became difficult to import and now it works much less than its capacity.

In 2013 in Japan, there were 1,083 shredding operations and 1,364 shredding sites. Shredding operators follow the framework set up by the ELV law: crushing of frame and exterior,

recovery of useful metals, handover of shredder dust to the manufacturers, and the recycling fee is supported by car users.

Pollution control

In Cambodia, Lao PDR, Indonesia, Myanmar, Philippines, and India, hazardous materials such as oil and waste liquid emitted from the dismantling process are not properly treated because the dismantling facilities do not have appropriate pollution control measures. This is because of the lack of implementation capacity of environmental legislation. Inappropriate dismantling causes air, water, and soil pollution. In addition, unsellable materials are illegally dumped in undesignated areas like roadsides or rivers and generate environmental pollution.

In Japan, in accordance with existing Japanese ELV law, ELV dismantling facilities have to introduce pollution control measures. Local governments are responsible for checking whether they are properly introduced when they issue licences to dismantlers. Local governments in Japan are also in charge of preventing the illegal disposal of ELVs and waste generated from the ELV dismantling process.

Licence regulations for dismantling operation

In many countries in Asia, there is no specific licence regulations for dismantling operations. For example, we could not acquire information on licence regulations for Cambodia, Lao PDR, and the Philippines. In Myanmar, there is no licence regulation but only MEC is allowed to operate ELV dismantling facilities.

However, in some countries, dismantling companies have to require a licence for waste treatment operation. In Indonesia, only certified dismantling facilities, certified and authorised recycling workshops, or collection points that have been nominated by the manufacturers are permitted to issue these certificates.

Malaysia's ATFs will have to get a waste management licence from the appropriate environmental agency and must meet standards to ensure that they store and treat ELVs in a way that does not harm the environment; remove all hazardous components and liquids (known as 'depollution'); and recycle, store, and dispose the parts appropriately.

In Thailand, recycling companies have to acquire a licence according to Notification of Ministry of Industry (MOI) No. 15 (B.E. 2544 (2001)).

In Viet Nam, batteries and liquid wastes from ELVs are in the hazardous waste list, and the recycling and treatment facilities must possess hazardous waste management permits to operate.

In Japan, ELV dismantlers are required to introduce pollution control measures in compliance with relevant environmental regulations. Dismantlers have to dismantle in compliance with requirements under the Japanese ELV law[4].

Pollution control regulation

On the definition of hazardous waste in pollution control regulations, ELVs are categorised as hazardous waste in Thailand[5]. Some parts such as batteries are categorised as hazardous waste in Malaysia, Thailand, and Japan.

Pollution control regulations for ELV dismantling differ between countries. Cambodia and Lao PDR seem to have no regulation on pollution control of ELV dismantling because there is no information on it. Myanmar introduced the Environmental Conservation Law and related regulations to prevent environmental pollution. Even though Viet Nam environmental protection laws are introduced, environmental pollution from recycling villages are not properly controlled.

In Thailand, there are various MOI notifications on the control of environmental pollution from dismantling facilities. One example is Notification of MOI B.E. 2548 of 2005 which controls pollution from industries. Thai municipalities monitor the implementation.

In Malaysia, regulations include the 'Environmental Quality (Scheduled Wastes) regulation 2005[6]' and the 'Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment and Disposal Facilities) Order 1989', which prescribe the types of waste treatment, disposal facilities, and licence, as well as the procedure when owners of facilities change and the obligation of informing the amount of waste accepted, treated, stored, and disposed.

In Indonesia, Law No. 32/2009[7] controls pollution from all sectors. Law No. 18/2008 covers certain sectors for industrial waste. Government regulation No.101/2014 regulates hazardous waste. The Basel Convention on hazardous wastes as well as the Convention on Climate Change international treaties, provincial environmental legislation, and local environmental legislation are also applicable.

In India, Automotive Industry Standard (AIS) 129 requests collection centres and dismantling centres to conduct depollution treatment for the dismantling of ELVs.

In Japan, dismantlers are requested to comply with environmental conditions in obtaining the licence in the ELV law.

[4] Under the Japanese ELV law, dismantlers have to receive a licence from the prefecture in order to operate. To acquire a licence, dismantlers have to show that they comply with the requirements prescribed by the Japanese ELV law.
[5] Notification of the Ministry of Industry, Industrial Waste Disposal, B.E. 2548 (2005).
[6] Malaysia revised the Environmental Quality (Scheduled Wastes) Regulation 1989 as Environmental Quality (Scheduled Wastes) Regulation 2005.
[7] Indonesia is revising Law No. 23/1997.

1.4 Reuse of parts

Sale of used parts

Many used parts are traded and sold in ASEAN countries, India, and Japan.

In Cambodia, majority of parts dealers sell small parts, but some dealers sell used engines and half-cut bodies.

There are many used parts dealers in Myanmar, Thailand, and Malaysia who mainly sell Japanese car parts. These dealers specialise in specific parts. For example, some dealers sell only body parts and some dealers sell mainly driveshafts.

In Viet Nam, there are used parts markets called as 'Gioi' where many used parts dealers are located. The demand for car parts is met by imitation parts from China and the market size for domestically generated used parts is relatively small. Even though imports of used parts are prohibited, used parts are imported from neighbouring countries.

There are many used parts dealers in Indonesia. Used parts are sold in agglomerated markets of car repair shops and parts dealers called as 'Bengkel'.

In the Philippines, used parts are sold through auction in the form of parts packages in the container.

In India, used parts are recovered, refurbished, and sold by dismantlers to second-hand spare outlets located in the same scrap yards.

In Japan, used parts and rebuilt parts are sold in the domestic market. The information on stocks and orders are exchanged through the information system. At the same time, those products are exported to foreign countries, mainly Malaysia, United Arab Emirates (UAE), Russia, and others.

Imports of used parts are prohibited in many countries but sometimes, used parts are imported illegally.

Remanufacturing

There are no remanufacturing facilities in Myanmar. In Viet Nam and Indonesia, some remanufacturing companies reuse parts such as alternators, drive shafts, and starters. There are some existing remanufacturing companies that reuse parts. In Malaysia, some companies like the members of the Malaysia Automotive Recyclers Association (MAARA) remanufacture transmission and the like. Some companies in the Philippines like the ITO MFG Philippine Corporation remanufacture the chassis, body, or engine among others.

In India, the informal sector remanufactures motors, starters, alternators and the like in a crude manner. There is no organised industry for remanufacturing used car parts.

There is huge market of remanufactured parts in Japan for parts such as alternators and starters.

Quality management regulation

Generally, there is no quality standard for used parts in ASEAN countries and this has caused safety problems. In Indonesia, remanufacturers are required to register the year of the product, which controls a certain level of quality. The India Automotive Industry Standard 129 (AIS129) for ELVs controls the quality listing of the component parts deemed non-reusable. Japan has no specific regulation on quality assurance of used parts.

Assurance provisions are different between countries. In Viet Nam, there is generally no assurance of quality for used parts, but some companies in Viet Nam use assurance for a few years. In Malaysia, used parts are sold domestically with one to three months' warrantee and the quality of the product is assured to some extent. In Japan, many dealers provide a certain quality guarantee for a fixed period to the buyers. A uniformed standard for the quality guarantee was established among three related associations. The expansion of scope of the guarantee is under consideration.

1.5 Downstream recycling and treatment facility

Resource utilisation (recycle of material from ELVs)

Most of the countries do not have official statistics on the existing treatment of steel scrap, non-ferrous metal scrap, and plastic scrap. However, we could presuppose the situation through field surveys, including the results of the field survey conducted in existing studies.

In Cambodia, Myanmar, and Viet Nam, steel scraps, non-ferrous scraps, and plastics are exported while wire harnesses are retrieved from half-cut bodies and reused. In Lao PDR, wastes such as plastics, aluminium, and copper are recycled domestically, and recyclable wastes are exported to neighbouring countries. Plastics are sent to China or Viet Nam and aluminium and copper are sent to Viet Nam. In Myanmar, scraps dismantled by MEC are also utilised by the steel manufacturing facilities of MEC.

In Indonesia, the remnant car body is manually cut into steel scraps. Iron recyclers buy and process these scraps. Recyclable materials such as glass, tires, large plastic parts and the like are processed using separate recycling techniques.

In Malaysia, steel scraps from ELVs are sent to scrap trading companies. Scrap trading companies sell them to steel manufacturing companies and then steel manufacturing companies recycle them. Non-ferrous metals are also sent to scrap trading companies and scrap trading companies sell them to manufacturing companies for recycling.

In the Philippines, valuable metals from ELVs are recovered from scrapped cars manually. Retrieved metals are sold to metal factories. Other wastes such as wire harnesses, plastics, and rubbers are recycled.

In Thailand, steel scraps from ELVs are recycled in steel manufacturing companies. Steel scraps are sent to scrap trading companies and then sold to steel manufacturing companies. Non-ferrous metals are recycled in manufacturing companies. These non-ferrous metals are then sent to scrap trading companies and sold to manufacturing companies. Recyclers collect

wastes either from car owners nearby or from brokers. Then, after separating recyclable waste and processing it, recyclers sell processed waste to steel plants and plastic recyclers.

In Viet Nam, steel taken from ELVs are sent to relatively modern large-scale steel plants in industrial zones or small plants in Craft Villages that are specified for metals or other resources. Recycling of non-ferrous metals is also carried out in Craft Villages.

In India, ELV scrap metal items such as sheet metal, aluminium, and plastics are generally retrieved and reused. Unusable items such as rubber parts, excluding tires, insulation materials, glass, and the like are disposed in municipal garbages.

The Law for Promotion of Effective Utilisation of Resources in Japan specifies the responsibility of the business entity to adopt the 3R measures. Steel scraps and non-ferrous metals, catalysts, and tires are reused or recycled.

Hazardous waste treatment

Hazardous waste treatment and disposal is one of the major challenges for ASEAN countries and India.

In Cambodia, Lao PDR, and Myanmar, lead battery is not properly treated, and this causes the emission of hazardous wastes. Some of the hazardous wastes are not properly treated.

In Viet Nam, there are seven permitted battery recycling facilities with a capacity of around 100 tons per day. Only some batteries are recycled and the others are not. Even when batteries are recycled, they are done in an environmentally unfriendly way. Waste oil is recycled but not all waste oil is collected. Some oil wastes are disposed in the sewage. Some informal sector members collect waste oil but treat or recycle them inappropriately. Chlorofluorocarbons (CFCs) are not properly treated in Viet Nam.

In Thailand, Malaysia, and Indonesia, batteries are recycled but not all batteries are recycled. Waste oil and CFCs are not recycled and not properly treated, and may cause soil and air pollution. In Malaysia, all fluids are being drained and stored for the respective recyclers. Hazardous wastes such as mercury are removed to storage at this stage. In Indonesia, waste oils are accumulated and resold to recycling shops, while CFC is generally not recovered and released in the air without processing even though recovery instruments are distributed to some factories.

In the Philippines, batteries are sold to specialised battery stores or junk shops and the like. Waste oils are not retrieved or resold and are mostly dumped. CFC is not retrieved during processing and released in the air, as there are no CFC collecting facilities.

In India, batteries are sold to spare shops and the like though there are formal regulations concerning disposal of used batteries. Regulations exist for return and recycling of batteries but these are not strictly enforced. Hazardous materials are not properly treated, and it causes air, water, and soil pollution in recycling facilities. Testing of the formal mechanised recycling process has been started at the recycling demonstration unit of the Global Automotive Research Centre, which can properly treat batteries, oil, airbags, and others.

In Japan, the ELV law was introduced and manufacturing companies have the responsibility to properly process the three parts designated for proper treatment (fluorocarbons, airbags, and ASRs). The Law for Promotion of Effective Utilization of Resources specifies the responsibility of business entities to adopt the 3R measures. Lead-acid battery is properly collected and treated by the system-established initiative of the battery manufacturing association. The Waste Management and Public Cleansing Act specifies the responsibility of business entities to adopt the 3R measures and to conduct proper treatment of ASRs, discarded tires and half-cuts containing airbags, and the like. The downstream retrieval of ELVs in Japan requires the proper treatment of the three items designated as specific negative cost components. There are approximately 20,000 recovery places and 8 collection/neutralisation plants for CFCs; 26 airbag collection centres and 5 recycling plants for airbags; 54 recycling facilities; and 33 incineration and landfill sites for ASRs. The Japan Auto Recycling Partnership Limited. (JARP) is in charge of the management of the destruction of CFCs and airbags.

Licence regulation for the treatment of hazardous wastes

The development of licence regulations differs between countries. There is no adequate legal system for the treatment of hazardous wastes in Cambodia. In Viet Nam, some companies receive recycling licences from the Ministry of Natural Resources and Environment (MONRE) but most of the companies operate without licences.

In Thailand, recycling companies have to acquire a licence in accordance with the Notification of MOI No. 15 B.E. 2544 (2001).

In Malaysia, the Environmental Quality (Scheduled Wastes) Regulation 2005[8] and the Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment and Disposal Facilities) Order 1989 prescribe a licence for waste treatment and disposal facilities. Both regulations also prescribe the procedures when owners of facilities change and the obligation of informing the amount of waste accepted, treated, stored, and disposed.

In Indonesia, only certified dismantling facilities and authorised recycling workshops or collection points that have been nominated by the manufacturer are permitted to operate.

In India, AIS 129 incorporates the provision for accreditation of dismantling standards after they meet specific standards.

In Japan, industrial waste disposal operators are required to obtain a licence under the Waste Management and Public Cleansing Act. Fluorocarbon collectors and shredding operators are required to obtain the licence under the ELV law.

[8] Malaysia revised its Environmental Quality (Scheduled Wastes) Regulation 1989 as Environmental Quality (Scheduled Wastes) Regulation 2005.

Waste treatment regulation

Some countries, in particular least developed countries (LDCs) in this study, regulate waste treatment by general environmental law while other countries have specific regulations for waste treatment. Some countries also have specific regulations for the treatment of waste from automobile dismantling.

Lao PDR, Myanmar, and Indonesia control waste treatment under the general environmental law. In Lao PDR, the Environmental Protection Law stipulates that waste disposal sites must be allocated; and that waste should be separated before disposal. Governments support the implementation of technologies for waste treatments, reuse, and recycling. In Myanmar, the Environmental Conservation Law and related regulations have been introduced to prevent environmental pollution. In Indonesia, Law No. 32/2009 on Environmental Protection and Management Act No. 32[9] prescribes the treatment of hazardous wastes.

Malaysia, Philippines, and Thailand control waste by specific regulations, orders, and notifications for waste management. In Malaysia, various regulations such as the 'Environmental Quality (Scheduled Wastes) Regulation 2005[10]' and the 'Environmental Quality (Prescribed Premises) (Scheduled Wastes Treatment and Disposal Facilities) Order 1989', prescribe the storage and treatment procedures.

In the Philippines, DAO 2004-36[11] prescribes the responsibility of polluters of the hazardous wastes such as sulfuric acid, waste oils, and ozone-depleting substances (CFCs and halon).

Thailand has a regulation on waste treatment, Notification of MOI B.E. 2548 (2005), which controls pollution from industries. The notification indicates the responsibility of dismantlers and polluters, and lists hazardous wastes such as waste oil and liquid, CFC, lead battery, and catalyst.

Viet Nam, India, and Japan have specific regulations for waste from automobile dismantling. In Viet Nam, Decision 50/2013 of the Prime Minister on the retrieval and treatment of end-of life products was introduced, and specific scheme for waste oil will be introduced in 2016. A specific scheme for batteries and tires will be introduced in 2016, and a specific scheme for ELVs will be introduced in 2018. Take back schemes for batteries and waste oil are considered under the decision. The Environmental Protection Law was introduced to prevent environmental pollution. Waste treatment companies are also controlled under this Act.

In India, AIS 129 requires collection and dismantling centres to possess equipment and facilities for hazardous wastes.

In Japan, the polluter is responsible for the treatment of industrial wastes generated from its business under the Waste Management and Public Cleansing Act. The ELV law prescribes ASR

[9] Originally, this Act was introduced as Act of the Republic of Indonesia concerning Basic Provisions for the Management of the Living Environment (No.4/1982) in 1982 and revised as Environmental Management Act (No. 23/1997) in 1997.

[10] Malaysia revised its Environmental Quality (Scheduled Wastes) Regulation 1989 as Environmental Quality (Scheduled Wastes) Regulation 2005.

[11] Order for implementing Republic Act No. 6969 'An Act To Control Toxic Substances and Hazardous and Nuclear Wastes, Providing Penalties for Violations Thereof, and for Other Purposes'.

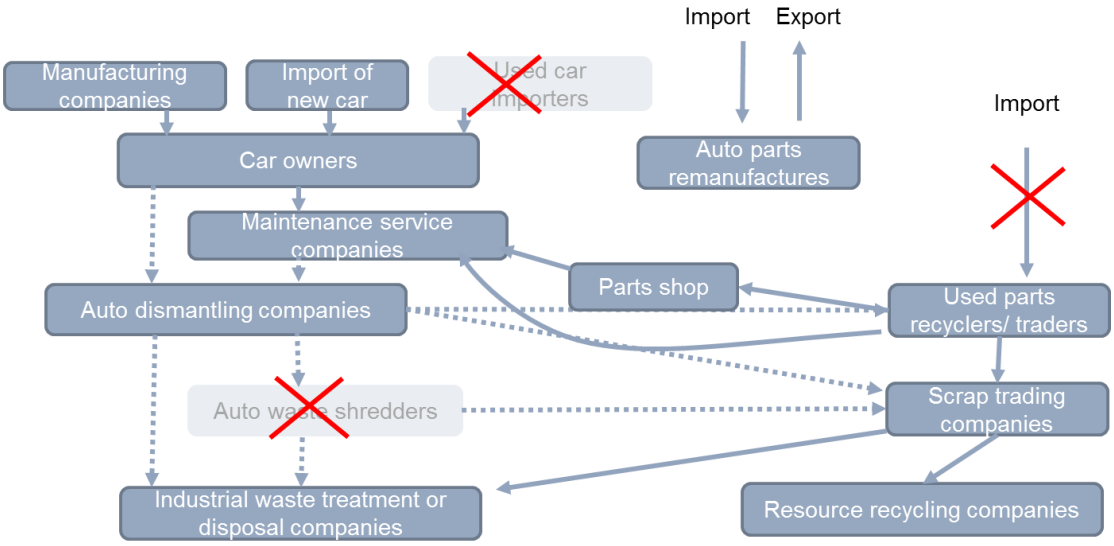
recycling targets as follows: 30 percent in 2005, 50 percent in 2010, 70 percent in 2015; and airbags recycling target: 85 percent.

2. Indonesia

2.1. Overview

The overview of ELV recycling in Indonesia is illustrated in Figure 1. Overview of ELV recycling in Indonesia. Indonesia's automotive society is currently growing rapidly. Indonesia prohibits the importation of used cars and used parts. The main source of ELV is domestic generation. There are approximately 20 informal sector dismantlers in Jakarta. They collect ELV from car owners among others. They dismantle ELV manually and take used parts, segregate materials, and sell scraps to scrap trading companies.

Figure 1. Overview of ELV recycling in Indonesia



ELV = End-of-Life Vehicle.
Source: Study Team.

2.2. Status of trade of used cars and used parts

(1) Importation of used cars

The importation of used cars is prohibited in Indonesia. Since 28 February 2007, the Government of Indonesia has suspended the importation of used vehicles (Minister of Trade Document No.1311 of 29 December 2006). The Minister of Trade Regulation (57/M-DAG/PER/12/2008) concerning Provision of Import of Non New Capital Goods did not include automotive vehicles.

(2) Importation of used parts

The import of used car parts is prohibited in Indonesia. However, some traders import illegally.

2.3. Generation, flow, and treatment of ELVs, used parts, and resources

(1) Generation of ELVs

In Jakarta, there are small dismantling companies. They register their business with the municipality. These small dismantling companies originally belonged to the informal sector. They collect and buy ELVs by themselves or sometimes, the owners bring them to the company. They buy ELVs at Rp3,900 per kilogram. The study group's interview found that the number of purchases of ELVs has decreased. Sometimes, they do not buy ELVs for a month because of lack of money.

ELVs are used as used cars or sold as scrap. Before selling them as scrap, dismantlers take parts such as engines, suspensions, interiors, among others, and sell them to used parts shops, repair shops, and car owners. However, most of the parts are too old to be bought. Therefore, most of the parts of ELVs are sent to scrap trading companies or recycling companies, or the steel plant in Pulogadun. Aluminium is sold to companies in Jakarta. When dismantlers sell ELVs as scrap, they dismantle ELVs using gas burners, divide them as small parts, and segregate them by material types. They often hire people to dismantle but in case the amount is small, they dismantle it themselves. Batteries are reused if they still work or they are sold to battery recyclers if they do not work. Waste oil is disposed in junk yards. Tires can be sold. Tires are reused or recycled as rubber products such as cushion materials and flip-flops, and the like. Airbags of cars that have figured in accidents are destructed but airbags of non-accident cars can be reused. Therefore, air bags are sold in some cases.

Recently, the price of steel scrap has decreased. Previously, steel scrap can be sold at Rp7,000 per kilogram but now it is Rp3,800 per kilogram. Recently, dismantlers have been storing ELVs without selling. They are waiting for the price of steel scrap to increase. Used cars can be sold as second-hand cars. However, such are rare cases.

According to Yano Research Institute, the number of ELV generated was 124,002 in 2013.

Table 2. Estimate of ELV Generation in Indonesia

Year	Estimated number of ELVs
2010	114,689
2011	116,516
2012	119,972
2013	124,002
2014	152,723
2015	178,524
2016	176,370
2017	160,389
2018	175,493
2019	218,337
2020	248,676

ELV – end-of-life vehicle.

Source: Yano Research Institute.

As an example, a pickup truck from the 1980s was priced at Rp11,000,000 including repair cost. In Indonesia, the existence and necessity of automobile dismantling industries is not recognised. Old vehicles deemed unusable are still treated as 'repairable' for years without repairing. Some vehicles are used to take up parts, and the remaining car bodies are manually cut into steel scraps, which are re-sold to iron recyclers.

Registration and Inspection

1) Vehicle registration

The Directorate General of Land Communications is in charge of registration and inspection in Indonesia. The base law is Indonesian Law No. 22 of 2009 on Road Transport and Traffic.

New Car Registration

According to Indonesian Law No. 14 on Traffic and Land Transportation of 1992, all motor vehicles are required to be registered. The Indonesian National Police is the agency responsible for motor vehicle and driver registration/identification. Compulsory insurance is also required.

In addition, prior to the sales and use of motor vehicles, manufacturers and importers must subject vehicles to the vehicle type approval system, also in accordance with Indonesian Law No. 14. This includes document application, vehicle testing and inspection, and certification by the Directorate General of Land Transportation.

On registration, the Surat Tanda Nomor Kendaraan (STNK)/Vehicle Registration Number, Buku Pemilik Kendaraan Bermotor (BPKB)/Proof of Car Ownership book), and Plat Nomor (licence plates) are issued to the car owners. The issuer of STNK and BPKB is the local police office.

Transfer or Selling Licence
In case of change of car ownership, the car owner is required to follow the procedure of BPKB and the new owner is required to pay the registration fee.

Re-registration
The car owner is required to renew annually the car registration. The STNK and Plat Nomor are valid for five years and should be renewed after five years.

Deregistration
Car owners need to deregister their cars at police stations. In practice, car owners often sell ELVs to repair shops instead of following the deregistration procedure. In the process of deregistration, car owners are required to change ownership described in the BPKB. The process is done on a written basis only and the car owners are not required to return the Plat Nomor.

2) Car inspection system

Commercial vehicles and public vehicles are required to be inspected every six months. However, personal vehicles are currently not the target of compulsory inspection. The introduction of the inspection system for all vehicles is currently under discussion. There are 130 inspection centres in Indonesia.

(2) Dismantling of ELVs

Generally, the informal sector plays a central role in the operation of waste collection/recycling. Used parts are taken off and bodies are dismantled manually using gas burners. In Indonesia, there is no official vehicle shredder location.

(3) Flow of resources: steel and non-ferrous metals

Interviews with ELV dismantling companies revealed that steel scraps from ELVs are sent to steel plants in Indonesia. In Jakarta, there are many steel plants. In particular, the Pulogadun stores steel scraps and makes steel from scraps. Domestic car scraps occupy only a small

fraction of raw materials used in Indonesian ironworks in which cheaper imported scraps dominate.

Other metals are recovered in crude ways such as open incineration for wire harnesses.

(4) Flow of resources: plastics

Plastic scraps are traded in the informal sector in Indonesia.

2.4. Generation, flow, and treatment of hazardous wastes from ELVs (batteries, tires, etc.)

In Indonesia, the informal sector plays a central role in the operation of waste collection/recycling. The formal sector collectors are in charge of industrial and hazardous wastes, which are sent to formal recyclers. Other wastes such as municipal wastes go through a complex system of informal waste management where mobile door-to-door scavengers (*pemulung*) and community-based crews collect them and then sell them to *lapaks* along with traded recyclable items (cans, plastics, and others). *Lapaks* function as intermediaries between collectors and the *bandar*, the informal dealers from whom the wastes eventually reach formal and informal recycle factories. These intermediaries perform the function of collection, selection, separation, cleansing, and pre-treatment.

(1) Batteries

There are many battery recyclers in Indonesia, and many of them are in the informal sector. Only parts of the batteries are recycled. Battery is treated as a valuable resource. There are some recyclers who dismantle the batteries into lead and plastic, and fabricate ingots from the lead that has been dismantled.

(2) Tires

Used tires are recycled in Indonesia. Recycling is mainly conducted by the informal sector but companies such as Xinxiang Huayin Renewable Energy Equipment Company Limited introduced advanced technology to change waste tires into fuel oil.

(3) Waste Oils

Approximately 529 tons of oil is accumulated and resold to recycling shops. Waste oil is treated as a valuable resource. According to the research conducted by EX Research Institute, collected oils are accumulated and reach four waste oil recyclers, including Pennzoil, an American company, and Agip, an Italian company. Waste oil recyclers are required to have a licence from the Department of Transportation, Indonesia.

(4) CFCs

CFC is generally not recovered even though recovery instruments are distributed to some factories. Narogong factory of PT Holcim Indonesia is the first factory of cement kilns that directly destroys CFCs.

2.5. Generation, flow and, treatment of end-of-life motorcycles

The flow of end-of-life motorcycles could not be identified by the research. Based on the interview, they are brought to repair shops and repair shops sell them to scrap companies.

2.6. Recycling companies and industry

Scavengers are typically paid Rp15,000 to Rp25,000 per day. Quite often, scavengers rely on credit from *lapaks* who would pay beforehand for future transactions. *Lapaks* have warehouses, vehicles, and a small number of workers, many of which were started by former scavengers and junkmen (waste traders). *Lapaks* desire to be brokers or even dealers (*bandars*) who enjoy a relatively large scale of operation including pre-treatment. One iron and metal dealer can yield a profit of Rp5,000,000 per month, equivalent to 30-50 percent of the revenue. Some *bandars* even conduct industry-level recycling.

There are many battery recyclers in Indonesia. Examples of battery recyclers are as follows:

Example of battery recyclers

Pt Gramitrama Battery

Pt Gramitpama Batteryin Sidoarjo is a national private-owned company that has been established since 1975. It first produced battery plates and it now supplies both domestic and international customers with good raw materials through the use of the latest technology.

Pt Baretec Indonesia

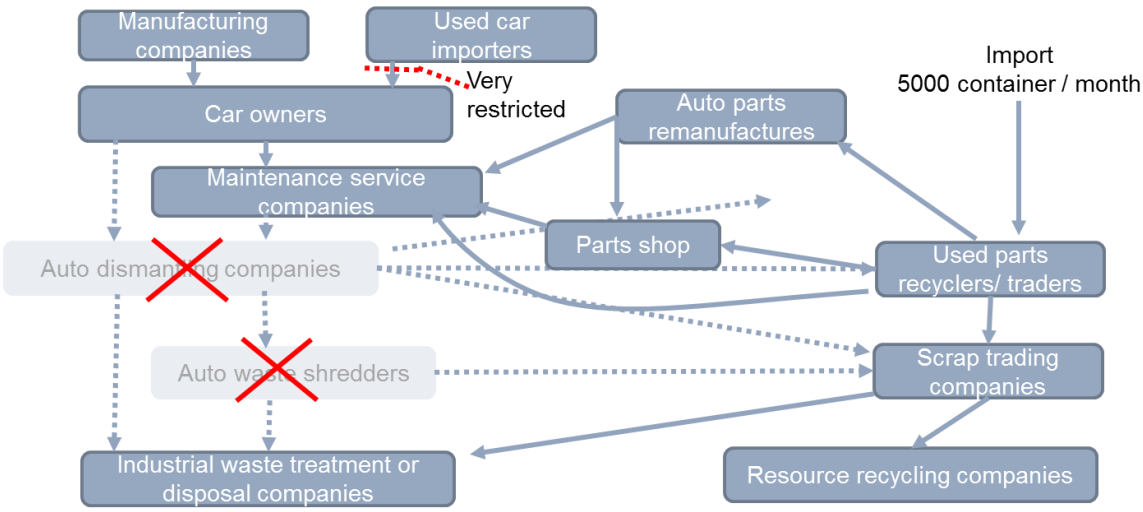
Pt Baretec Indonesia has the most innovative and advanced technology for the refurbishing battery technology. We have a patent for the production method and chemicals. Pt Baretec Indonesia can supply all kinds of refurbished lead acid batteries (for car, ship, heavy equipment, golf cart, and many others).

3. Malaysia

3.1. Overview

The overview of ELV recycling in Malaysia is illustrated in Figure 2. Overview of ELV recycling in Malaysia. Malaysia is the centre of used car parts trade in Asia. Malaysia imports many half-cuts and used parts from other countries, mainly from Japan. Many used car parts recycler/traders dismantle half-cuts. Used parts recyclers/traders export about 70 percent to other countries and sell 20 percent domestically. The number of ELV generation in Malaysia is not recorded but based on interviews; the number seems to be small. As a result, there are no ELV dismantling companies. Amsteel introduced auto waste shredders before to shred soft press from Japan. However, as soft press importation from Japan is not allowed, shredders do not work at full capacity.

Figure 2. Overview of ELV recycling in Malaysia



ELV – End-of-life vehicle.

Source: Study Team.

3.2. Status of trade of used cars and used parts

(1) Importation of used cars

The importation of used cars is restricted in Malaysia. The importation licence is only for personal, government use and the like. Import duty must be paid on any vehicle imported into Malaysia. These rates can be quite high and excise duties can be up to 100 percent when importing a foreign vehicle. To import a car, an application must be made to the Ministry of International Trade and Industry (MITI) for an import licence called 'Approved Permit'. The car to be imported must have been registered in the home country of the person applying

(in case of foreigners). The system of approved permit is expected to be abandoned and a ban on used car importation for commercial purposes from 2016 will be introduced.

Malaysia allows its local ELV recycling companies to import ELVs from other countries. These vehicles require clearance from the Royal Malaysian Customs office. According to the law, an importation approval permit is required for vehicle import. Normally, ELV recyclers will choose and import the vehicle using their own means of transportation.

All businesses need to obtain a business licence to import and/or export scrap materials. The Malaysian Government takes measures to prevent resources from going out of the country. The measure states that any resource used in Malaysia should be processed and recycled in the country. Therefore, scrap purchase prices in Malaysia are low.

The estimate of Malaysia's total used car imported from Japan in 2013 was 35,879. In 2012, it was 23,370 and in 2013, it was 27,835[12].

Table 3. Number of imported used cars in Malaysia

Year	2009	2010	2011	2012	2013
Total	22,285	28,678	24,006	25,666	35,879

Source: Malaysia's Trade Statistics.

Table 4. Number of used vehicles exported from Malaysia

Year	2009	2010	2011	2012	2013
Total	297	377	325	701	800

Source: Malaysia's Trade Statistics.

(2) Importation of used parts

The importation of used parts to Malaysia is very huge. It is the hub of trade of used parts. According to Malaysia's Trade Statistics, used parts worth around $4,907,442 were imported from the world in 2013, $951,494 of which was from Japan.

In Malaysia, used parts factories are centred in Klang and Kepong, and more than 5,000 companies deal with used parts. Some of the factories have roofs and concrete floors. They import approximately 5,000 containers per month. The imported used parts are half-cuts or parts such as engines, gearboxes, transmissions, and the like. They have a network with the dismantling companies and used parts traders in other countries.

Based on interviews with used parts companies, 90 percent of the total used parts are imported from overseas. Of those, approximately 30 percent are sold in Malaysia and 70

12 Source: Planetcars site, Yano Research Institute.

percent are re-exported to the ASEAN region (14 percent), Africa (24 percent), Middle East (24 percent), and other countries (8 percent). Imported parts from Japan occupy about 90 percent of used parts circulated in the market in Malaysia. The amount of traded used parts in Malaysia is the most in the world. In the past, many used parts were traded in Singapore but because of increased prices, the centre of trading moved to Malaysia. As there are many Muslim people in Malaysia, it is easier for Malaysian traders to trade with the Middle East and North African countries.

Many Daihatsu and Mitsubishi Motors' used parts are traded in Malaysia because they collaborated with Perodua, Proton and both cars have many common parts. Remanufacturing companies for these parts also exist in Malaysia. The amount of import is larger than the domestic generation of used parts in Malaysia.

Example of used parts factory

Around 70 percent of used parts are re-exported and 30 percent are sold in Malaysia. Countries of destination are Nigeria, Egypt, Jordan, Pakistan, China, Thailand, Indonesia, Myanmar, and Russia. Used parts are also exported to the Maldives once or twice per year. Used parts are sold domestically as follows:

- Wire cable: Sold to local companies both with pealing cover and without pealing.
- Catalyser: Sold to local companies. The price is RM100 for each part.
- Engine: Sold to engine dealers. The engine dealers manually separate engines into steel and aluminium, and sell them to electrical furnace steel manufacturers. Gearboxes are sold to the other companies. The companies buy aluminium from construction companies and can manufacturing companies and sell it to metal refinery.
- Battery: treated as industrial waste.

3.3. Generation, flow, and treatment of ELVs, used parts, and resources

(1) Generation of ELVs

The importation of used cars is very limited in Malaysia. Broken cars that have figured in accidents are sent to workshops, which have contracts with insurance companies. Car insurance provides incentives for car owners/workshops to use used parts. The number of ELVs is estimated at 61,430 per year (2013). The prices of used cars range from RM4,000 for a 1990 model, RM60,000 for a 2005 model (Toyota Carole), RM6,500 for a 1998 model (Perodua Kancil), and RM7,786 for a 1992 model Honda Accord 2.0.

According to the field survey conducted by EX Research Institute, the purchasing prices of ELVs range from RM500 to RM5,000. According to a dismantler in Kuala Lumpur, ELVs are sold to dismantlers for about RM480 per unit.

Older models of cars are sold as used cars many times after repairing and changing parts, without being dismantled as ELVs. With the introduction of 'Cash for clunkers[13]', the number of ELVs dismantled in Malaysia is expected to increase.

Registration and Inspection

1) Vehicle registration

a) Vehicle registration

Any new or imported vehicle is required to be registered with the Malaysian Road Transport Department, which is in charge of the registration of all motor vehicles and trailers, and the licensing of drivers of in Malaysia. The registered owner's address and registration number are connected.

The Road Transport Department under the Ministry of Transport controls the registration of new cars, change of registration, change of registered information, and deregistration under the Road Transport Act 1987 and the Motor Vehicles (Registration and Licensing) Rules 1959**.** If a vehicle meets the standard (weight, size, equipment, and so on), the registration certificate is issued. Every year, car owners renew their registration and pay the Road Tax (LKM) on the registration. The LKM depends on engine size (see Table 6). If renewal is not done for a certain period, caution is sent to the owner. If the owner does not follow, penalties will be imposed on the owner. In case of new registration and re-registration, the owners have to pay the registration fee in addition to the LKM. Under the Road Transport Act, owners have to buy insurance. Owners also have to buy insurance in case of re-registration.

Table LKMs for general cars

Size of engine	LKM
Less than 1,000CC	RM20.00
1,001CC to 1,200CC	RM55.00
1,201CC to 1,400CC	RM70.00
1,601CC to 1,800CC	RM90.00
1,801CC to 2,000CC	RM200.40-280.00
2,001CC to 2,500CC	RM280.50-380.00
2,501CC to 3,000CC	RM882.50-2130.00
3,001CC to 5,000CC	RM2,134.50-11,130.00

LKM – Road Tax.
Source: Road Transport Department.

[13] Proposed by Malaysian Automotive Institute.

b) Transferring or selling used cars

In case of selling or transferring ownership of used cars, the owners have to inform the registration agencies and the registration certificate is passed on to the new owner.

c) Deregistration

The owners can deregister their vehicles. In addition, if a car is not renewed for more than 2 years, a car is automatically deregistered. No certification of disposal of car is required for deregistration.

2) Car inspection system

Only commercial vehicles are required to be inspected annually under the Road Transport Act. Random inspection is conducted on the road and penalty is imposed on a commercial vehicle if it does not have a sticker indicating that it has been inspected annually. There is no inspection system for private vehicles. However, plans to introduce an inspection system for private cars are often proposed in connection with the deregistration policy. It is highly possible that an inspection system for private vehicles will be introduced in Malaysia.

(2) Dismantling of ELVs

There are very few companies dismantling ELVs in Malaysia. Used parts sellers generally dismantle used cars. Used parts sellers have press equipment and the like.

ELVs will be generated after four to five years. Proton started production from 1984 and the number was tens of thousands. However, from early 2000s, Proton began to produce more than 100,000 units. If the lifetime of cars is assumed to be 20 years, many ELVs will be generated from 2020.

(3) Flow of resources: steel and non-ferrous metals

Steel and non-ferrous metals are collected by scrap trading companies such as Thanam Industry Sdn Bhd, YS Metal auto parts, Sdn Bhd and many others. There are many scrap trading companies in Malaysia. Collected copper and iron are mainly recycled domestically because these companies are located in Malaysia. There are also aluminium companies in Malaysia, but aluminium scraps are used domestically and exported.

(4) Flow of resources: plastic

Plastics are collected by scrap trading companies. There are many scrap trading companies in Malaysia and some of them appear to be in the informal sector. Collected plastics are used domestically and exported.

3.4. Generation, flow, and treatment of hazardous wastes from ELVs (batteries, tires, etc.)

The 'Environmental Quality (Scheduled Wastes) Regulations 1989', which was revised in 2005, regulates hazardous waste such as batteries, catalysts, and waste oils.

(1) Tires:

Waste tires are not categorised as scheduled waste. Tire dealers usually employ private rubbish collectors to dispose their waste tires. They do not have any guidance or assistance from their principals or authorities for the proper management and disposal of waste tires. Private rubbish collectors collect waste tires. However, the extent to which these tires are disposed in an environmental friendly and legal manner is unknown.

Scrap tire collectors and traders collect and transport scrap tires from tire shops to retreading and recycling facilities or to the nearest landfill sites. Although collectors charge a fee to discard scrap tires, the extent to which these tires are disposed in an environmental friendly and legal way is unknown. In addition, high transportation fees are required when there is undefined coverage of collection.

Scrap tire traders identify and sort scrap tires according to their usage, either to send them to tire retreading or recycling centres. Traders are the brokers who buy tires that can be retreaded either from collectors or directly from the tire workshops. These traders then resell the tires that can be retreaded to the retreading facilities, both locally and internationally. The remaining tires go to the treatment facilities of scrapped tire or for other uses.

The ways to recycle and dispose tires are through: 1) recovery of rubber granules/rubber powder steel wires from the scrap tires, 2) production of reclaimed rubber, 3) pyrolysis treatment, 4) used for the cement industry, and/or 5) disposal.

(2) Batteries:

Batteries are categorised as scheduled waste—SW102 waste of lead-acid batteries in whole or crushed form. According to the Environmental Quality (Scheduled Wastes) Regulations (1989/2005), every waste generator of battery shall ensure that the scheduled waste generated is properly stored, treated on-site, recovered on-site for material or product from such scheduled wastes, or delivered to and received at prescribed premises for treatment, disposal, or recovery of materials or products from scheduled wastes. Recovery of materials or products from waste batteries is done at prescribed premises or at on-site recovery facilities. Residuals from the recovery of materials or products from scheduled wastes shall be treated or disposed at prescribed premises.

Generally, used batteries are collected and sold to recycling companies.

(3) Waste oils:

Waste oil is also categorised as scheduled waste—SW312 oily residue from automotive workshops, service stations, oil or grease interceptors. Every generator of waste oil shall ensure that the scheduled waste generated is properly stored, treated on-site, recovered on-site for materials or products from such scheduled wastes, or delivered to and received at prescribed premises for treatment, disposal, or recovery of materials or products from scheduled wastes. Waste oils are stored and reused for waste generator sites or collected and sold by waste oil collectors.

The recovery of materials or products from waste oils is done at prescribed premises or at on-site recovery facilities. Residuals from the recovery of materials or products from scheduled wastes are treated or disposed at prescribed premises.

3.5. Generation, flow, and treatment of end-of-life motorcycles

The flow of end-of-life motorcycles cannot be identified by the research. Based on the interviews conducted, they are brought to repair shops and the repair shops sell them to scrap companies.

3.6. Recycling companies and industry

(1) Dismantling companies

The generation of ELVs is limited. Therefore, there seems to be no ELV dismantling companies. However, there are more than 5,000 dismantling companies that dismantle imported half-cuts. For example, the Malaysia Automotive Recyclers Association (MAARA) has member companies that are: 70 percent used parts sellers and 30 percent scrap sellers. About 20 companies have licence to dismantle ELVs. Between 30 to 40 used parts companies are located in Kepong. Each company handles on average about one to two 40-feet containers per day.

There used to be two shredder companies in Malaysia before but now, Malaysia only has Amsteel (Mega Steel). Mega Steel is the only one with blast furnace and buys scrap from construction. Four electrical furnace steel production companies exist in Malaysia but there are no casting companies. Steel production is top in Southeast Asia.

(2) Downstream recycling companies

There are many scrapping traders for iron, copper, aluminium scrap, and plastic.

For iron, there is an association called 'The Malaysian Iron and Steel Industry Federation (MISIF)'. MISIF is the national industry association for manufacturers of iron and steel products. It has 152 member companies. There are other companies that are not members of MISIF like Amsteel.

For copper, there is the VCS Copper Industries Sdn Bhd, one of the largest manufacturers and exporters of high-quality copper wire produced from recycling of scrap copper. In 2006, VCS set up a state-of-the-art recovery cum manufacturing plant at Bukit Raja in Malaysia,

Malaysia's only manufacturer to recover scrap copper and use it for producing different forms of copper wire. VCS copper is producing at 18,000 MT/s per year.

Regarding aluminium, there are many companies like Press Metal Berhad and Daiki Aluminium Industry (Malaysia) Sdn Bhd. Press. Metal Berhad was established in 1986. They have a smelting capacity of 440,000 tons and an extrusion capacity of 190,000 tons per annum. They are the largest integrated aluminium producer in Southeast Asia.

Regarding plastic, there are many recyclers in Malaysia. However, it is difficult to identify which companies deal with plastic scrap from ELVs.

Table 5. Number of plastic manufacturers and plastic recyclers in Malaysia

Region	State	Plastics Manufacturers (PM)		Plastics Recyclers (PR)	
		Numbers of Industries	Recommended Sample Size	Numbers of Industries	Recommended Sample Size
Northern	Perlis	-	-	-	-
	Kedah	47	12	5	5
	Pulau Pinang	199	49	47	47
	Perak	129	32	14	14
Central	Kuala Lumpur	164	41	16	16
	Selangor	414	102	53	53
Eastern	Pahang	5	1	2	2
	Terengganu	2	0	1	1
	Kelantan	5	1	2	2
Southern	Negeri Sembilan	26	6	3	3
	Melaka	26	6	1	1
	Johor	201	50	29	29
TOTAL		**1218**	**301**	**173**	**173**

[1] Yamane Table can be sourced from Statistics, An Introductory Analysis, 2nd Ed., New York. Harper and Row.

Source: National Solid Waste Management Department, Ministry of Housing and Local Government, Malaysia 'A Study on Plastic Management in Peninsular Malaysia', December 2011.

(3) Management situation of recycling-related companies

Based on the interviews conducted by the study team, the number of employees of recycling-related companies (used parts factory) is from 15 to 120. The revenues vary depending on the size and domain of business. The revenue ranges from RM1 million to RM 20 million for the above companies.

4. Myanmar

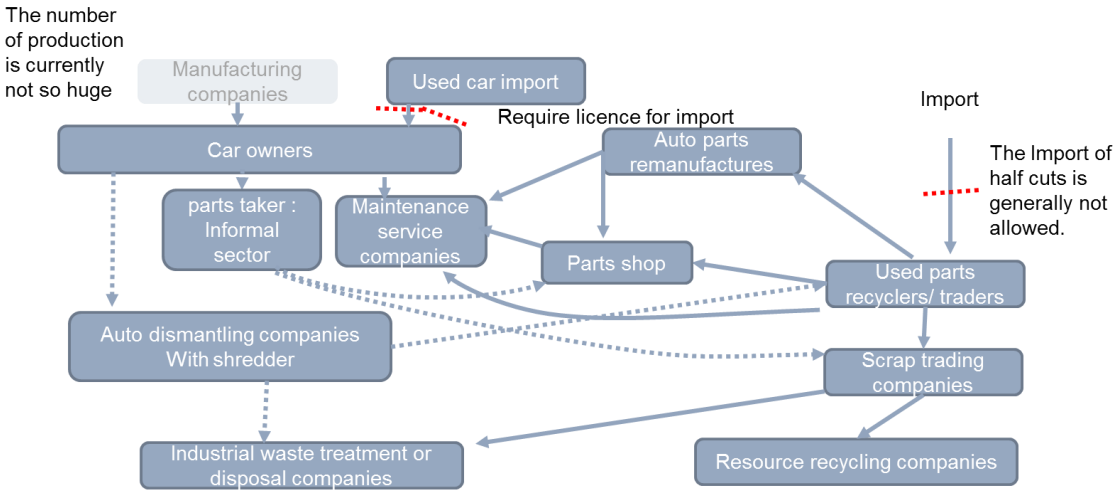
4.1. Overview

The overview of ELV recycling in Myanmar is illustrated in ELV – End-of-life vehicle.

Source: Study Team.

The importation of commodities in Myanmar requires an import licence. Import licences for used cars are issued in case the previous car is dismantled or is of a foreign currency account. There is no specific law for the importation of car parts. The importation of used parts is allowed, but the import of half-cuts is prohibited. Imported used parts are used domestically. The Myanmar Economic Corporation has two ELV dismantling sites. Car owners bring ELVs to these sites to get a new licence to import a used car.

Figure 3. Overview of ELV recycling in Myanmar



ELV – end-of-life vehicle.

Source: Study Team.

4.2. Status of trade of used cars and used parts

(1) Importation of used cars

The importation of commodities requires an importation licence in Myanmar. Importation licences for used cars are issued in case the previous car is dismantled or is of foreign currency account. The total number of imported cars was 149,621 in 2013. The number of cars imported from Japan was 120,836 in 2012, and 134,659 in 2013.

(2) Importation of used parts

There are no specific laws for the importation of car parts. The importation of used parts is allowed but the importation of half-cuts is prohibited. Imported used parts are used domestically. The Myanmar Economic Corporation has two ELV dismantling sites. Car owners bring ELVs to these sites to get new licences for the importation of used cars.

The exportation of used cars from Japan to Myanmar has been rapidly increasing since 2011, when the government announced a replacement programme for cars aged at least 40 years. Import licences became obtainable for cars made between 1995 and 2005. In 2012, the number reportedly went up to six times the number for the previous year. Although there are no public data by the Myanmar Government, estimates from other sources show that the number of used cars in Myanmar would be about 150,000 cars, of which approximately 90 percent come from Japan. However, this number may decrease in the future because of the prohibition of right-hand drive cars announced in 2013.

When analysed from a money-based perspective, the market size of used cars imported in 2011 was about $9,300,000,000. Japan took up 40 percent of the whole market, which was about $3,677,000,000.

The total sum of automobile car parts imported from Japan in 2013 was approximately ¥1,400,000,000, which includes new and used parts. This means the market is not large enough. However, because the cars had been coming into the country rapidly lately, the demand for used parts would possibly increase as a result of the rise in demand for maintenance of the imported cars.

Many of the recycled parts were imported from Malaysia and Thailand. Since Malaysia and Myanmar do not share a land border, some of the items are imported via Thailand. Moreover, because majority of cars in Myanmar are Japanese made, many recycled parts are for Japanese cars, which explains why the user's manual are often in Japanese. However, there are engines that have been imported from Dubai and Indian dealers import their parts from India. Based on these, we could conclude that part stores have their own way of buying their parts, depending on their race and connection.

One of the places where sold used parts end up is Ahlone district where many maintenance service dealers from Yangon gather and fix cars.

Used engines are sold in the Yadana area at $450 for Toyota Probox, and $1,000 for Toyota Vitz. Doors are approximately $5,000 for Toyota Probox ($8,000 for those with window glasses). Used Japanese front lights (set of two for left and right) cost approximately $20,000. However, there are some new imitation parts imported from China and they are about $3,500 each, which is cheaper than the Japanese used ones.

4.3. Generation, flow, and treatment of ELVs, used parts, and resources

(1) Generation of ELVs

The government controls the disposal of ELVs. The government also collects metals. On the other hand, the Ministry of Industry in Myanmar does not own a recycling facility for non-ferrous valuable metals and these metals are not supposed to be collected there.

(2) Dismantling of ELVs

Because of the replacement programme announced by the Myanmar Government in 2011, there are overwhelming amounts of cars, making a 3-km line, waiting to be scrapped in scrap

car plants. Before sending ELVs to dismantling facilities, the car owners request the informal sector to take off used parts. Brokers come to buy used parts from car owners.

The research team could not get much information from the scrap car plants. The reason is that they are operated and supervised by the Myanmar Economic Corporation, which is a corporation under the Myanmar Government. However, according to a dealer in Yangon, the plants also deal with used parts, making the process slower. Thus, not many cars are processed every day.

(3) Flow of resources: steel and non-ferrous metals

Scrapped cars taken to Myingyen are taken to an iron factory supervised by the Myanmar Ministry of Technology and put in an electric furnace. This iron factory is temporarily stopping its work, but it is estimated that the factory can deal with about 20 tons of iron annually.

Although iron is recycled under the strict control of the ministry system, it seems many other valuable metals are not recycled at all. Data shows that there are no government-related facilities for copper and aluminium recycling. Many people were not even aware that there were rare metals in catalysers inside muffler parts, and that those rare metals are put in electric ovens with other scrapped parts as iron scrap. Although rare metals might not be used in old modelled cars made in Myanmar, if the same process were to be conducted in the future, this could become an enormous loss of resource.

4.4. Generation, flow, and treatment of hazardous wastes from ELVs (batteries, tires, etc.)

(1) Batteries

The Yangon Metal Industry Company Limited is Myanmar's pioneer industrial lead smelter. It produces 99.9 percent pure lead and other various lead alloys, antimony, and calcium for industrial applications. Every day, they take in deliveries of used batteries, lead scraps, and other lead wastes from collection points, which are later sorted, smelted, and refined into quality lead products for industrial partners.

(2) Tires

There are informal sector recyclers of tires in Yangon. They turn discarded tires into flip-flops[14], buckets, and hard-to-find spare parts for used cars. Old truck tires are transformed into rubber washers and bushings for cars and rice mills. Around 300,000 cars, most of which are second-hand, are now on the roads and they need rubber bushings and washers.

[14] The most popular footwear in the rural areas.

4.5. Generation, flow, and treatment of end-of-life motorcycles

The study team could not acquire information on end-of-life motorcycles in Myanmar.

4.6. Recycling companies and industry

(1) Dismantlers

The dismantling of ELVs is operated and supervised by MEC), which is a corporation under the Myanmar Government. MEC launched two ELV dismantling plants in Myanmar. Before sending ELVs to the dismantling facilities of MEC, the car owners request the informal sector to take off used parts. Brokers come to buy used parts from car owners. In this case, recycling is mainly conducted by hand. The wastes are ultimately sold to recycling facilities.

On the other hand, household waste collectors and waste pickers collect waste products and sell to wholesalers, sometimes through brokers. Wholesalers subsequently sell to recycling facilities.

(2) Other Related Companies

(3) Batteries

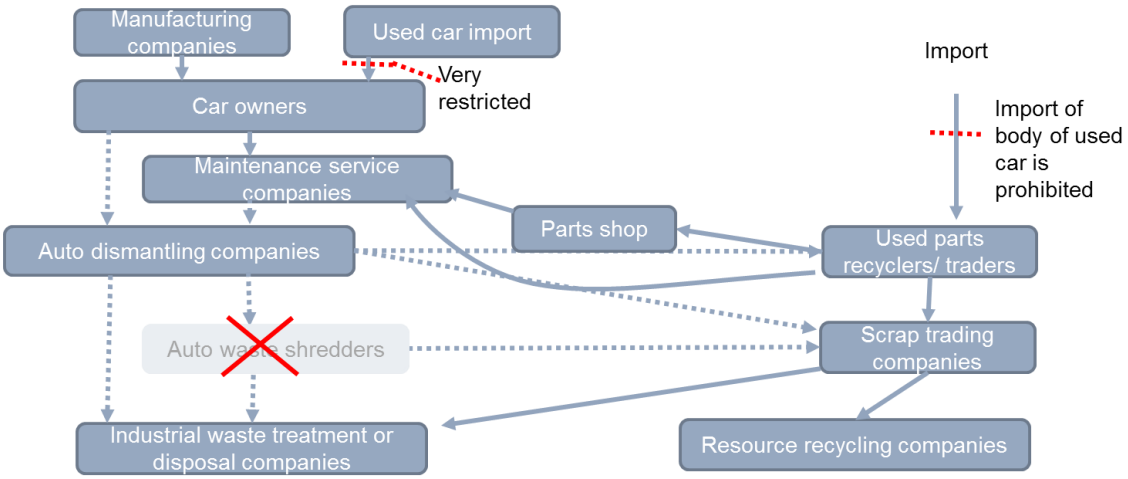
As previously mentioned, there is a pioneer industrial lead smelter in Myanmar, the Yangon Metal Industry Company Limited. They produce 99.9 percent pure lead and other various lead alloys, antimony, and calcium for industrial applications.

5. Philippines

5.1. Overview

The overview of ELV recycling in the Philippines is illustrated in Figure 4 Overview of ELV recycling in the Philippines. The importation of used cars is very restricted and is only allowed for special cases. The importation of used parts is also under control and the importation of bodies of used cars is prohibited. ELVs in the Philippines would first flow to repair shops where usable parts are taken out. After that, the remaining scraps are sent to junk shops.

Figure 4. Overview of ELV recycling in the Philippines



ELV = End-of-life vehicle.

Source: Study Team.

5.2. Status of trade of used cars and used parts

(1) Importation of used cars

In the Philippines, the importation of used private cars is prohibited under Executive Order No. 156, series of 2002 (EO 156), except for special cases (personal use or official use).

Executive Order No. 156, series of 2002 (EO 156)

Section 3. Used motor vehicles.

3.1 The importation into the country, inclusive of the Freeport, of all types of used motor vehicles is prohibited, except for the following:

3.1.1 A vehicle that is owned and for the personal use of a returning resident or immigrant and covered by an authority to import issued under the No-Dollar Importation Program. Such vehicles cannot be resold for at least 3 years;

3.1.2 A vehicle for the use of an official of the Diplomatic Corps and authorized to be imported by the Department of Foreign Affairs;

3.1.3 Trucks excluding pick-up trucks:

1. with gross vehicle weight (GVW) of 2.5–6.0 tons covered by an authority to import issued by the Department of Trade and Industry (DTI).

2. with GVW above 6.0 tons.

3.1.4 Buses:

1. with GVW of 6–12 tons covered by an authority to import issued by DTI;
2. with GVW above 12 tons.

3.1.5 Special purpose vehicles:

1. fire trucks
2. ambulances
3. funeral hearses/coaches
4. crane lorries
5. tractor heads or truck tractors
6. boom trucks
7. tanker trucks
8. tank lorries with high pressure spray gun
9. reefers or refrigerated trucks
10. mobile drilling derricks
11. transit/concrete mixers
12. mobile radiological units
13. wreckers or two trucks
14. concrete pump trucks
15. aerial/bucket flat-form trucks
16. street sweepers
17. vacuum trucks
18. garbage compactors
19. self-loader trucks
20. man lift trucks
21. lighting trucks
22. trucks mounted with special purpose equipment
23. all other types of vehicles designed for a specific use.

(2) Importation of used parts

The importation of used parts is restricted by Customs and Border Protection (CBP) Circular No. 1389, series of 1993, and Customs Memorandum Order (CMO) 21-2008. According to CMO 21-2008, all items classified as stock lots, side runs, cull rolls, seconds, mill lots, off grade, B-grade, C-grade, used, second-hand, off specs, substandard, off-quality, overruns,

sweepings, overflow, recycled, waste, reconditioned, refurbished, refashioned, surplus, scrap, scrap metals, metal waste, cut up, bath roll, odd lengths, and unbranded are subjected to 100 percent inspection in the presence of technical experts. Importers should also have an authorised manufacturer's or supplier's certificate of quality as to the actual condition of the articles, including the standard for the product being imported, and its deviation from such standards.

5.3. Generation, flow, and treatment of ELVs, used parts, and resources

(1) Generation of ELVs

End-of-life cars in the Philippines would first flow to repair shops where usable parts are taken out. Afterward, the remains, along with cars that have figured in accidents, are sent to junk shops.

Registration and Inspection

The main law governing vehicles in the Philippines is Republic Act (RA) No. 4136, the National Law on Traffic, which controls vehicle operations such as the registration and inspection of vehicles. The Department of Transportation and Communications (DOTC) is in charge of the use of vehicles and the operation of traffic rules.

New Car Registration

Starting April 2015, DOTC and the Land Transportation Office (LTO) strictly enforced the 'No Registration-No Travel Policy' for motor vehicles. This means all vehicles must be registered to be on the road. The prescribed procedure of registration is conducted at the LTO. Vehicle registration must be renewed every year. In order to renew the registration, users need to pay a Motor Vehicle Usage Charge (MVUC).

The rates of MVUC set by RA 8794, an Act imposing MVUC on owners, differs depending on the Gross Vehicle Weight (GVW) and vehicle classification as below. The rate is also different for specific vehicles such as taxies and cars registered before RA 8794 was enforced.

Licence to Transfer or Sell

Ownership of a car can be changed with required documents such as the original copy of the Deed of Sale at the LTO district office. However, according to the provisions of Batas Pambansa Blg. 43, an Act Providing Number Plates to Owners of Motor Vehicles and Trailers, change of licence plate is not allowed.

Re-registration

Owners can re-register at any LTO District Office. The schedule of re-registration depends on the plate number. The last digit of the plate number indicates the month of the registration, while the middle digit indicates the weekly deadline.

The LTO issued new standard licence plates in January 2015. Car owners who need to renew their registrations have to prepare an additional P450 for the licence plate fee. These new plates are claimed 45 days after the LTO registration renewal.

Deregistration

There is a deregistration system which is utilised by a few people. Registered vehicles are basically required to be renewed every year, however, it is not applied for inactive cars. If the owners want such cars to be activated again, they need to renew the registration and pay accumulated renewal fees.

Inspection

All motor vehicles, including passenger and commercial cars, are subjected to mandatory inspection prior to registration as per Memorandum Order (MO) No. 86-003 dated 3 June 1986. No motor vehicle is accepted for registration unless it is fully inspected in accordance with the standards and procedures for motor vehicle inspection. The three venues of inspection are LTO District Offices, Motor Vehicle Inspection Stations (MVIS) and Private Emission Testing Centres (PETC).

Annual inspection is mandatory, and a report of inspection is required to be submitted at the renewal registration. Owners of brand-new cars can skip the safety inspection for the first 3 years, but they need to take the emission inspection from the first year.

(2) Flow of resources: used parts

Used parts are sold in specific areas such as Evangelista in Metro Manila. In this area, many repair shops and used parts dealers have shops. They buy parts at the auction held in the port area. Such parts are imported from Japan, China, and Thailand,

(3) Flow of resources: steel and non-ferrous metals

Retrieved metals are sold to junk shops. Junk shops segregate metals. There, valuable metals are recovered from scrapped cars by hand. Copper is retrieved from wire harness by open incineration. These activities cause environmental pollution. Steel and non-ferrous metals are sold to scrap dealers.

(4) Flow of resources: plastic

Plastics and rubbers are also collected and recycled.

5.4. Generation, flow, and treatment of hazardous wastes from ELVs (batteries, tires, and the like)

(1) Batteries

Batteries are recycled by the formal licensed and government-regulated sector, primarily the Philippine Recyclers Incorporated (PRI), and the informal sector.

According to Mr Brian Wilson, the International Lead Management Centre (ILMC) Programme Manager, the formal licensed sector, primarily PRI, produced 23,000 tons of secondary lead, whereas the informal sector produced 12,000 tons. These statistics mean that the informal sector accounts for 30 percent of the secondary lead production in the Philippines.

(2) Used tires

Used tires are mainly recycled by informal sectors. Used tires are remanufactured as various rubber products such as cushion materials, flip-flops, and many more.

5.5. Generation, flow, and treatment of end-of-life motorcycles

Flow of end-of-life motorcycles cannot be identified during the research.

5.6. Recycling companies and industry

(1) Dismantlers

There is no specific registration scheme for vehicle dismantling and there is difficulty in the effective regulation of the industry. Dismantlers do not exist and dismantling is mainly conducted by repair and junk shops. Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity.

(2) Lead batteries

PRI is the largest and most advanced battery recycling facility in the Philippines. It supplies all the lead requirements of the Ramcar Battery group, the largest battery manufacturer in the Philippines. The company is certified to ISO 14001 and ISO9002, and has received numerous local awards and recognition for its environmental management efforts. However, PRI is no longer operating.

(3) Tires

Danglos Eco Systems invested in a modern tire recycling plant to help rid the Philippines of the waste tires and convert them into a useful bi-product known as rubber crumb.

(4) Waste oils

There are more than dozens of waste oil treatment companies in the Philippines and they are listed in the List of Registered Treatment/Storage/Disposal facilities for Hazardous Waste of the Department of Environment and Natural Resources.

Recyclers in Metro Manila

In Metro Manila, more than 50 percent of waste collected is organic/biodegradable, and 44 percent is recyclable or factory-returnable. The latter is comprised mostly of scrap paper (19%), plastics (17%), iron/metals (3%), aluminium (2%), glass (3%), and special hazardous waste (1%).

The National Solid Waste Management Commission (NSWMC) has a database of recyclers. According to the database, there are 24 plastic recycling companies, 1 used lead-acid batteries recycling company, and 6 tire recycling companies in the Philippines. The number seems to be smaller than the real activities.

Recyclers Locations (based on NSWMC database)

Type or Recyclables	No. of Recyclers	Locations (in Luzon / around Metro Manila)	Locations (ot than Metr Manila/ Luz
Plastics (HDPE, LDPE, PP, PS, PET, HIPS, PVC, Others)	24	Valenzuela (14) Manila (2) Quezon City (2) Caloocan Laguna Mandaluyong Muntinlupa Parañaque	Cebu
Paper (newsprint, office paper, other white grades, corrugated cartons, paper boxes)	14	Makati (2) Pasig (2) Quezon City (2) Caloocan Cavite Laguna	Davao

		Malabon Marikina Pampanga		
		Parañaque		
Used Lead-Acid Batteries	1	Bulacan		
Computers/ Electronics	1	Laguna		
Tin Cans	1	Mandaluyong		
Metals	2	Cavite Quezon City		
Container Glass	6	Cavite (2) Laguna Makati Manila	Cebu	
Flat Glass	1	Pasig		
Tetra Pak	*Usually also by paper recyclers			
Tires	6	Bulacan Las Piñas Manila Marikina Pasig Quezon City		
Total	56	53	3	

HDPE - High Density Polyethylene, HIPS - High Impact Polystyrene, LDPE - Low Density Polyethylene, NSWMC - National Solid Waste Management Commission, PET - Polyethylene terephthalate, PP - Polypropylene, PS - Polystyrene, PVC - polyvinyl chloride.

Note: Some Locations (e.g. Makati) are those of headquarters rather than plant facilities.
Source: National Solid Waste Management Commission Database.

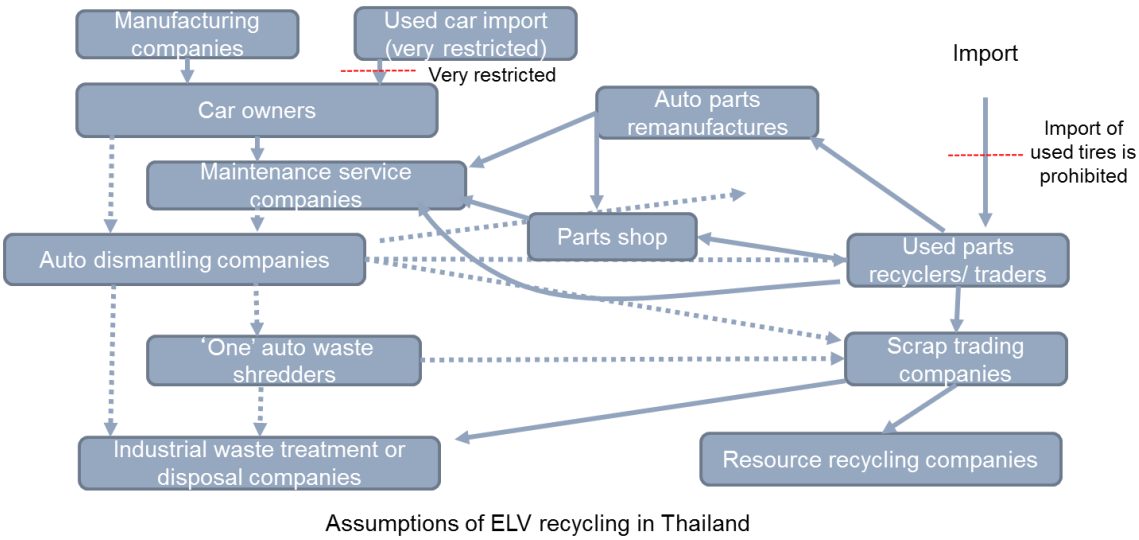
6. Thailand

6.1. Overview

The overview of ELV recycling in Thailand is illustrated in Figure 5. Overview of ELV recycling in Thailand. There are huge hubs of used car parts trade in Thailand. Thailand imports many half-cuts and used parts from other countries, but mainly from Japan. Many used parts recyclers/traders dismantle half-cuts. Some are domestically used and others are exported.

Locally generated ELVs are dismantled by auto dismantling companies. Some of the auto dismantling companies are in the informal sector. ELV shredders have already been introduced in Thailand. However, the number of ELV generation in Thailand is not so many to generate the need for dismantling by shredders. ELVs are dismantled manually.

Figure 5. Overview of ELV recycling in Thailand



Source: Study Team.

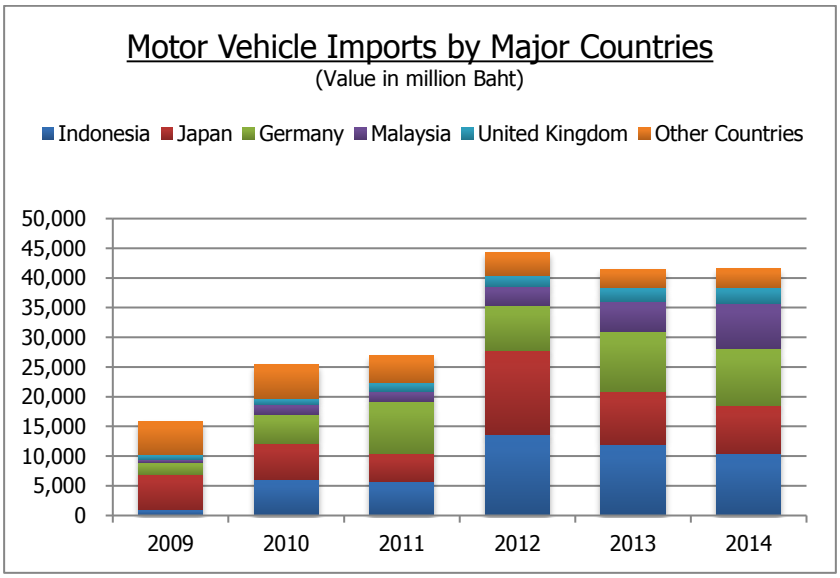
6.2. Status of trade of used cars and used parts

(1) Importation of used cars

The importation of used cars is strictly regulated in Thailand. Used/second-hand vehicles need to obtain an import permit from the Foreign Trade Department of the Ministry of Commerce. For vehicles less than 3,500 kilograms, the importers need to obtain an import permit from the Industrial Standard Institute as well. The total number of imported cars in Thailand in 2013 was 16,357.

The cumulative bar graph shows automobile (HS code: 870321 - 870390) imports, including used cars, to Thailand from 2009 to 2014. The total volume of imports in 2012 grew 16 percent from the previous year due to the Thai Government incentive programme for first-time car buyers.

Figure 6. Thailand's automobile imports



Source: Thailand Ministry of Commerce.

(2) Importation of used parts

Thailand prohibits the importation of some used parts such as used tires, used engines and parts for motorcycles. The importation of used diesel engines requires an import permit. As mentioned, Thailand imports many half-cuts and used parts from other countries, mainly from Japan. Many used parts recyclers/traders dismantle half-cuts. Some of the used parts are domestically used and the others are exported.

According to the estimate of Yano Research Institute, a total of ¥9.25 billion of used parts were imported from around the world. Among these, about ¥8.25 billion was from Japan.

6.3. Generation, flow, and treatment of ELVs, used parts, and resources

(1) Generation of ELVs

In Thailand, drivers continue to use even old types of used cars. If used cars become older and older, they are likely to be resold from urban to rural areas or from Thailand to neighbouring countries such as Myanmar, Lao PDR, and Cambodia. Therefore, ELVs can be seen in rural areas in Thailand. Some of the industrial scrap trading companies are considering the introduction of shredders, but according to them, the amount of generation is not enough.

The price range of used cars is from B300,000 to B800,000. According to the report, used cars ranging from B350,000 to B400,000 (¥1.14 million to ¥1.3 million approximately) are popular.

In 2014, the number of ELVs was 164,934. The number of used car distribution was about two million in 2013.

Role of Department of Land Transport
The Department of Land Transport (DLT) under the umbrella of the Ministry of Transport is in charge of new car registration, transfer or selling of licences, re-registration, suspension, and deregistration.

New Car Registration
In Thailand, all types of vehicles must be registered. DLT is in charge of car registration and inspects vehicles in the following manner:

- Private inspection stations authorised by DLT carry out inspections of motorcycles and taxis i.e. vehicles registered under the Motor Vehicle Act (MVA).
- Car owners have to pay a road tax.
- Compulsory insurance is also required.

DLT administers two relevant pieces of legislation:

- Motor Vehicle Act (MVA) for smaller vehicles, including cars, pickups, and motorcycles, taxis and so on.
- Land Transport Act (LTA) for heavy-duty diesel vehicles, including buses and trucks.

A motor vehicle shall be registered at a Land Traffic Office over the car owner's registered address. If the owner mostly wants to use the vehicle at some other area, he/she may have it registered at a Land Traffic Office with such a jurisdiction.

The tax fee for the registration depends on the type and age of the vehicle. Typically for a motorbike, it is around B300 to B400. For a car, the fee starts at around B1,000 (for engines up to 2,000 cubic centimetre). The average price is about B2,000 but it can go up to B6,000 to B7,000 for a four-door pickup. The fee is the same each year for the first 5 years and it is reduced by 10 percent every year up to a maximum of 50 percent.

At present, motorcycles and cars aged more than 5 and 7 years respectively must be inspected before their registration can be renewed. The registration system relies on a logbook which is tied to the vehicle or motorcycle.

Transfer or Selling of Licence
Car owners are required to transfer the registration in case of change of ownership, colour and/or engine.

. Re-registration
Registered cars are required to renew their registration every year after registration and car owners have to present certifications of automobile tax, inspection, and compulsory insurance at the time.

Suspension
In case of suspension of use of registered car over 15 days, the car owner is required to submit an application.

Deregistration
Deregistration is obligatory within 15 days after the owner has stopped to use the vehicle

in Thailand. If a car owner does not pay the registration fee for more than 3 years, the car will be automatically deregistered.

Inspection
The responsibilities of owners for periodic inspection of in-use vehicles are divided as follows:

- DLT inspects vehicles regulated under the LTA; and
- Private inspection stations authorised by DLT carry out inspection of motorcycles and taxis (vehicles registered under the MVA).

The Ministry of Industry supported the improvement of automotive testing centres, enabling them to conduct testing according to international standards as well as testing related to non-tariff measures to trade (for example, ELV management).

DLT established privately operated inspection stations in 1994. At present, there are 225 centres in Bangkok Metropolitan Region (BMR). The distribution of centres is as follows: 169 centres in Bangkok, with a further 56 in the surrounding provinces that make up the balance of the BMR. About 70 percent of the centres also do repairs.

Personal vehicles are required to be inspected every year after seven years of its new registration. Commercial vehicles have to be inspected every year after registration.
DLT has 13 staff in Bangkok who are responsible for monitoring the quality of inspections. Each station is only monitored on average three times per year. There is no centralised reporting.

(2) Dismantling

ELVs generated domestically and imported are dismantled in dismantling companies in Thailand. Dismantling is conducted mainly by hand and the waste oils and CFCs are not properly treated, which threatens labour safety.

Steel scraps generated in the process of dismantling are sent to recyclers and catalysers inside mufflers, including rare metals, are sold to recyclers.

(3) Flow of resources: used parts

Areas where used parts dealers gather are dotted in Thailand. Small-scale dealers conduct their business in those areas. There are dealers specified in specific items, and they deal with used parts coming from both inside and outside of the country. Those dealers send their dismantling skilled staff to dismantling work places in Japan, and then the dealers import used parts from Japanese dismantling sites where their staff work. In addition to automotive repairers and parts' brokers, end users sometimes purchase the parts directly.

The parts can be re-exported. Thailand allows dealers to import only those which can be sold as parts if they are valuable as resources.

(4) Flow of resources: steel and non-ferrous metals

Steel scraps and unsold mufflers are pressed by steel recyclers and then re-refined after selling to electric furnace operators and steel mills.

Used parts that cannot be sold are recycled by metal recyclers who can handle parts other than automobiles. Harness, for example, is refined to copper by dealers other than dismantlers.

Dismantlers break used cars into parts. Waste oils and CFCs are not recycled.

(5) Flow of resources: plastics

Plastics from ELVs are collected and pelletised. Plastic scraps are sold to plastic manufacturing companies or traders.

6.5. Generation, flow, and treatment of hazardous waste from ELVs (batteries, tires, etc.)

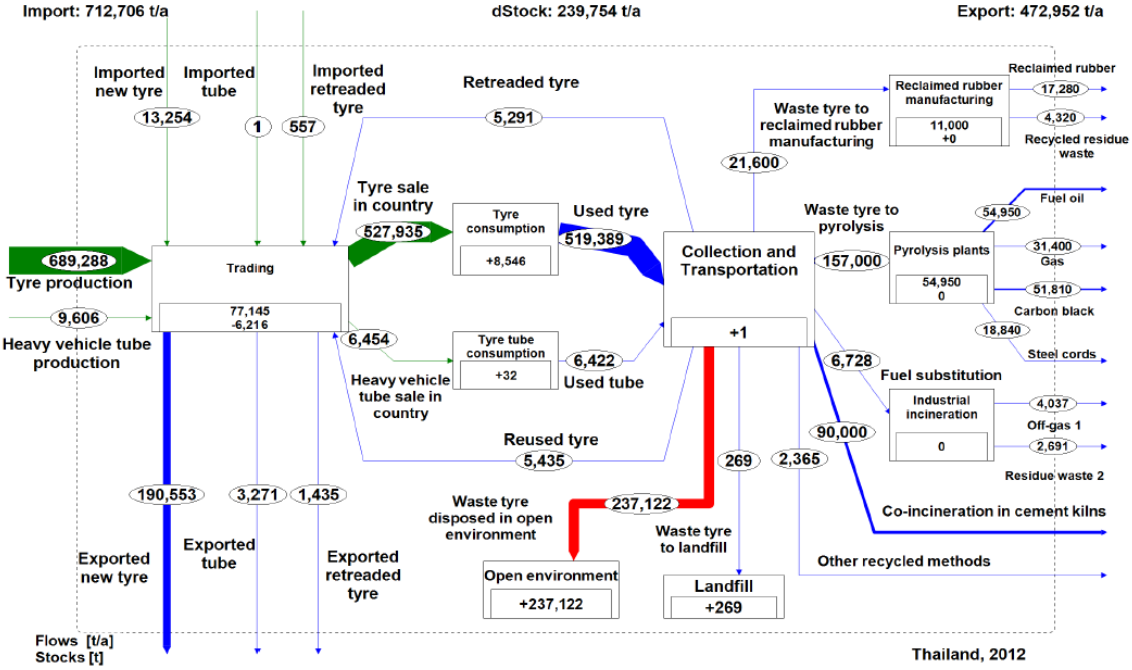
(1) Batteries

Batteries are collected by the informal sector, recycling companies (for example, T.K. Metal Trading Limited Partnership), and trading companies among others. Some of the collected batteries are recycled domestically, and the others are exported, mainly to China.

(2) Used tires

Approximately 529,000 tons of used tires are collected annually. Nearly 50 percent of waste tires goes into the open environment without proper collection and treatment, while very less is recycled as reclaimed rubber, and energy contained in the tire is recovered through co-incineration and pyrolysis processes. Cement kilns are identified as one of the potential industries to utilise waste tires as fuel substitution in their energy intensive cement production processes.

Figure 7. Tire recycling in Thailand



Source: Tasawan Suparat (2013), Waste Tyre Management in Thailand: A Material Flow Analysis Approach.

6.6. Generation, flow, and treatment of end-of-life motorcycles

There is no reliable estimate of generation of end-of-life motorcycles. End-of-life motorcycles are sent to junk shops and parts are taken out and recycled as steel and the like.

6.7. Recycling companies and industry

(1) Dismantling companies

Dismantlers commonly offer to buy damaged automobiles and ELVs. At the same time, they sell imported used parts and brand new parts. Dismantling seems to be conducted mainly by hand. Waste oils and CFCs are not properly treated so these may cause soil and air pollution. In Thailand, recyclers collect wastes and people either bring them to recyclers nearby or brokers bring them to recyclers after buying waste.

Dismantlers and used parts traders who import half-cuts and used parts are located in specific areas such as Bang Na, Ptathumwang, and Phaholyothin Frontage Road. Originally, such dismantlers and used parts traders were mainly located in Ptathumwang, a real estate of Chulalongkorn University. Chulalongkorn University rents apartments at very cheap prices and, therefore, people come to gather in these areas. In 1990, the contract between dismantlers and used parts traders and Chulalongkorn University expired. Then, in 2000, Chulalongkorn University requested dismantlers and used parts traders to leave the area. At

first, there was huge objection from dismantlers and used parts traders but recently, the dismantlers have left Ptathumwang and moved to Bang Na and Phaholyothin Frontage Road.

(2) Downstream recycling companies

After separating and processing recyclable wastes, recyclers sell processed wastes to steel plants and plastic recyclers. The exact number of dealers is unknown because special registration or permission is not required when conducting automotive businesses. Permission for antiquary is required in order to sell used parts.

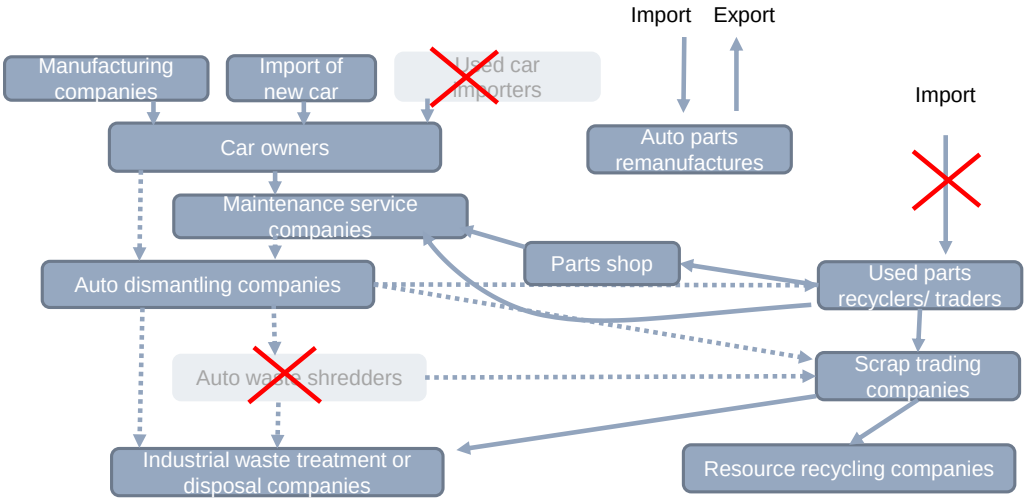
Regarding batteries, AP Honda is now collecting batteries from used motorcycles and sends them to T.K. Metal Trading Limited Partnership.

7. Viet Nam

7.1. Overview

The overview of ELV recycling in Viet Nam is illustrated in Figure 8. Overview of ELV recycling in Viet Nam. The importation of commodities requires an import licence in Viet Nam. Import licences for used cars are issued when the previous car is dismantled or of a foreign currency account. There is no specific law for the importation of car parts but for the acquisition of licences. The importation of used parts is allowed but the importation of half-cuts is prohibited. Imported used parts are domestically used. Car owners bring ELVs to the sites to get a new licence for the importation of used cars.

Figure 8. Overview of ELV recycling in Viet Nam



ELV = End-of-life vehicle.
Source: Study Team.

7.2. Status of trade of used cars and used parts

(1) Importation of used cars

A used automobile can be imported into Viet Nam, although import duties are high and the procedure is complicated. The present owner of the vehicle must be the original owner. If the automobile has changed ownership, the vehicle cannot be imported into Viet Nam. The vehicle must have been legally registered in the owner's home country for at least six months, have a minimum mileage of 10,000 kilometres, and cannot be more than five years old.

Vehicles may enter the country through one of four ports: Cai Lan in Ha Long City, Hai Phong, Danang and Ho Chi Minh City. Viet Nam Customs is in charge of the import of any vehicle into Viet Nam. Two- or three-wheel vehicles of 175 cubic centimetres and above are required to have an import licence.

Types of vehicles banned from import (according to the government's Decree No. 12/2006/ND-CP dated 23/1/2006) are right-hand drive vehicles (including converted drive vehicles or disassembled vehicles), except for special purpose vehicles with right-hand drive operating in a small area such as: crane lorries, breakdown lorries, road sweeper lorries, spraying lorries, rubbish lorries, passenger buses at airports, pick-up trucks, concrete-mixer lorries, and vans working in parks and golf courses.

The total number of imported cars in 2013 was 17,692. Because the trading data in Viet Nam does not separate categories into used cars and new cars, the study team could not confirm the accurate number of total used car imports. However, the team was able to estimate the rough number by adding up the number of used cars exported to Viet Nam from over 32 countries.

It can be concluded that the number of used car imports are few because it is technically impossible to import used cars for business. On the other hand, considering the data that there are certainly a few used cars exported from Japan to Viet Nam and from other countries, the team cannot deny the possibility that there might be some illegal used car imported.

(2) Importation of used parts

In Decree No. 12/2006/ND-CP, dated 23/1/2006, second-hand vehicles include:

- Engines, frames, inner tubes, tires, accessories, and suspensions of cars, tractors, and two-wheeled and three-wheeled vehicles;

- Under-carriage frames of motorised cars and tractors (including new underframes with second-hand motion and/or second-hand underframe with new motion);

- Motorised two-wheeled and three-wheeled vehicles;

- Ambulances; and

- All types of cars with structures and functions altered from the original design.

7.3. Generation, flow, and treatment of ELVs, used parts, and resources

(1) Generation of ELVs

In Viet Nam, there is a law on the limitation of service of cars (expiration period). Commercial cars cannot be used for more than 22 years, and private cars cannot be used for more than 25 years.

In Viet Nam, vehicles' penetration rate is low. Besides, drivers tend to use their vehicles until they are broken. Therefore, the number of ELVs is low. ELVs are broken into parts informally and sold as parts. Some resources from ELVs are recycled. Automobile recycling business is mainly conducted in areas such as 'Te Lo' village. Operators collect ELVs and bring them to the areas where ELVs are broken into pieces by hand.

Waste disposal and recycling is conducted in 'Craft Villages', which are industry integrated areas located mainly in the Red River Delta and South Central Coast region in Viet Nam. Craft villages tend to deal with one type of item in industrial clusters such as Da Tien village for tires, and Mansart or Quan Do villages for aluminium.

(2) Flow of resources: used parts

There is a used parts market called 'Gioi', which is likely to be illegal. New parts are possibly made in China and brought in by land.

The demand for automobile parts is met because, in addition to imitation parts made in China, the number of cars itself is low in Viet Nam. Therefore, in many cases, used auto parts are reused in agricultural machinery.

(3) Flow of resources: steel and non-ferrous metals

Recycling of non-ferrous metals is carried out in 'Craft Villages', which are specified for metals or resources. Like other wastes, after sorting out the metals brought by recyclable collectors manually, they are refined.

There are many small-scale steel plants in Da Hoi village. They recycle steel into construction materials from steel scraps by using small electronic furnace. Small-scale steel plants do not have appropriate pollution prevention equipment. As a result, they cause air pollution.

There are also many household businesses recycling non-ferrous metals such as aluminium. In Bac Giang Province, there is an area where many such companies are gathering. Workers do not work with appropriate equipment such as masks. Therefore, there might be an occupational health risk.

As for circuit boards, since there are no facilities that can deal with rare metals, the substrate is exported to China as it is.

(4) Flow of resources: plastics

Plastics from ELVs are collected and pelletised. Plastic scraps are sold to plastic manufacturing companies or traders.

7.4. Generation, flow, and treatment of hazardous wastes from ELVs (batteries, tires, etc.)

'Decision 50/2013/QD-TTg', issued by the Prime Minister, prescribes that, from 1 January 2015, enterprises producing waste products are responsible for the retrieval and disposal of discarded products, which include hazardous substances such as batteries. Before the decision was issued, there were no facilities that could collect CFCs, discarded products were manually dismantled, CFCs collection facilities did not exist, and waste oils were not collected.

(1) Batteries

Batteries are collected and dismantled by small household businesses, which are mainly in the informal sector. Batteries are cut without appropriate pollution prevention measures. In many cases, sulfuric acid is discharged to rivers without treatment. In addition, occupational heals risk is a huge problem because the workers cut batteries without masks and gloves. Workers face the risk of lead poisoning. By an initiative of the Vietnamese Government, recycling facilities of batteries and lead have been established. There are seven permitted battery recycling facilities in Viet Nam with capacity of around 100 tons per day.

(2) Used tires

Used tires are collected by small companies, mainly in the informal sector. After being cut into small parts, used tires are sold to traders or companies using them as fuels for manufacturing companies, e.g. cement companies.

(3) Waste oils

There are 23 permitted facilities in Viet Nam with capacities of around 10 tons per day, besides other illegal recycling facilities. One of them is Long Hung Company. Their characteristics are as follows:

- Oil distillation (fractional distillation and simple distillation);
- Oil water separation by mechanical method (centrifugation) and heat;
- Simple distillation technology (simple equipment, easy to manufacture, install, and operate, low investment); and
- Fractional distillation technology (produce diesel oil).

7.5. Generation, flow, and treatment of end-of-life motorcycles

In Viet Nam, motorcycles are dismantled in the recycling villages. In Te Lo village, there are motorcycle dismantlers and traders. Used motorcycles are collected, and some are sold as second-hand motorcycles, or dismantled by taking out the available parts. The scraps that have been dismantled are sold.

Steel scraps and aluminium generated in the dismantling process are sold to electric furnace companies. Tires and plastics are sent to specialised traders. Tires are recycled into asphalt and sandals. A motorcycle dismantler interviewed by the study team handled 10 to 30 units per month.

7.6. Recycling companies and industry

Among all disposal wastes, the volume of automotive parts to be treated is low. Various wastes, including home appliances, are dismantled and sorted manually. Afterwards, metals retrieved in the process go to the craft villages that specialise in the item.

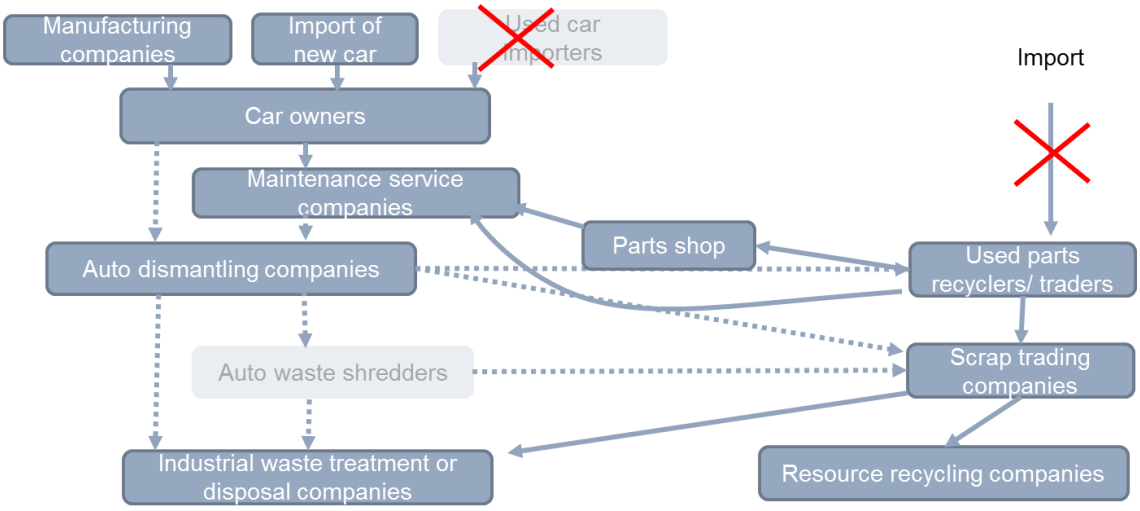
Viet Nam is in the process of introducing legislation to control ELV recycling and making preparations for the introduction of an ELV legislative management system.

8. India

8.1. Overview

The overview of ELV recycling in India is illustrated in Figure 9. Overview of ELV recycling in India. The importation of used cars and parts is prohibited in India. The number of automobile is increasing, and more and more ELVs are being generated. Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity. Used parts are dismantled, refurbished, and sold by dismantlers to second-hand spare outlets located in the same scrap yards. Scrap metals, aluminium, and plastics from ELVs are collected by dealers and used as materials.

Figure 9. Overview of ELV recycling in India



ELV = End-of-life vehicle.
Source: Study Team.

8.2. Status of trade of used cars and used parts

(1) Importation of used cars

Used car importation is very limited in India due to harsh trade barriers. The domestic used car market is large, as the number of transactions for used cars equals that for new ones.

(2) Importation of used parts

The importation of remanufactured, rebuilt, and/or used motor vehicle parts is not permitted.

8.3. Generation, flow, and treatment of ELVs, used parts, and resources

(1) Generation of ELVs

The registration of motor vehicles in India is governed by the country's Motor Vehicles Act of 1988. Motor vehicles cannot be used unless they are registered. Every owner of a motor vehicle must have it registered by a registering authority in his or her residence or place of business where the vehicle is normally kept. Section 41 of the Act details the steps to register a motor vehicle in India.

Cars that have figured in accidents are auctioned off in India. Currently, the informal sector is taking in ELVs, but the industry is reported to have many problems. The working condition is very bad for the estimated 100,000 recycling workers who face severe health threats. Little treatment is done for hazardous materials, resulting in air, water, and soil pollution in these informal recycling centres situated in city centres. Testing of the formal mechanised recycling process has been started at the Recycling Demonstration Unit of the Global Automotive Research Centre, which can properly treat batteries, oils, airbags, and other materials.

Old vehicles are repaired by the informal sector and those that cannot be repaired are sent to dismantling centres as ELVs. Bulk disposers such as companies and government institutions sell ELVs at auctions. Individual owners trade in their old cars for new ones at car dealers or they go to the local dismantling centres.

Used cars used to be traded by small-scale dealers or acquaintances in India. However, the situation has changed these days. Major automobile manufacturers such as Maruti Suzuki, Toyota, and Tata have launched programmes to deal with used cars, which support the expansion of the ELV market.

Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity. The working condition is very bad for the estimated 100,000 recycling workers who face severe health threats. Furthermore, there is not enough space for a facility. Vehicles are dismantled in scrap yards located inside the cities with the use of hand tools, hammers, and the like. Historically, these locations were in the city outskirts but they are now in busy residential areas, often in the heart of the city.

Currently, dismantling is centred in the informal sector, offering employment to nearly 15,000 people directly and 80,000 people indirectly.

There is not a single shredder in operation in India for ELVs. The small volumes are not enough to make the operation of shredder economically viable. The Ministry of Steel is proposing to install shredders where ELV volumes are guaranteed.

(2) Flow of resources: used parts

Used parts are recovered, refurbished, and sold by dismantlers to second-hand spare outlets located in the same scrap yards. Used parts such as bumpers, headlamps, bonnets, steering wheels, batteries, among others, are used.

(3) Flow of resources: steel and non-ferrous metals, and plastics

An estimated 410,700 tons of metal, aluminium, and plastic scraps are sent to scrap dealers. Around 700-800 tons of rubber and plastic that cannot be recycled are dumped in open garbage areas.

8.4. Generation, flow, and treatment of hazardous wastes from ELVs (batteries, tires, among others)

Generally, little treatment is done for hazardous materials, resulting in air, water, and soil pollution in recycling facilities.

(1) Batteries

Battery is sold to spare shops and the like, though there are formal regulations concerning the disposal of used batteries. Regulations exist for the return and recycling of batteries, but these are not strictly enforced.

(2) Tires

Scrap tires are either retreaded, sold to small industries, or discarded into garbage dumps. Scrap tire collectors and traders collect and transport scrap tires from tire shops to retreading and recycling facilities, or to the nearest landfill sites.

(3) Engine Oils

Engine oil is used as fuel for industrial furnaces and boilers or as recycled oil after distillation. Oil without the process of distillation is used as lubrication for crane wire and gear oil.

(4) Waste Oils

Several kinds of waste oils such as transmission oil, coolant, power steering oil, brake oil, hydro oil, and gear oil are mixed and treated by heat. Afterwards, they are used as lubrication for gears after chemical congelation.

The testing of the formal mechanised recycling process has been started at the Recycling Demonstration Unit of the Global Automotive Research Centre, which can properly treat batteries, oil, airbags, and other materials.

8.5. Generation, flow, and treatment of end-of-life motorcycles

While sales of new cars and commercial vehicles declined in the country, powered two-wheelers saw modest growth of 2.3 percent during the financial year 2012-13.

In the 12 months to the end of March 2014, the demand for two-wheeled transportation climbed 7 percent to 16.9 million units. According to the Society of Indian Automobile Manufacturers (SIAM), in the first half of this financial year, growth more than doubled to 16 percent, to a record sale of 8.17 million units. That figure represents nearly one-fifth of the world's total motorcycle, scooter, and electric bicycle sales.

According to automotive supplier Bosch, the volume will continue to grow. The company expects the two-wheeler market in India to reach 27 million units by 2020.

The study team could not get information on end-of-life motorcycles. However, as the motorcycle is one of the subjects of the Draft Automotive Industry Standard for ELVs, drafted by SIAM, the regulation on end-of-life motorcycle is expected to be concretised and strengthened.

8.6. Recycling companies and industry

Both large-scale organised companies and small-scale informal sector businesses deal with ELVs in India. The former buys and sells bulk ELVs at auctions and sells them to scrap dealers once they have picked the reusable parts. The latter manually deals with picked parts that cannot be reused.

(1) Batteries

Small recyclers dominate the Indian market. Most rely on coal to fuel crude furnaces. Furthermore, the quality of lead derived from these operations is insufficient to be used in producing high-quality long-life lead batteries.

According to a study of the Occupational Knowledge International 2010, there are 336 registered recyclers for lead batteries in India. However, most of these facilities are small scale, and very few are likely to operate efficiently and with sufficient pollution control measures.

(2) Tires

In India, waste tire recycling plant companies exist.

Fab India is a manufacturer of recycled waste tires and a pioneer in the field of designing, developing, and quality manufacturing recycled tires with more than 20 years' experience. It is located in Ahmedabad, Gujarat.

Divya International is a manufacturer of recycled waste tires and equipment spare parts with a professional approach that is aimed at result orientation. The company installs quality pyrolysis machineries across India. Divya International today is one of the leading manufacturers of pyrolysis in India.

S&J Granulate Solutions Pvt. Limited is a company that started production in their new fully automated Eldan tire recycling plant in 2012. The plant, which is located in the Vapi region, Gujarat, India, currently has the highest capacity of any such facility in India. The production line is capable of processing up to 5,000 kilograms of shredded used tires per production hour.

CHAPTER 3

Current challenges and considerations in automobile recycling laws and institutional systems in vehicle recycling

This chapter describes the current challenges and considerations in automobile recycling laws and institutional systems in vehicle recycling in Cambodia, Lao PDR, Indonesia, Malaysia, Myanmar, Philippines, South Korea, Taiwan, Thailand, Viet Nam, and India.

The challenges in the vehicle recycling system in each country, such as illegal dumping, inappropriate processing of wastes, stringent situations of final disposal sites, dismantling technology, safety, efficiency, and recycling rates are briefly presented. The challenges that need to be addressed in the institutional system include improper processing of designated recovery items such as fluorocarbons, airbags, and Automobile Shredder Residues (ASRs); roles, obligations and economic burdens among production officers (manufacturers and importers), related operators, vehicle users and government agencies including local governments; and the presence or absence of environmental regulations such as landfill and incineration bans and heavy metals use bans.

1. Cambodia

All vehicles in Cambodia are required by law to be registered. The Department of Transport, Ministry of Public Works and Transport, is responsible for issuing the vehicle licence, registration certificate, and any authorisation concerning transport. Cambodia does not have an adequate legal system or equipment for the treatment of hazardous wastes. In Cambodia, car trading is mostly done through the unofficial 'grey market' due to the expensive import tax, especially for new cars. This means that the importation of used cars through unofficial routes is far cheaper. Cars imported include accident salvage cars, most of which are imported from Japan. Some report the emission of hazardous wastes from components such as batteries and crankcase oils. Tires, which are also imported as used parts mainly from Japan, generate environmental problems such as waste accumulation and fire hazards, where tires in disposal sites catch fire[1].

[1]Biopolitics International Organisation. http://biopolitics.gr/biowp/wp-content/uploads/2013/04/VOL-V-Phyrun.pdf
http://www.thaiscience.info/Article%20for%20ThaiScience/Article/4/Ts-4%20is%20importing%20second-hand%20products%20a%20good%20thing%20the%20cases%20of%20computers%20and%20tires%20in%20cambodia.pdf

As for challenges, it is difficult to obtain the correct number of ELVs. Using old cars threatens people's safety and the environment.

There is no specific registration scheme for vehicle dismantling facilities and there is difficulty in the effective regulation of the industry. The capacity of formal governmental waste collection/treatment service is insufficient. The gap is filled by the informal sector, that is, the waste pickers. As dismantling is done by the informal sector, the components and scraps are circulated through the informal route. Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity. Environmental measures such as prohibition on illegal dumping of waste and collection of chlorofluorocarbons (CFCs) and the like are insufficient. Metallic component recycling is done manually. This causes labour safety issues.

The volume of automotive scrap required to promote ELV recycling is insufficient. Used parts are illegally imported from other countries. Imported used parts cause environmental pollution due to the lack of environmental measures from import dealers.

- Rebuilt parts are not popular due to the lack of awareness of parts dealers and their low quality.
- Non-valuable resources are not properly collected and, in some cases, illegally dumped.
- Metallic component recycling is done manually. This causes labour safety issues.

With respect to the downstream recycling and treatment facilities, there is no adequate legal system or equipment for the treatment of hazardous wastes. The emission of hazardous wastes from components, such as batteries, crankcase oils, and tires, causes environmental problems such as waste accumulation and fire hazards where tires in disposal sites catch fire. Due to the lack of processing facilities, CFCs are released into the atmosphere without being properly recovered. Metallic component recycling is done manually. This causes labour safety issues.

2. Lao People's Democratic Republic

In Lao People's Democratic Republic (PDR), only diplomats may import vehicles, and they may do so by obtaining a letter from the Ministry of Foreign Affairs verifying their status and requesting a customs permit to import duty free.

The procedure to import a vehicle for a non-diplomat is time consuming and tedious. Vehicles are subject to duties assessed on the type, age, and engine size of the vehicle and can be as high as 300 percent of the new purchase value of the vehicle.

All types of imported mechanised vehicles that need to be registered and used permanently in Lao PDR are required to have structures in accordance with the technical standards of the production factories, steering wheels on the left hand side, and qualities in accordance with the technical standards issued by the Ministry of Communication, Transport, Post and Construction.

On the other hand, specific regulations are issued to define the conditions and technical standards of vehicle that are authorised to be imported for registration and use in Lao PDR, including the importation of vehicle accessories for assembling, in compliance with the relevant laws and regulations of Lao PDR. (More details can be found in http://www.laotradeportal.gov.la/index.php?r=site/display&id=45).

The Law on Land Transport in Lao PDR distinguishes between vehicles owned by a transport company and those owned and used by individuals and organisations. Different regulations apply according to how a vehicle is classified.

Vehicles used for transport enterprises and specialised transport require the following items:

- Registration as a transport vehicle;
- Valid licence plates;
- Compliance with the technical requirements for transport;
- Relevant insurance (Law on Insurance No. 11/90/PSA dated 18 December 1990, Article 37);
- Payment of annual road usage fees; and
- Technical inspection as required by rules and regulations (Law on Land Transport No. 03-97/NA dated 12 April 1997, Article 16.).

All types of mechanised vehicles of civilians, including heavy machinery, such as bulldozers, excavators, motor graders, compactors, and other heavy machinery, shall be registered and shall have licence plates in accordance with the regulations issued by the Ministry of Communication, Transport, Post and Construction. Only authorised state organisations have the authority to produce and issue driving licences, vehicle registrations, and licence plates[2].

3. Indonesia

There are currently no provisions on automobile recycling and/or the management of ELVs in Indonesia. In addition, the following issues surrounding the waste management sector in general could also indicate potential challenges for vehicle recycling in Indonesia (Chaerul, Tanaka, and Shekdar, 2007):

- lack of national policy and legal framework for municipal solid waste (MSW) management;

[2] References:
http://thailand.nlambassade.org/binaries/content/assets/postenweb/t/thailand/nederlandse-ambassade-in-bangkok/import/landeninformatie/laos/met-de-auto-naar-laos

- low coverage service for waste transportation;
- use of improper waste storage at generation points; and
- lack of appropriate final disposal practices.

In addition to current regulatory deficit on ELV management and challenges surrounding the waste management, the system for the processing of the three designated recovery items (fluorocarbons, airbags, and ASRs) has not been institutionalised so far.

Private vehicle companies in Indonesia implement their own ELV recycling to comply with laws abroad such as the European Union (EU) Directive 2000/53/EC or the Japan Automobile Recycling Law of 2005. These companies practice a take-back scheme, which gives users the option to return their used ELVs upon meeting the following requirements:

- The vehicle must be free from additional waste.
- All key components such as drive systems (engine, transmission, and so on), chassis, body, catalytic converter or electronic control units are in the vehicle.
- The vehicle is or at least it was before storage.
- The registration documents are handed over at the same time.
- In order to deregister old vehicles, a 'disposal certificate' is needed. This certificate proves that the vehicle has been disposed in accordance with the regulations.
- Only certified dismantling facilities, certified and authorised recycling workshops, or collection points, which have been nominated by the manufacturer, are permitted to issue these certificates.

After the old vehicle is returned to that manufacturer, recycling is done as follows:

- As legally required, the vehicle is drained of all fluids such as oil, brake fluid, and the like, which are then recycled.
- All reusable parts as well as recyclable materials are then removed. Recyclable materials such as glass, tires, large plastic parts, and others are processed using separate recycling techniques.
- The rest of the bodywork is shredded and separated into its different components. As far as possible, these are then recovered and reused.
- The structural framework of the automotive industry in Indonesia consists of the following players:
    - Regulators: Ministry of Industry (main), Ministry of Trade, Ministry of Transportation, State Ministry for the Environment, Ministry of Finance, Ministry of Energy and Mineral Resources, and Ministry of Home Affairs

- Financing: Banks and Multi-Finance Companies
- Automotive Industry: Principals, Brand Holding Sole Agents ('ATPMs'), Sole Distributors, and Main Dealers/Dealers
- Automotive Aftermarket: Component/Parts, Maintenance, Insurance
- Customers: Individual Users and Corporations
- Association of Indonesian Automotive Industries ('GAIKINDO').

- Importers/manufacturers: subject to tariffs and taxes, vehicle type approval, registration.
- Users: compliance to road transport regulations, including licences and periodic inspection.
- Government agencies:
  - Directorate General of Land Transport – certification for vehicle type approval.
  - National Police – in charge of vehicle and driver registration/identification.

There is a myriad of regulations and legislations present in Indonesia that are related to or directly govern the environmental management and protection of the country. These can be classified into five categories, namely:

1. General Environmental Legislation – legislation accompanied by implementing regulations governing environmental management in general and covers all sectors such as Law No. 32/2009.
2. Environmental Legislation for waste management – legislation accompanied by implementing regulations governing certain sectors closely related to environmental management such as Law No. 18/2008 for Municipal Solid Waste (MSW).
3. Ratified Environmental Convention – including international treaties such as:
   a. Basel Convention (hazardous wastes);
   b. Convention on Climate Change;
4. Provincial Environmental Legislation; and
5. Local Environmental Legislation.

4. Malaysia

The Government of Malaysia reviewed National Automotive Policy 2014 (NAP 2014) and many solutions to challenges related to ELV recycling were proposed. The gradual introduction of an ELV policy is one of the issues raised in the review. According to the Ministry of International Trade and Industry (MITI) website, at present, 2.7 million passenger

vehicles are 10 years old or older on the road. Compared to other countries, Malaysia presents a very low vehicle scrap rate and a relatively high average vehicle age.

As a first step towards the implementation of a full ELV policy, the NAP review introduced mandatory annual inspections as a requirement for road tax renewal for all vehicles aged 15 years or older. At present, obligatory inspection is imposed only on commercial vehicles. Expanding this obligatory inspection to private vehicles has been discussed several times and is still under discussion among stakeholders in Malaysia.

Safety and environmental concerns from the practice of importing used parts and components without any restrictions or mandatory tests were raised. The NAP review introduced a mechanism to prohibit the importation of used parts and components effective from June 2011. The Malaysia Automotive Recyclers Association (MAARA) raised the importance of utilising used parts. However, the importation of used parts is not introduced. Safety and environmental issues related to used parts are still subject to discussion.

Some ELV recyclers do not adhere to environmental laws or guidelines. This causes the inappropriate processing of wastes. For example, engine coolants are being discharged freely into the drains, and air-conditioning gas is being freely released into the air. This will lead to a serious impact on the environment.

The occupational health of ELV recyclers during the dismantling process and downstreaming recycling is also a challenge. Some workers in some ELV recycling sites are working in bad conditions.

According to the Malaysia Automotive Institute (MAI), the development of appropriate infrastructures for promoting ELV recycling is also challenge. The lack of standards covering the whole life of the vehicle, e.g. design, parts, dismantling process, and so on, is also challenge. The enhancement of collaboration among ministries related to ELV recycling is also expected.

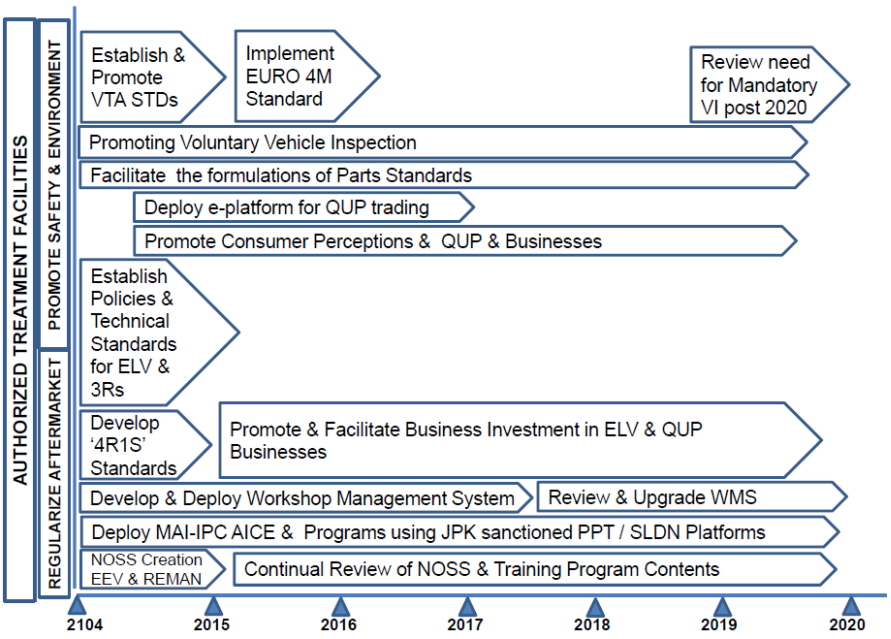
Malaysia is in its early stages of starting the ELV recycling system and considering ELV recycling regulations. Many environmental regulations are related to ELV recycling. Environmental Quality Act 1974 is a basic law for environmental issues. Waste management is also mentioned in the law. The law was revised in 1985, 1996, 2000, and 2001.

NAP 2014 focuses on the objectives of enhancing the competitive advantage of the local automotive industry and developing an environmentally friendly automotive manufacturing ecosystem and their outputs. The main objectives are to:

- Promote a competitive and sustainable local automotive industry, including national car companies;
- Develop Malaysia as the regional automotive hub in energy efficient vehicles;
- Promote the increase of value-added activities in a sustainable manner while continuously developing the local capabilities;
- Promote increase in exports for vehicles and automotive components;

- Promote participation of Bumiputera companies in the total value chain of the local automotive industry; and
- Safeguard consumers' interest by offering safer and better quality products at competitive price.

Figure10. Developing automotive authorised treatment facilities Framework



AICE = Automotive Industry Certification Engineering, EEV = Energy Efficient Vehicle, ELV = end-of-life vehicle, MAI-IPC = Malaysia Automotive Institute- Industry lead Professional Certification, PPT = Pentauliahan Pencapaian Terdahulu, QUP = Quality Used Parts , SLDN = Sistem Latihan Dual Nasional, STDs = Standards , VTA = Vehicle Type Approval, WMS = Workshop Management System , 3R = Reduce, Reuse and Recycle.
Source: Malaysia Automotive Institute (MAI).

To complement the execution of NAP 2014, there are six road maps and implementation plans that have been developed. The road maps will be under the supervision of MITI. MAI shall act as the agency to coordinate, implement, and monitor the programs. These road maps will serve as guidelines to achieve the transformation objectives of the local automotive industry. These road maps are as follows:

1) Malaysia Automotive Technology Road Map

2) Malaysia Automotive Supply Chain Development Road Map

3) Malaysia Automotive Human Capital Development Road Map

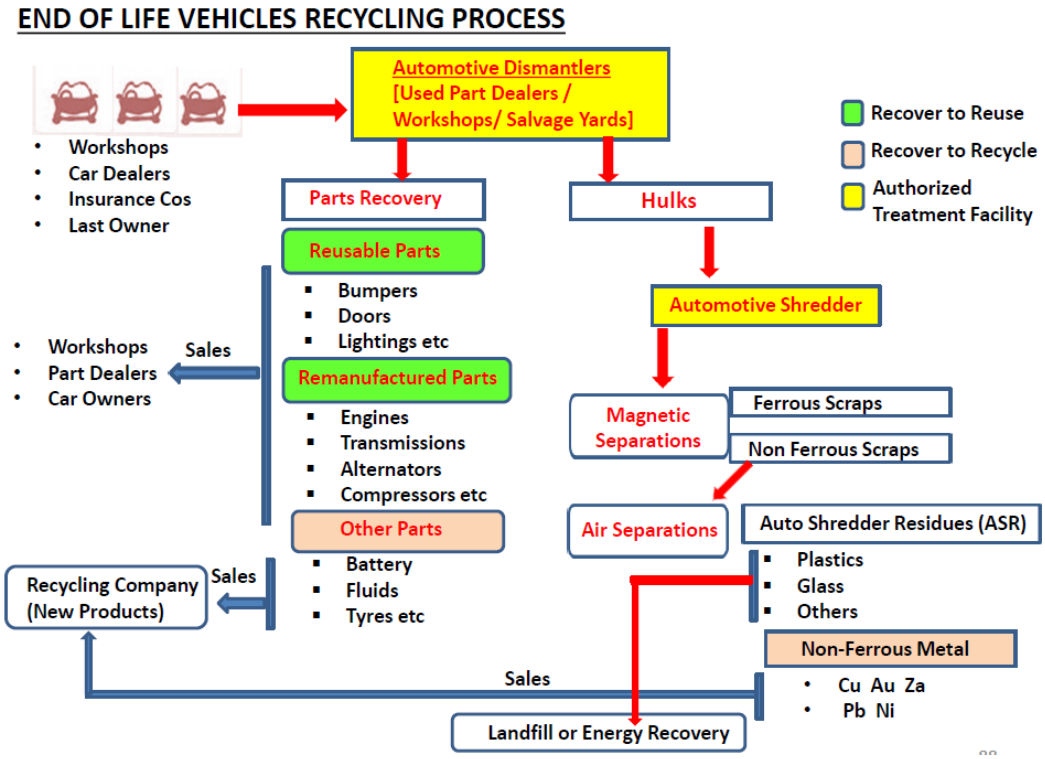
4) Malaysia Automotive Remanufacturing Road Map

5) Development of Automotive Authorized Treatment Facilities (ATF) Framework

6) Malaysia Automotive Bumiputera Development Road Map.

The development of the Automotive Authorised Treatment Facilities Framework was established for ELV recycling. NAP 2014 will promulgate policies to introduce an ELV regime, which will be supported by authorised treatment facilities to enable ELV processing. NAP 2014 will promote regulations that drive 'Extended Producer Responsibility' and the '4R' practices (Reduce, Reuse, Recycle and Remanufacture) that substantially decrease the final 'waste' of a product by improving product design. SIRIM is also currently developing ELV standards. The ELV standards will relate to general matters, hazardous wastes, dismantling, and the 3Rs. Details of the ELV recycling scheme are under discussion at MITI.

Figure 11. ELV recycling process



Au = Gold, Cu = Copper, ELV= End-of-life vehicle, Ni = Nickel, Pb = Plumbum,. Zn = Zinc.
Source: Malaysia Automotive Institute (MAI).

5. Myanmar

Inspection systems are installed in Myanmar but they are not strictly managed. Consequently, very old cars can be used and they threaten the safety and the environment. These systems should be strictly implemented.

Dismantling is being done by the informal sector and components and scraps are circulated through the informal route. Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity. Capacity building is required for the proper operation of facilities. The automotive scrap volume required to promote ELV recycling is insufficient. Because of insufficient and unstable electricity, there is difficulty in steel production. Appropriate infrastructure like stable electricity is required for sustainable operation. In addition, environmental measures such as prohibition on illegal dumping of waste and collection of CFCs and the like are insufficient.

Used parts are illegally imported from other countries. Imported used parts cause environmental pollution due to the lack of environmental measures from import dealers. Remanufacturing parts are not popular due to the lack of awareness of parts dealers and their low quality.

Non-valuable resources are not properly collected and, in some cases, illegally dumped. Metallic component recycling is done manually. This causes labour safety issues. The quality control of steel production is required to promote metal recycling by separating the plastic during the burning. Valuable metals such as copper and aluminium are not utilised due to the lack of government-related facilities for copper and aluminium recycling.

The emission of hazardous wastes from components such as batteries, plastics, and waste oils causes environmental problems such as waste accumulation. Metallic component recycling is done manually, which causes labour safety issues.

The Myanmar Government does not hold a recycling facility for valuable metals such as rare metals, coals, and aluminium, which might turn out as an enormous loss in the future.

Furthermore, as mentioned in 4.2 (2), the replacement programme for scrapped cars was released by the government in 2011 and since then, people have been rushing to get their scrapped car certificate as well as their car importing licence. Two scrapped car plants in the country are unable to handle the excessive number of used cars waiting in lines.

Currently, there are no regulations on ELV recovery targets.

6. Philippines

The Philippine regulation relating to import and export is the Tariff and Customs Code of the Philippines 1991, amended in 2001. The code regulates the practice of evaluation and collection of duties in import and export as well as Customs supervision. The Philippine Tariff Commission makes tariff policies including tariff concessions, modifications, and rebates. The Commission also holds public hearings on anti-dumping and countervailing cases, and conducts investigations on safeguard measures. The Bureau of Customs, under the Philippine Department of Finance, is the sole agency that administers tariff laws and collects value-added tax and other additional taxes.

The regulations relating to vehicle registration are follows:

1) Motor vehicle inspection system

All motor vehicles shall be subjected to mandatory inspection prior to registration as per Memorandum Order No. 86-003 dated 3 June 1986. No motor vehicle of any classification shall be accepted for registration unless fully inspected in accordance with the standards and procedures for motor vehicle inspection. The three venues of inspection are the Land Transportation Office (LTO) District Office, the Motor Vehicle Inspection Stations (MVIS), and the Private Emission Testing Centres (PETC).

The existing institutional frameworks on certification and regulation are follows:

- Department of Transportation and Communications (DOTC) - LTO (Republic Act (RA) 4136) - for whole motor vehicle units;
- Department of Trade and Industry (DTI) - Bureau of Product Standards (BPS) (RA 4109) - for motor vehicle parts and components;
- Department of Environment and Natural Resources (DENR) - Environmental Management Bureau (EMB) (RA 8749) – for emission Standards;
- Department of Energy (DOE) - Oil Industry Management Bureau (OIMB) - for fuel quality; and
- Department of the Interior and Local Government (DILG) - Philippine National Police (PNP) - for anti-car napping/theft.

A proposed framework of Whole Vehicle Type Approval System is being developed.

2) Clean Air Act of the Philippines, RA No. 8749, was passed in 1998. The Act:

- provides for air quality management
- sets the ambient air quality guidelines and standards for monitoring
- sets emission limits for motor vehicles effective by 2003 (linked to registration).

The regulation of the importation of motor vehicles and engines should comply with emission limits.

The Philippines has an existing regulation known as the Ecological Solid Waste Management or RA 9003. However, there are no provisions on automobile recycling, even on the management of ELVs. The existing institutional frameworks on certification and regulation are follows.

- DOTC-LTO (RA 4136) – for whole motor vehicle unit;

- DTI-BPS (RA 4109) – for motor vehicle parts and components;
- DENR-EMB (RA 8749) – for emission standards;
- DOE-OIMB – for fuel quality; and
- DILG-PNP – for anti-car napping/theft.

The Philippines has no regulations on ELV recovery targets. The Philippines has environmental regulations on landfill, incineration ban, and heavy metals use ban.

7. South Korea

In South Korea, car manufacturers such as Hyundai and Kia have sophisticated recycling factories partly due to the high demand for recycle ratio in export destinations. A dismantling factory of Kia can systematically break up cars on conveyors. They first take out fluid then take out parts, and finally press the body. In 2010, it was estimated that 684,000 ELVs were generated each year in South Korea.

In the disposal/recycling process, workers in the recycling centres manually check each vehicle, treat and remove the airbags, drain any fuels and oils, remove batteries, then dismantle the car and engine. They place recycled auto parts in boxes clearly labelled in both English and Korean.

Before squashing the vehicle in the body press, doors, interior parts, tires, seats, and glass are removed for recycling.

Korean cars that are more than three years old cannot be sold in the used car market. Therefore, they must be dismantled.

The recycling ratio for ASRs in South Korea is not high because recycling activity is governed by the principle of economics; that is, less valuable materials tend not to be recovered during the dismantling process.

Korea is governed by the 2007 Act for Resource Recycling of Electrical and Electronic Equipment and Vehicles, which creates a framework to hold producers and importers responsible for their use of resources. The law addresses the use of hazardous substances, recyclability of materials, collection of ELVs, recycling rates, and information exchange through an online data base.

Korea's Waste Electrical and Electronic Equipment (WEEE) and ELV recycling regulations came into force in January 2008.

Key components of the Korean ELV legislation include:

- Research and Development production stage; and
- Restriction on the use of hazardous materials.

New vehicles must be compliant with the annual recyclable rate, currently set at 85 percent through the improvement of materials and structure.

8. Taiwan

Taiwan has more than 200 scrap car dismantling yards and five crushing plants. ELVs are collected through the public, police, and car repair shops. In the yards, battery, oil and tires are taken out first to avoid pollution. These materials are separately treated. The remaining body would be pressed to take out valuable metals. The ASR generated is then sent to separation factories where iron and non-ferrous metals are recovered.

Taiwan has put in place a 'car recycling incentive' scheme which is similar to the 'cash for clunkers' programmes practised in other countries. The collection of ELVs is conducted in an organised way, equipped with web-based reporting system for recycling businesses. According to the Environmental Protection Administration, about 125,000 cars were recycled in 2013. The resource collection rate of waste motor vehicles in 2013 was about 65.39 percent.

Around 100,000 tons of tires have been recycled each year from 1999 to 2013. In 2013, the collection rate of waste tires was 62.26 percent. The recycling of lead-acid batteries has increased in Taipei, reaching more than 50,000 tons in 2011 to 2013. Resource collection rate for waste lead-acid batteries in 2013 was 81.72 percent.

Though quantities are unknown, the recovery of steel and non-ferrous metals in Taiwan is advanced. Taiwan uses a metal separation equipment. Pressed car scraps are crushed by crushers. The metal dust is separated by wind and then later by a magnetic separation process. Recovered metals would be sent to respective metal plants.

9. Thailand

Although there is an inspection system in Thailand, the rigorous implementation of the system is not assured and this leads to the circulation of old used cars. Using old cars threatens people's safety and the environment.

Dismantling operators have to acquire a licence (Department of Industrial Works Code-105 and 106) under the Notification of Ministry of Industry (MOI) No.15 B.E.2544 (2001). Under the regulation, they are required to introduce appropriate pollution prevention measures. The municipalities regularly monitor the implementation of the above-mentioned measures. In reality, in Thailand, dismantling businesses in urban areas are not expected to expand because the generation of ELVs is centred on rural areas. Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity. Environmental measures such as prohibition on illegal dumping of waste and collection of CFCs, among others are insufficient. For the dismantling process and downstream recycling, the occupational health of ELV recyclers is also challenge. Some workers in some ELV recyclers are working in bad conditions.

For recycling technology and dismantling infrastructure, there are some local companies that have shredding facilities that shred automobile scrap. There is room for improvement or sophistication of recycling technology in Thailand.

Currently, there is no specific legislation on ELVs. Various environmental regulations are imposed for controlling ELV recycling. These include:

- The Enhancement and Conservation of National Environmental Quality Act, B.E. 2535 (1992);
- Pollution Prevention and Mitigation Policy (1997-2016), which includes management, investment, legal, and supporting guidelines to address:
    - Water Pollution
    - Air Pollution
    - Noise and Vibration Pollution
    - Pollution from Solid Waste and Night Soil
    - Pollution from Hazardous Materials
    - Pollution from Hazardous Waste; and
- Environmental Standards:
    - Water Quality (2009)
    - Air Quality and Noise (2007)
    - Soil Quality (2004).

Most ELVs generated in Thailand are exported to neighbouring countries such as Myanmar, Lao PDR, and Cambodia. The current roles of the stakeholders under the current regulations related to ELV recycling are as follows.

- Importers – subject to Customs formalities (e.g. required documents, fees, re-export, registration), depending on type of vehicle importation (temporary or permanent);
- Manufacturers – subject to design/technical standards and regulations, vehicle registration, and taxes;
- Users – must comply with transport regulations and standards (e.g. emission standards, periodic inspection); and
- Government agencies – must comply with requirements of the following agencies:
    - Ministry of Commerce – issuance of permit for vehicle importation
    - Department of Land Transport – registration and inspection of vehicles
    - Pollution Control Department – emission testing

- Department of Energy – guidelines on fuels for vehicles
- Police – inspection of in-use vehicles.

10. Viet Nam

While the Environmental Protection Law of 2005 broadly delegates the responsibility of recovering expired or discarded means of transportation to owners (Article 67, 1.a/), there is no existing regulation specific to the management of ELVs and/or vehicle recycling.

Other related challenges include:

- No legal document dedicated to e-waste;
- Poor separation at source;
- Lack of large-scale centralised treatment complexes for industrial solid wastes and hazardous wastes; and
- Recycling is small-scale, spontaneous, difficult to control, and technologically unsophisticated.

The following are the demarcation of roles in the vehicle type approval/conformity system in Viet Nam:

- Manufacturers (applying for Type Approval Certificate)
  - Preparation of sample motor vehicles for technical service testing;
  - Submission of information package (information folder and test report); and
  - Sales, pre-delivery inspection, and mass production (upon certification).

- Importers (applying for Certificate of Conformity)
  - Securing required documents for import of vehicles;
  - Submission of imported vehicles for testing; and
  - Finishing the Customs formalities (upon certification).
- Users
  - Compliance to road transport regulations (licence, periodic inspection for technical safety, environmental protection, and roadworthiness).

- Government agencies
  - Ministry of Transport (MOT) – approving authority, checking of documents, carrying out the vehicle test, and issuance of certificates;

- Vietnam Register (VR) – approving authority, periodic vehicle inspection;
- Vietnam Motor Test Centre (VMTC) – vehicle test for motorcycles;
- National Emission Testing Centre (NETC) – vehicle test for motorcycles; and
- Police – inspection of licence plates.

Viet Nam is in the process of introducing legislation to control ELV recycling and making preparations for the introduction of an ELV legislative management system.

Viet Nam has quite a number of existing environmental regulations such as the following:

Environmental Protection

- Decree No. 59/2007/NĐ-CP dated 9 April 2007, promulgating the regulation on solid waste management activities, and the right and duty of the person related to solid waste management.
- Decree No. 81/2006/NĐ-CP dated 9 August 2006, promulgating the regulation on sanctions against administrative violations in the field of protection of the environment (replacing Decree No. 121/2004/NĐ-CP).
- Decree No. 80/2006/NĐ-CP dated 9 August 2006, detailing the implementation of the law on environmental protection.
- Law on Environmental protection dated 29 November 2005 (took into effect from July 1, 2006), replacing the Environmental Protection Law 1993.
- Decision No. 64/2003/QĐ-TTg of the Prime Minister dated 22 April 2003, approving the plan for managing the establishments causing seriously environmental pollution.

Solid and Hazardous Waste

- Decision No. 23/2006/QĐ-BTNMT of the Ministry of Natural Resource and Environment (MONRE) dated 26 December 2006, promulgating the list of hazardous wastes.
- Circular No. 12/2006/TT-BTNMT of MONRE dated 26 December 2006, promulgating the instructions on the condition, documentation, registration, and code of hazardous waste management.
- Decree No. 23/2005/CT-TTg of the Prime Minister dated 21 June 2005, strengthening the activities on solid waste management in urban areas and industrial zones.
- Decree No. 13/2003/NĐ-CP dated 19 February 2003, providing for the commodities prescribed as being dangerous/toxic and their transportation via roads.

- Decision No. 60/2002/QĐ-BKHCNMT of the Ministry of Science, Technology and Environment (MOSTE) dated 08 August 2002, guiding the implementation of the hazardous waste burying technique.
- Circular No. 02/2001/TT-BKHCNMT of MOSTE, dated 15 February 2001, instruction on the treatment of special wastes that encourage investments.
- Decision No. 155/1999/QĐ-TTg of the Prime Minister dated 16 July 1999, promulgating the regulation on hazardous waste management.
- Inter-Ministerial Circular No. 1590/1997/TTLT/BKHCNMT-BXD of the Ministry of Construction and MOSTE dated 17 October 1997, giving instructions to implement directive 199/TTg urgent management solid wastes in urban areas and industrial zones.

Recycling

- Decision No. 03/2004/QĐ-BTNMT of MONRE dated 02 April 2004, importing waste as materials for domestic production.
- Official Letter No. 1146/BKHCNMT-MTg of MOSTE dated 06 May 2002, approving the national action plan for cleaner production.

More details: http://www.asian-energy-journal.info/Abstract/Legal%20and%20institutional%20framework%20for%20solid%20waste%20management%20in%20vietnam..pdf)

11. India

It is difficult to grasp correctly the number of end-of-life/service vehicles. The use of old cars threatens the safety and the environment. Due to the lack of a car inspection system and deregistration (which is under consideration), it is difficult to trace the flow of vehicles after ending their life.

As for ELV dismantling, although the ELV rule is under consideration, there is currently no specific registration scheme for vehicle dismantling and no effective regulation on the industry. Dismantling is being done by the informal sector, and components and scraps are circulated through the informal route. Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity. Environmental measures such as prohibition on illegal dumping of wastes and collection of CFCs, among others, are insufficient. The working condition is very severe for the estimated 100,000 recycling workers who face severe health threats. Metallic component recycling is done manually. This causes labour safety issues. There is not enough space for facilities and the facilities are located in residential areas/city centres.

There is no regulation that governs the used components/parts but this is under consideration. The automotive scrap volume required to promote ELV recycling is insufficient. Used parts are illegally imported from other countries. Imported used parts cause environmental pollution due to the lack of environmental measures from import dealers. Rebuilt parts are not popular due to the lack of awareness of parts dealers and their low quality. Non-valuable resources are not properly collected and, in some cases, illegally dumped. Metallic component recycling is done manually. This causes labour safety issues.

As for the downstream recycling and treatment facilities, little treatment is done for hazardous materials. This results in air, water, and soil pollution in recycling facilities. Although the ELV rule is under consideration, there is currently no specific registration scheme for hazardous wastes. Metallic component recycling is done manually and this causes labour safety issues.

CHAPTER 4

Approach for proper processing of end-of-life vehicles and development of relevant legislation in the ASEAN region

1. Overall situation and issues in ASEAN and other Asian countries

In the Association of Southeast Asian Nations (ASEAN) and other Asian countries, there are still countries where the gross national income (GNI) per capita is not sufficiently high. As a result, the diffusion rate of automobiles is not very high. However, in view of the current rapid pace of economic growth in those countries, it is expected that their GNI per capita will go up sharply in the future and that the diffusion of automobiles will advance rapidly. Yet, such rapid diffusion of automobiles is expected to bring about not only such problems as air pollution but also those associated with the treatment and recycling of waste materials.

Europe and Japan in the past had problems regarding illegal dumping of used automobiles and the treatment of residues from recycling used automobiles. While the mechanisation of the process of automobile recycling was promoted when higher efficiency in the automobile recycling was being sought, the treatment and disposal of matters such as shredder dust residues became a new problem[1]. Furthermore, due to the increased number of automobiles equipped with airbags and the like, the degree of difficulty in waste treatment has increased.

These problems derived from economic development and the associated increase in the number of used automobiles are also expected to occur in ASEAN and other Asian countries in future. Thus, this report will discuss the various problems that are expected to occur from the upstream to the downstream of automobile recycling, together with the possible measures/countermeasures that have been suggested to cope with such problems.

[1] Due to the large-scale illegal dumping of shredder dust residues, the shredder dust residues from used automobiles was categorised as one of the 'hazardous waste materials'. Such materials are obligated by law to be disposed in 'controlled' disposal sites built under strict conditions, instead of the conventional dumping in so-called 'stable' disposal sites. However, since the number of such controlled disposal sites is limited nationwide, there is a constraint in their accepting capacity. In addition, because the installation of new disposal sites has become more and more difficult, it became necessary to establish a system where the recycling rate is increased to reduce the volume of shredder dust residues. This is one of the major reasons that led to the enactment of the 'Automobile Recycling Law' in Japan.

2. Design for Recycling

(1) Situation and issues expected in ASEAN and other Asian countries

1) Expansion of need for activities in the upstream end-of-life vehicle (ELV) recycling flow (from the period of matured automobile society)

Design for Recycling (DfR) is a necessary approach towards the increasing sophistication of the downstream recycling process associated with (i) separability of parts and (ii) material identifiability. ASEAN countries are divided roughly into two categories: one, where automobile industry has already been developed; and two, where the automobile industry is in the process of development. DfR needs to be promoted in the car design process, depending on the development of the automobile industry itself. For the purpose of promoting DfR, the important point is identifying how to link the DfR to the recycling efforts on the downstream side, and how to offer incentives to automotive manufacturers.

(2) Expected measures

1) Development of regulatory systems to provide support for technological development of DfR and to promote DfR (from the period of matured automobile society)

As mentioned above, the promotion of DfR in the car design process is done in line with development of the automotive industry. The national government and public bodies are expected to provide support to private companies for the technological development of DfR. With respect to (i) and (ii) above, more sophisticated technologies need to be developed and implemented to reduce costs. Furthermore, regulatory systems to promote DfR such as incentives related to operators need to be developed.

For implementing the measure, the following points should be considered.

(i) Division of roles among stakeholders

Division of roles among the national government, municipalities, manufacturers, and dismantling and recycling operators is necessary. For the improvement of recyclability in particular, the provision of information from dismantling and recycling operators who are actually involved in the recycling business to manufacturers is important.

(ii) Degree of the involvement by the national government

Parallel with the voluntary efforts of private companies on the promotion of DfR, the introduction of legislative measures to promote DfR should be considered in the automobile recycling process.

3. Occurrence of ELV and its flow

(1) Situation and issues expected in ASEAN and other Asian countries

1) Illegal import and export of ELVs (from the early stage of automobile diffusion)

In countries where the GNI per capita is still low, cars are expensive and people prefer to buy imported used cars. In addition, there is a huge demand for imported half-cuts and used parts because car owners want to continue to use their cars for as long as possible. Sometimes, they are illegally imported. Illegal importation of half-cuts and used parts poses problems not only in terms of violation of legislation but also in terms of creating environmental pollution and safety concerns. On the other hand, there are companies that have appropriate licences for importing half-cuts and used parts, and trading the used parts. These companies are contributing to sustainable resource utilisation. Hence, just prohibiting import of such parts may have a negative impact on resource utilisation. Therefore, ASEAN countries are required to prohibit illegal importation but allow it in case it can obviously contribute resource utilisation.

2) Unclear situation of ELV generation (from the early stage of automobile diffusion)

Due to the fact that automobile registration and deregistration systems are not well developed in developing countries, it is difficult to obtain accurate statistical data on the occurrence of ELVs (e.g. number of generation, generating area, ages, among others). For developing policies on ELV recycling, the acquisition of reliable data is important. Incentives to deregistration are also required.

3) Safety and environmental issues caused by continuous use of too old vehicles (from the early stage of automobile diffusion)

A low GNI per capita means that main road transportation measures, motorcycles, and four-wheel vehicles are fairly expensive for ordinary people. This leads people to refrain from replacing their ‘expensive’ cars with new ones and to try to use their own cars for as long as possible when there is no restriction on their service life. There are also cases where no legal automobile inspection systems exist or where no strict application of the law is imposed, even if a certain inspection system is in place. Thus, cars continue to be used for a long time without sufficient maintenance. This situation certainly causes safety concerns.

4) Illegal dumping of ELVs (from the period of matured automobile society)

In countries where the value of ELV is high, scrap trading companies collect even abandoned ELVs. However, as labour cost increases and environmental and safety costs increase (due to the increased awareness of people), the cost for the treatment of shredder dust because of automation increases. Thus, the possibility of ELV becoming worthless is increased. As a

result, illegal dumping of ELVs may happen.

(2) Expected measures

1) Stricter control of import (from the early stage of automobile diffusion)

(a) Stricter control by the Customs

The strengthening of Customs should be prioritised to prevent the illegal importation of ELVs. Stricter control by the Customs needs to become necessary not only to prevent the flow of ELVs to improper routes but also to prevent imports that could bring about environmental problems such as leakage of engine and transmission oil during the transfer.

(b) Review of import conditions and review of licensing conditions

Further measures are desired to prevent ELV parts from flowing to improper routes through reviews of required environmental standards for traders such as preventing leakage of engine and transmission oils and licensing conditions of importers (whether importers have the required licence or not).

For implementing stricter control of import, the following points should be considered.

(i) Division of roles among stakeholders

The division of roles among stakeholders will be a critical factor in ensuring stricter control of importation. Whether Customs, the local central responsible ministry, or the local municipality should inspect appropriate practices of importers and exporters will become a big issue.

(ii) Constraints of human resources and funds

A Customs officer pointed out the human resources and funds as constraints in Customs inspections. Under these restrictions, how to make strict inspection of used parts imports becomes a huge issue.

(iii) Appropriateness of content of import conditions

At the time when the environmental standards (e.g. prevention of oil leakage and licensing conditions) were reviewed, the contents corresponding to the actual situation of each country needed to be examined. For instance, the import permit is related to monitoring of

importers' activities after import. The import permit should therefore be set in consideration of the monitoring process.

2) Establishment and strict management of the registration system (from the early stage of automobile diffusion)

(a) Strengthening of the registration system

In the recycling of ELVs, automobile registration and deregistration systems play important roles such as collecting information required for policy making and preventing used cars and ELVs from being sent to the inappropriate informal sector. As the registration system itself is a basic system for national traffic safety, there are many countries that have already introduced this system. However, in countries where the system has just been introduced and the system is not sufficiently mature, there are problems such as data mismatch and there is a need for improvement. Enabling accurate registration information will not only be useful for the promotion of ELV recycling but will also greatly contribute to the protection of automobile users in various aspects, including automobile safety, prevention of environmental pollution, smooth implementation of automobile safety measures, and proof of proprietary rights. Furthermore, the compilation and publication of statistical data will make it possible to refine analytical results of market surveys, which is expected to contribute to the sound development of automobile-related industries.

(b) Strict management of the registration system

In the early stage of automobile diffusion, cars were not popular and the number of registrations was small. Hence, even though the capacity for accepting registration applications and managing them was small, it was acceptable. However, as the registration system itself is the basic system for national traffic safety, the problem in registration should be solved as soon as possible for the consideration of future diffusion of vehicles. Also, during the early stage of automobile diffusion, the government's administrative ability was not so high because of limitations on human and financial resources and sometimes delays in registration. Therefore, strengthening of capacity is indispensable.

(c) Effective operation of the registration system

If the collection of data is recorded manually, there are instances when data is recorded inaccurately such that the actual car type, age and similar information are inconsistent. Registration information is also not maintained accurately. It is thus necessary to check the integrity of the data through sample surveys in order that no contradiction occurs at the time of deregistration.

To establish and strictly manage the registration system, the following point should be considered.

(i) Securing of funds and human resources

To achieve the objectives of the above proposal, it is necessary to secure funds and human resources. Improvement of the functions to check data integrity and create a registration database, among others, cannot be realised without a budget. Securing such budget is a huge challenge for policymakers. In addition, the fostering of human resources who are to be involved in operations also becomes an important issue.

3) Establishment and strict management of the deregistration system (from the early stage of automobile diffusion)

(a) Establishment of a deregistration system

The establishment of deregistration system has been steadily progressing in the ASEAN and the other countries in Asia. In some cases, deregistration is directly requested of car owners but there are little incentives for following procedures. To improve effectiveness, some countries introduced a scheme where cars are automatically deregistered when car owners do not pay taxes or registration fees for more than specific terms. Deregistration is the pivotal system for the recycling of ELVs and its establishment/improvement is important. Therefore, countries are expected to introduce a robust deregistration system at the earliest possible time. The system needs to be linked with the registration system, and information such as the model and age of the used automobile and the region where the relevant automobile was disposed need to be recorded.

(b) Strict management of the deregistration system

If deregistration is not obligatory, there is no incentive for automobile users to deregister. In such cases, even though the system exists, it may not function well. Therefore, it is necessary to obligate automobile users to deregister. In case it is impossible to make it obligatory, there is the option to automatically deregister cars when car owners do not pay their tax and registration fees during the terms in their countries,

(c) Improvement of the function to check the integrity of data

As with any registration system, if the collection of data is paper based, there are cases when the integrity of the data is not maintained. As a result, registration information such as car type, age, owner, and the like are not very accurate. It is thus necessary to check the integrity of the data so that no contradiction occurs at the time of deregistration.

In the case of paper-based aggregation, we often encounter problems such as input errors and/or longer calculation times for aggregation. If a database based on computerised registration information were available, paper-based aggregation would no longer be necessary and the time lag between registration and completion of aggregation can be shortened. It will also be possible to capture the number of automobiles more accurately. Furthermore, as the aggregation by region becomes feasible, it will become easy to capture the flow of ELV and it will become possible to establish proper strategies such as determining where to establish recycling centres.

To establish and strictly manage the deregistration system, the following points should be considered.

(i) Legal obligation or provision of incentives

In cases where no legal obligation is stipulated or where there is no incentive for automobile users, the deregistration system will not function well, even if the system is well created. There will also be cases where quasi-scrap automobiles continue to be counted among the number of retained automobiles semi-permanently. This situation will make it difficult to capture the number of retained automobiles accurately. Accordingly, it is important to not only develop a system but also to examine the way to stipulate the obligation or to give incentives.

(ii) Creation of a system based on the premise of ELV recycling

In addition to the recording of simple information about the disposal of a certain vehicle, information on whether a vehicle is exported or disposed domestically is also important when examining the contents of the ELV recycling system. Thus, there is a need to improve the deregistration system based on the premise of ELV recycling.

(iii) Securing of funds and human resources

As in the case of the automobile registration system, it is necessary to secure funds and human resources to achieve the objectives of the above proposal. Just like the registration system, securing funds to create a hardware system and fostering human resources to be involved in operations are important issues.

4) Development and improvement of the automobile inspection system (from the early stage of automobile diffusion)

(a) Development of the automobile inspection system

From the viewpoint of ELV recycling and safety, the automobile inspection system, which promotes the scrapping of old automobiles with no proper maintenance, is a very important system. It is indispensable to introduce and develop the inspection system. A proper system can be created by carefully examining the contents of the automobile inspection system operating in the country in question. There may be cases where, even if an automobile inspection system is in place, the system is not properly operated, such as low accuracy of inspection and passing without achieving appropriate level. Then, measures need to be taken so as to make a stricter operation of the system.

In other countries, the automobile inspection system is applied to commercial vehicles only. For the promotion of ELV recycling and improvement of safety, it is important to expand the inspection system to private vehicles as well.

(b) Development of infrastructure

To operate the automobile inspection system, suitable devices for inspection and location is required. Thus, in parallel with the development of an automobile inspection system, the development of infrastructure also needs to be pursued.

(c) Fostering human resources

To operate the automobile inspection system, the fostering of human resources to manage the system is required.

To develop and improve the automobile inspection system, the following points should be considered.

(i) Securing of funds

It is difficult for developing countries to secure enough funds for the infrastructure required for the automobile inspection system. Government may put less priority on automobile inspection systems because of lack of budget. Securing funds is an important issue for improving the inspection system.

(ii) Division of roles among stakeholders

In the development of infrastructure, the division of roles between the government and the

private sector is also important. In certain countries, expansion of the diffusion of the automobile inspection system is promoted in such a way that the government asks the private sector to assume the operation of automobile inspection within their jurisdiction. In any event, a proper division of roles among stakeholders is important.

5) Restriction on expiration period

In order to eliminate the use of old automobiles with no sufficient maintenance, it is also effective to impose restrictions by law on the length of usable years of vehicles. In fact, restrictions on the length of usable years are imposed on passenger and commercial vehicles in Viet Nam, and on taxis in Thailand. Along with effective policies, these regulations actually contribute to the improvement of road safety.

To restrict the expiration period, the following points should be considered.

(i) Measures to close loopholes

Even if a system of usable years of vehicles is introduced, there may be a variety of loopholes, including falsification of records and alteration of the sequence numbers of parts such as engines, in the actual implementation of the system. It is thus necessary to consider countermeasures against such acts.

(ii) Coordination/collaboration among stakeholders

Good coordination/collaboration is required among stakeholders, including police officers involved in the control of vehicles on roads and traffic-related public agencies such as District Land Transport Bureaus in charge of the automobile inspection system.

6) Establishment of a legislative scheme specific for ELV recycling (in the period of matured automobile society)

Labour, environmental, and safety costs, and treatment and disposal fees of shredder dusts will increase depending on the economic status of the country. Thus, it is possible that ELVs may not be sold as a valuable material but treated with fee.. In such cases, the establishment of a legislative scheme is required to address the problem. For example, the following legislative measures can be imposed.

(a) Division of roles between final users and related companies

Establishing a legislative scheme that demarcates the roles among final users and related companies, among others, can refrain ELVs from flowing to improper sectors. Arranging the sharing of the disposal fee of difficult items to dispose such as waste shredder dusts; setting

the obligation of passing ELVs to proper companies; and establishing appropriate ELV flows can also be developed.

(b) Introduction of a licence scheme

Among the various legislative measures related to ELV recycling, the licence scheme is an effective measure. Providing licences only to companies that implement safety and environmental measures can ensure that a certain level of safety and environmental standards will be secured. In addition, by clarifying the responsibilities of dismantling companies and requesting them to fulfil these will ensure that proper ELV recycling can also be secured.

To establish a legislative scheme specific for ELV recycling, the following points should be considered.

(i) Arrangement of division of roles among stakeholders

When a licensing system is introduced, the major question to ask should be: 'Who will administer the system?' There are various types of operations such those performed by local agencies of the central government or by municipalities.

(ii) Vigorousness of the licensing system

If a licence scheme is operated without the effective control of municipalities, ELVs might flow to the informal sectors who do not implement the environmental measures and so on. Another option is to introduce a less strict and more flexible licence system. In the former case, however, there is a question of whether it is possible to vigorously confirm that conditions of the authentication are all satisfied.

4. Dismantling facilities for ELVs

(1) General situation and issues expected in ASEAN and other Asian countries

1) Insufficient labour safety and environmental protection measures (from the early stage of automobile diffusion)

The actual situation concerning the dismantling of ELVs depends on the level of economic development of a country. In countries whose level of economic development is low, ELV dismantling is conducted mainly by hand and dealt through underground market mechanisms. This may be due to the low GNI per capita which causes low wages, and also because ELVs are not generated in a large quantity domestically. However, since these countries have generally no reserve of human resources and funds to deal with the administration of laws and regulation on industrial safety and environmental protection,

safety measures for workers and environmental measures are not sufficiently implemented. Consequently, there are health and environmental problems in these countries.

2) Introduction of advanced technologies (in the progressive stage of automobile diffusion)

When the level of economic development advances, incentives for mechanisation arise in line with the increasing level of wages. First, new tools are introduced. Then, when the economy further advances, large machines such as shredders and guillotine shears are introduced. However, as a result of automation, automobile shredder residues (ASRs) start to be generated and, by necessity, the establishment of landfill sites for ASRs becomes necessary.

3) Promotion of recycling or adequate disposal of ASRs for preventing illegal dumping of ASRs (in the period of matured automobile society)

Proportionate with the steady growth in the economy, there is an increasing social attention to industrial safety and environmental protection, and industrial safety and preventive measures on waste oils, among others, are being taken. Thus, associated costs are also increasing. It is therefore imperative that countermeasures dealing with ELV problems and the improper treatment and illegal dumping of ASRs should be considered. In particular, it is desirable to launch cost measures for recycling or adequate disposal of ASRs and other materials that are not easily treated or disposed.

(1) Expected measures

1) Promotion of labour safety measures (from the early stage of automobile diffusion)

(a) Rigorous application of labour safety regulation

Labour safety measures are enhanced through the establishment/improvement of implementation of laws/regulations and through actual operations. Labour safety measures deal not only with ELV dismantling but also with overall labour safety measures. In the rigorous application of labour safety regulations, municipalities, local agencies, or the responsible agency of the central government (that serves as the watchdog of the application of the regulation) play an important role. Therefore, capacity building of these agencies is important.

(b) Guidance by municipalities and workshops organised by industrial organisations

When the economy advances and people's interests in matters related to labour safety get stronger from the social standpoint, the awareness of ELV dismantling operators about labour safety is also expected to increase. Meanwhile, the municipalities will be expected to teach technical know-how and to expand human resources in relation to labour safety. Thus, it is

necessary to create a situation where ELV dismantling operators can deal with improvements in labour safety more voluntarily and/or mandatorily, through the guidance of municipalities and workshops organised by industrial organisations, besides the vigorous application of labour safety regulations.

To promote labour safety measures, the following points should be considered.

(i) Capacity building at municipalities

As mentioned above, building the capacity of personnel at municipalities or local agencies of the central government is important for the vigorous application of labour safety regulations. The question is how this may be accomplished as the question of who performs the capacity building and in what manner depends partly on the labour safety regulations in each country. Therefore, it is necessary to examine the specific method of capacity building in each country.

(ii) Measures when industrial organisations do not exist

If no appropriate industrial organisation exists in a country, the question of who will organise the workshops is important. Because the quickest way to address this issue is to establish a new industrial organisation that focuses on ELV dismantling domestically, each country is expected to first consider establishing such an organisation. If doing so is difficult for whatever reason, the government has to find an organisation elsewhere that can organise and hold the workshops instead.

(iii) Materialisation of a licensing system

Even if a licensing system is introduced, questions such as what conditions to attach to licences, which agency should take responsibility for the licensing system, and what legal system should be developed need to be considered and resolved. It is expected that each country would discuss these issues internally with a view to introducing its own licensing system.

2) Promotion of environmental measures (from the early stage of automobile diffusion)

(a) Rigorous application of the environmental regulation

At present, many ASEAN countries place more importance on the economic efficiency of ELV dismantling than on environmental protection measures. However, since various types of environmental pollution are expected to occur in the process of ELV dismantling, the appropriate countermeasures against them need to be considered. Among others, environmental problems caused by waste oil, and recovery of CFC, need to deal with. In view

of this, capacity building at municipalities is needed. It is necessary to contrive a concrete and workable operation scheme to control violations of the environmental regulations.

(b) Guidance by municipalities and workshops organised by industrial organisations

When the economic development of a country advances and people's environmental awareness rises, their criticism is expected to become quite severe if and when any of the ELV dismantling facilities has brought about environmental pollution. ELV dismantling operators, too, will become more aware about environmental measures. In the meantime, municipalities are expected to accumulate technical know-how and to expand human resources for environmental protection. Thus, it is important to encourage ELV dismantling operators to take voluntary measures, through the guidance of municipalities and workshops organised by industrial organisations.

(c) **Introduction of recycling technologies**

The introduction of recycling technologies and the development of infrastructure are necessary to ensure that Chlorofluorocarbons (CFCs) and waste oils are retrieved in an environmentally proper manner.

The same issues and points as those for labour safety must be considered. In addition, the following issues specific to the environment may be considered.

(i) Preparation of devices required for monitoring

For vigorous monitoring of environmental measures like evaluation of soil contamination levels caused by waste liquids and waste oils, various kinds of measuring instruments are needed. Therefore, the acquisition of such instruments and the fostering of personnel to handle them need to be considered.

(ii) Incentives for the introduction of technologies

There is a problem of incentives when proceeding with the introduction of technologies. For example, in the introduction of treatment technology for CFCs, the regulations or incentives are important so that the private sector will bear the burden of the introduction of the CFC recovery unit. It is also important to treat and recycle collected CFCs in a proper manner besides the introduction of the technology. Assuming that the introduction of the technology is initiated with the aid of international donors such as the World Bank, the Asian Development Bank or the Japan International Cooperation Agency and so on, it is necessary to discuss how the introduction will be done as the method of introduction of technology varies depending on the current regulations and respective systems of each country. Furthermore, assuming that technologies are to be introduced, it is also necessary to

determine the division of roles among stakeholders.

(iii) Coordination between the recovery/treatment system for household electrical appliances and CFC recovery

There are cases where certain CFC recovery/treatment systems for household electrical appliances are in place. There needs to be a linkage between those systems.

3) Development of infrastructure (final disposal sites (landfill) and recycling technologies) (in the progressive stage of automobile diffusion)

In addition to the introduction of shredders and guillotine shears, proportionate with the mechanisation of the dismantling operations, the technical know-how for assorting operations in advance and the treatment technology and infrastructure for residues generated from the disposal process are also important.

To develop the appropriate infrastructure, the following points should be considered.

(i) Linkage to waste management policy and energy policy

The development of infrastructure should not be considered from the standpoint of ELV recycling policy alone. For example, ASRs from shredders and guillotine shears should be properly treated in appropriate recycling facilities or disposed at appropriate disposal sites. Developing recycling facilities and appropriate disposal sites is not only for ELV recycling but for other industrial wastes as well. Therefore, it is linked with not only ELV policy but also with total industrial waste management policy. In addition, assuming the introduction of a large treatment facility, the installation of enough power infrastructures needs to be considered. Therefore, the energy policy is also related to the development of ELV recycling and disposal infrastructures.

4) Legislation for automotive recycling (in the period of matured automobile society)

Once the automobile society has become matured and social challenges relating to automobile recycling have become apparent, the legislation for automotive recycling for the purpose of further sophistication of ELV recycling should be considered. When the division of roles among the stakeholders in the automobile recycling system is considered, it becomes possible for the ELV recycling system to function appropriately since the responsibilities of dismantling operators are clear and they can implement it. The licensing system is considered to be an effective way of regulation because a certain known level of measures for labour safety and for the environment can be guaranteed since the approval is given only to companies that have already implemented measures for labour safety as well as for the environment.

To legislate for automotive recycling, the following points should be considered.

(i) Division of roles among stakeholders

When a licensing system is introduced, the division of roles among stakeholders should be determined. The next major question then is who will administer the system. We can think of various types of operations—whether it is by local agencies of the central government or by municipalities.

(ii) Vigorousness of the licensing system

A licensing system, unless implemented effectively by municipalities, will encourage the circulation of ELVs in the informal sector, which does not take environmental measures into account. It may also be possible to introduce a flexible authentication system rather than a vigorous licensing system. In the former case, however, there is a question of whether it is possible to vigorously confirm that all conditions for the authentication are satisfied.

5) Establishment of recycling technologies for ASR treatment (in the period of matured automobile society)

If ASRs are treated not in the least-controlled final landfill site but in the controlled type final disposal site, the treatment cost becomes higher. The difference in treatment cost may lead to the illegal dumping of ASRs. Therefore, reducing the volume of the treatment by recycling the shredder dust should be considered. Concretely, it should promote further the sophistication of recycling by way of thermal recycling and/or feedstock recycling of shredder dusts, and recycling of welding slag.

To establish recycling technologies for treatment of ASRs, the following point should be considered.

(i) Development of recycling technologies and incentives for their introduction

The development and introduction of recycling technologies such as thermal recycling and feedstock recycling of shredder dusts, and recycling of welding slag require high costs. Then, supposing that the development and introduction do not proceed, unless the incentives for development and introduction are given to the recycling industry, the structuring of the scheme in the form of subsidies and incentives is necessary.

5. Reuse of parts

(1) Situation and issues expected in ASEAN and other Asian countries

1) Illegal import and export of used parts (from the early stage of automobile diffusion)

At the stage, when automobiles are not yet widely diffused and a sufficient number of ELV is not generated domestically, the need for imports of used parts will become strong. This is because automobiles running in town are mainly imported, used and old, and a gap occurs between the demand for and supply of imported used parts. Although some of the countries prohibit the importation of used parts to foster the domestic industry, it is generally difficult to cover the demand by domestic production alone because the domestic parts-producing industry has not yet grown sufficiently. As a result, used parts are imported in an informal way. The illegal importation of used automobile parts needs countermeasures because environmental pollution could occur in both importing and exporting countries as the parts are being exported/imported without proper environmental measures such as prevention of engine and transmission oil leakage.

2) Insufficient safety and environmental measures (from the early stage of automobile diffusion)

Used parts are sometimes imported in the form of parts per se and sometimes in the half-cut form. In cases where they are imported in the half-cut form, a dismantling process to get out the parts is required. Then, as in the case of ELV dismantling facilities, safety measures need to be considered for workers as well as the environment. If the monitoring and guidance of responsible departments of local municipalities is not sufficient, safety and environmental problems may happen. As with ELV dismantling facilities, the violation of safety and environmental regulations is a serious problem. Therefore, the scheme to prevent this should be prioritised.

3) Safety problem from continuous use of very old used parts (from the early stage of automobile diffusion)

Continuous use of very old used parts may cause safety issues. For example, if used tires and used brake pads do not work effectively, serious accidents may occur. It is therefore important to keep the safety quality of used parts.

4) Immature network of distribution and promotion of utilisation (from the progressive stage of automobile diffusion)

To promote the utilisation of used parts, it is imperative that a proper network of distribution is established. To promote a certain standard of used parts and ensure that used parts do not have safety problems, traders' associations are also expected to establish a proper network.

Currently in ASEAN countries, traders' associations are launched but their networks are immature. In addition, remanufacturing parts are not utilised and the promotion of utilisation is expected.

(2) Expected measures

1) Enhancement of import control systems (from the early stage of automobile diffusion)

(i) Stricter control by Customs

First of all, used parts should be prevented from reaching informal traders who do not implement environmental pollution prevention measures and safety measures. Stricter control by Customs authorities is necessary to prevent the flow of used parts to improper routes and to prevent imports that could bring about environmental problems such as leakage of engine and transmission oils during the transfer. In the importation of half-cuts, importers should be careful because it can be subject to the Basel Convention. On the other hand, during the early stage of automobile diffusion, it is necessary to allow the import of a certain amount of used parts to promote the diffusion of automobiles, although this goes against the fostering of domestic industries. Even if the importation of used parts were officially prohibited, they would still be imported by underground organisations anyway. Therefore, it will be beneficial to officially permit the import of a certain amount of used parts in the early stage of automobile diffusion.

(ii) Review of import conditions and review of licensing conditions

Further measures are desired to prevent used parts from flowing to improper routes through reviews of required environmental standards for traders such as preventing leakage of engine and transmission oils and licensing conditions of importers.

To enhance the import control system, the following points should be considered.

(iii) Division of roles among stakeholders

The division of roles among stakeholders will be a major issue when the license system for dealing with used parts is introduced. In particular, the question of who should inspect importers will become big issue. Will it be the Customs, the local agency of the responsible central ministry, or the local municipality?

(iv) Constraints of human resources and funds

A Customs officer pointed out the human resources and funds constraints of Customs when inspecting used parts imports. Developing a guidance manual for Customs officers when checking used parts imports is a possible option.

(v) Appropriateness of content of import conditions

When environmental standards such as prevention of oil leakage and licensing conditions are reviewed, the contents corresponding to the actual situation of each country should be reviewed and considered. For instance, the import permit is related to the monitoring of importers' activities after import. The import permit should therefore be set in the consideration of the monitoring process.

2) Promotion of labour safety measures (from the early stage of automobile diffusion)

Just like the case of ELV dismantling facilities, operators who handle used parts are also required to take labour safety measures such as health measures to prevent exposure to hazardous materials and safety measures for dangerous operations and the like. The process for improving the measures is quite similar to the ELV dismantling facilities.

3) Promotion of environmental measures (from the early stage of automobile diffusion)

Environmental measures such as prevention measures for waste oil and waste liquid, and collection of CFCs are also required of the plants and storage facilities of operators. In particular, when used parts importers take parts from containers, engine oil and transmission oil tend to leak. Therefore, importers should take necessary measures such as opening containers on the concrete floor and separating oil from water with oily water separator. The same measures are required to be taken for ELV dismantling facilities.

4) Safety standards for used parts (from the early stage of automobile diffusion)

It is important to set safety standards for used parts and remanufacturing parts, and to develop checklists to prevent used parts from causing environmental problems. This way, repair shops can check whether used parts and remanufacturing parts achieve safety standards.

To promote labour safety measures, the following point should be considered.

(i) Setting appropriate standards

Setting strict standards prevents diffusion of used parts and remanufacturing parts. It is also desirable to set up appropriate standards such as the obligation to install oily water separators, which does not prevent the diffusion of used parts and remanufacturing parts.

5) Developing a network of distribution of used parts (from the progressive stage of automobile diffusion)

Establishing a network of industrial associations will promote the distribution of used parts. First, establishing an industrial association of companies dealing with used parts that keep a certain quality should be considered. Such organisation should take the initiative to develop the distribution network of used parts. There may be cases when used parts cannot be used because of the difference in car types, ages, and so on. Therefore, collaboration between companies is very important. In future, it is recommended that an industrial organisation should establish a common database, strengthen collaboration, and accumulate technical know-how in checking whether used parts or half-cuts have safety problems or not. Distribution networks of used parts are also useful in terms of data collection. At present, there are still many countries that do not have good statistics of used parts. Accordingly, the circulation of used parts has not been well grasped. Therefore, it is important to establish a structure that takes charge of the collection of such data so that meaningful measures on used parts can be examined properly, and networking will contribute to it.

To develop a distribution network of used parts, the following points should be considered.

(i) Contribution of government

Mainly, industrial organisations are in charge of developing networking. In case there are many industrial associations, it is very difficult for government to contribute without being considered giving advantage only to a specific association. Therefore, the government can leave the issue of establishing networking to industrial associations.

(ii) Collaboration among stakeholders

To establish a database, there should be a division of roles and good collaboration among stakeholders. The most important point is who will create the database. The other point is who will input the information and at what point, should the importer of used parts input the information? Alternatively, should it be the dismantling companies, or the used parts shops?

(iii) Incentives for inputting data

A used parts database would only work when correct data is inputted. The merit of collaboration among companies is huge but as this is not expected during the early stage, we need to consider incentives for inputting proper data.

6) Quality standards on used parts (from the progressive stage of automobile diffusion)

In early stage of automobile diffusion, prices are prioritised over quality. However, proportionate with economic growth, car owners tend to want used parts with high quality. Hence, safety standards as well as quality standards on used parts should be established.

7) Standards on rebuilt parts (from the progressive stage of automobile diffusion)

During the early stage of automobile diffusion, car owners tend to use cheap used parts and demand for remanufacturing parts is small. The demand for rebuilt parts occurs only when the rebuild parts industry has already been developed to a certain level. Proportionate with the growth of the industry, demand will shift from used parts to remanufacturing parts with high quality. In many countries, rebuilt parts are recognised as being more or less the same as used parts. In Japan, however, rebuilt parts that have the same confirmed operability as that of new ones are also circulating in the market. This contributes to the efficient use and safety improvement of used parts. Therefore, it may be necessary to differentiate high-level rebuilt parts from other rebuilt parts by slightly improving the so-called used parts, and to take measures to make people recognise the existence of such high-level rebuilt parts. Developing quality standards and guidelines are expected.

To introduce standards on rebuilt parts, the following point should be considered.

(i) Creator of the guidelines

First, there is the question of who will create the guidelines. The second question is, to what extent should public institutions be involved since the contents of the guidelines are related to the interests of stockholders. The operators should be asked to establish their own voluntary guidelines.

8) Raising awareness of users (from the progressive stage of automobile diffusion)

Raising car owners' awareness for used parts is necessary. At the early stage of automobile

diffusion, because of the low income of people, there is an incentive to use used parts due to the price. However, as the income increases, the demand for used parts decreases. On the other hand, even though rebuilt parts have high quality at the progressive stage of the automobile diffusion, the use of rebuilt parts with high quality does not advance since it is thought to have the same quality as the used parts. Thus, for the sake of advancing the utilisation of used parts, especially the rebuilt ones, automobile users' awareness of used parts should be raised.

To raise the awareness of users, the following point should be considered.

(i) Coordination with brand-new parts industry

The utilisation of used parts and rebuilt ones generates a negative impact on the parts industry even though it brings about environment protection. In advancing the awareness of users of used parts and rebuilt ones, we have to carefully reflect on what level to proceed while considering how to promote the brand-new parts industry.

6. Downstream recycling and treatment

(1) Situation and issues expected in ASEAN and other Asian countries

1) Insufficient labour safety and environmental protection measures (from the early stage of automobile diffusion)

Downstream recycling plays an important role by making waste products resources in the ELV recycling system. Recycling facilities on the downstream side are not specialised in ELV recycling and this tendency gets stronger when we go further down the stream. Metals, non-ferrous metals, and plastics, among others, usually flow through the ordinary trading route of resources. When labour costs are low, recycling is mainly conducted by small household companies. Work is mainly done by hand, and there are concerns over the safety of workers. For instance, in the treatment of batteries, workers handle hazardous materials such as lead and sulfuric acid. This raises concerns about their health. There are also concerns about the health damage to local residents due to soil contamination of these harmful substances. Moreover, as downstream recycling operation is small scale, done informally, and with insufficient supervision and guidance from municipalities, the compliance with regulations on environmental protection and labour safety is not guaranteed.

2) Low quality of recycled resources (from the progressive stage of automobile diffusion)

Recycled resources such as metals, aluminium, and plastics reduce their quality when they are mixed with impurities. Appropriate segregation is expected to prevent the degradation of their quality. In addition, appropriate component analysis is required. In some cases, their usage is limited because the components of the materials are not properly segregated or not properly analysed.

3) Disposal of ASRs (landfilling) (in the progressive stage of automobile diffusion)

When the level of the economy and industrialisation advances, and manual labour costs increase mainly due to higher wage levels, the conventional household system will become no more competitive. Then, mechanisation and industrialisation of ELV recycling will take place as a matter of necessity. With the promotion of such industrialisation, measures to deal with new problems associated therewith such as treatment and disposal of ASRs and the like will become necessary.

(2) Expected measures

1) Promotion of labour safety measures (from the early stage of automobile diffusion)

(a) Vigorous application of the labour safety regulations

Measures for labour safety will certainly become necessary for downstream recycling. As there is a high possibility that the workers suffer directly from hazardous materials such as lead and sulfuric acid, prompt measures concerning the health problems of workers are required, regardless of the level of economic development, as the problems could be related to human life. Protective items such as masks and gloves need to be provided without fail so that workers are not exposed to hazardous materials directly.

(b) Guidance by municipalities and workshops organised by industrial organisations

Same as the case of ELV dismantling, the guidance by municipalities and workshops organised by industrial organisations are needed.

2) Promotion of environmental measures (from the early stage of automobile diffusion)

(a) Vigorous application of environmental regulations

At the early stage of automobile diffusion, compliance with basic regulations on environmental protection will become the starting point as there is a limit on administrative capacity due to lack of human resources and funds. It is primordial to eradicate environmental degradation by complying with relevant regulations, as downstream recycling is prone to cause environmental pollution by hazardous substances. As mentioned earlier, downstream recycling is related to the trading flow of resource materials as well as ELV recycling. Therefore, we need to proceed with the capacity building of municipalities, based not only on ELV recycling but also on the optimisation of waste treatment and recycling as a whole. We also need to develop a concrete operation system for the sake of strictly controlling violations of environmental regulations.

(b) Guidance by municipalities and workshops organised by industrial organisations

Just like the case of ELV dismantling, the guidance by municipalities and workshops organised by industrial organisations are needed.

To promote environmental measures, the following points should be considered.

(i) Coordination of existing waste treatment and recycling systems

For downstream recycling, it is important to coordinate the existing waste treatment and recycling systems. It is necessary to create a system by carefully examining whether we should create a specialised system for ELV recycling or proceed with it as a general matter for waste disposal and recycling as a whole. We should also cautiously consider the matter so as not to contradict existing regulations.

3) Sophistication of recycling technologies (from the progressive stage of automobile diffusion)

During low economic development, the quality requirements for recycled resources are also low. However, when the economy advances and there is an increasing demand for quality products, the demand for recycled resources, whose quality are not guaranteed due to the insufficient control of the household system, is supposed to decrease. In countries that are at the stage of matured automobile society, it becomes necessary to sophisticate recycling technologies that enable operators to produce recycled resources with high quality.

To promote environmental measures, the following point should be considered.

(i) Barriers to technology transfer

High-level expertise is required to produce recycled resources with high quality. One example of expertise is quality management of the recycled resources. It is difficult to introduce this kind of know-how in the short run. Therefore, together with the introduction of equipment, it is necessary to promote the introduction of technology and to develop personnel who can operate it in the long run.

4) Development of infrastructure, especially landfill sites (in the progressive stage of automobile diffusion)

As the mechanisation and automation of recycling advances, the treatment and disposal of newly generated residues such as ASRs become a problem. The proper treatment and disposal of these materials is necessary. ASRs should not be treated through a least-controlled final landfill site but through a controlled final disposal site with liner sheet and leachate treatment facility as ASRs have hazardous materials. The installation of this controlled final disposal site should be considered.

To develop infrastructure, the following point should be considered.

(i) Rising cost of treatment

The disposal cost of a controlled final disposal site is higher than that of a least-controlled final landfill site. The difference of treatment cost leads to the illegal dumping of ASRs due to the reluctance of bearing the burden of treatment cost. The development of a monitoring system on industrial wastes should be considered so as to prevent illegal dumping while the installation of controlled final disposal sites is promoted.

5) Legislation for downstream recycling (in the stage of matured automobile society)

(a) Division of roles among stakeholders

The system in which users and/or manufacturers are required to bear part of the treatment costs in order to prevent illegal dumping associated with the sharp increase in treatment and disposal costs is considered effective. For this kind of system to be realised, the premise is that citizens who are the final payers of the costs agree to cooperate regarding the collection of fees. This kind of examination will be made only after we enter into the stage of matured automobile society.

(b) Related licensing system

We need to create a separate licensing system for ELV recycling areas that cannot be covered by the existing treatment and recycling of hazardous materials. In Japan, a licensing system to cover hard-to-manage materials such as ASRs, airbags, and batteries was introduced to avoid any improper treatment. It is important to ensure the proper treatment of such materials by either modifying the existing system or establishing a new system for those that cannot be covered by the existing system, depending on the existing systems in each country. There are many countries that have licensing systems in place for the treatment and recycling of hazardous wastes such as lead and sulfuric acid. Therefore, it will be effective and efficient to include the treatment and recycling of hazardous materials wastes in the existing licensing system.

To legislate for downstream recycling, the following points should be considered.

(i) Securing of necessary funds and human resources

While the operation of the licensing system is performed by municipalities or by central governments (including local agencies of the central government), there are many developing countries that are unable to secure sufficient funds and human resources. Therefore, with limited funds and human resources, we need to find out the most efficient way to operate the system in a proper manner.

(ii) Consistency between the existing systems and the new system

In case a system specialising in ELV recycling is created, it is necessary to make it consistent with the existing waste treatment and recycling systems.

(iii) Vigorousness of the licensing system

It may also be possible to introduce a flexible authentication system rather than a vigorous licensing system. However, the question whether it is possible to rigorously confirm that conditions of the authentication are all satisfied arises.

(iv) Examination of a fee collection scheme

When examining the cost allocation system, we need to consider the manner in which the system will be established, including the fee level, who will collect fees from whom and in what manner, who is to administer the system, and how to make payments from the fund. When Japan enacted the Automobile Recycling Law, they had an intensive discussion about structuring the cost scheme, encompassing the collection, administration, and payment of fees. Because the most appropriate system may differ from country to country, it is necessary

to examine the contents of proper schemes on the basis of individual countries to secure a fee collection scheme.

6) Establishment of recycling technologies for the treatment of ASRs (matured automobile society stage)

If ASRs are treated through the controlled final disposal site, the treatment cost is higher. As mentioned earlier, the difference in treatment cost will lead to the illegal dumping of ASRs. Therefore, reducing the volume of the treatment by recycling the shredder dust should be considered. Concretely, it should promote further the sophistication of recycling through thermal recycling and/or feedstock recycling of shredder dusts, and recycling of welding slag.

To establish recycling technologies for the treatment of ASRs, the following point should be considered.

(i) Development of recycling technologies and incentives to the introduction

Recycling technologies such as thermal recycling, feedstock recycling of shredder dusts, and recycling of welding slag require high development and introduction costs. Then, it is assumed that the development and introduction does not proceed unless the incentives for development and introduction are given to the recycling industry. In this regard, structuring the scheme such as providing subsidies and incentives is necessary.

7. Others

(1) Situation and issues expected in ASEAN and other Asian countries

While each country is aware of the importance of ELV recycling, sufficient measures have not been actually undertaken due to the funds and human resources constraints. In such circumstances, support to ASEAN and other Asian countries from donor countries is strongly sought.

(2) Expected measures

1) Request for and promotion of international support

EVL recycling is not necessarily high in the priority in terms of international development cooperation. However, it is an issue related to human life from the viewpoint of safety and health. Accordingly, the importance of this issue is quite high. It is therefore important to draw more international support for ELV recycling in ASEAN and other Asian countries by

improving the awareness of international society and international assistance institutions such as the World Bank, the Asian Development Bank, Japan International Cooperation Agency and so on.

2) Dispatch of experts from advanced countries

In order to operate various systems related to ELV recycling, it is necessary to gather a variety of knowledge and experience. Therefore, it is necessary to request developed countries to dispatch experts with such knowledge to promote ELV recycling. It is also important for developed countries collaborate with relevant industries so that they agree to dispatch personnel with relevant experience and know-how to developing countries proactively.

8. Recommendations for upgrading the ELV recycling system in ASEAN

Motorisation is rapidly progressing in the ASEAN region. A huge amount of ELVs is expected to be generated in the ASEAN region as a result of the rapid rise of the number of vehicles, and the establishment of a scheme for their proper collection, reuse, treatment, and disposal will be required in the near future. The recommendations of the Economic Research Institute for ASEAN and East Asia Working Group on ELV recycling are summarised below. As the condition of motorisation is different among countries, the following recommendations have been made according to the stage of motorisation.

General

Recommendation 1. There is a need to raise the awareness of policymakers, car owners, and the general public on ELV, including safety standards.

Collaboration among stakeholders such as car owners, automobile dismantlers, used cars/parts dealers, recyclers of materials, waste treatment/disposal facilities, government, local municipalities and so on is indispensable for upgrading the ELV recycling system. The government is expected to collaborate on various policy measures.

Preliminary Stage

Recommendation 2. Illegal importation of ELVs and used parts should be prohibited. Stricter Customs control is indispensable.

Recommendation 3. Appropriate data collection is fundamental for further policy development. Currently, ELV generation and flow are not captured clearly. The establishment of a database system that is user friendly to prevent used parts entering the market needs to be considered. The introduction, upgrade, and proper management of the registration and deregistration systems are indispensable and will contribute to capture the ELV flow.

Recommendation 4. All stakeholders related to the ELV recycling system are responsible for the prevention of environmental pollution from ELVs. First, all stakeholders should make an effort to mitigate the environmental burden from ELV recycling. The government and local municipalities should strengthen the monitoring of environmental pollution from the ELV recycling process.

Recommendation 5. Currently, many workers in ELV recycling facilities are working under unhealthy conditions. The introduction and promotion of safety measures and the avoidance of health risks to workers are required for the sustainability of the ELV recycling system.

Recommendation 6. The control of ELV generation and flow is highly expected at this stage. Governments should introduce some policy measures like the strict implementation of car inspection or the introduction of maximum use of old cars.

Expanding Stage

Recommendation 7. Networking of used parts distribution is indispensable for the promotion of the utilisation of used parts and remanufacturing parts. Developing quality standards for used parts and remanufacturing parts contribute to this. Raising the awareness of car owners is also important.

Recommendation 8. Stakeholders should collaborate for the further development of the ELV recycling system. In particular, efforts in the following activities are highly expected:

1) Introduction, development, and transfer of ELV recycling technologies.

- Setting up of demonstration centres for dismantling facilities with appropriate environmental and occupational health measures in ASEAN and other countries in the Asian region.

2) Establishment of controlled final disposal sites (landfill sites with liner sheet and leachate treatment facility) and the like.

Maturing Stage

Recommendation 9. Stakeholders should advance the ELV recycling system. Governments should consider policy measures such as:

1) Development of ELV-specific regulations or laws (division of role and responsibility among relevant business entities and licence systems by legislation.

2) Adoption of recycling technology for ASR treatment, among others.

3) Promotion of the 3Rs.

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Annex I

Working Group meeting (Policy Forum)

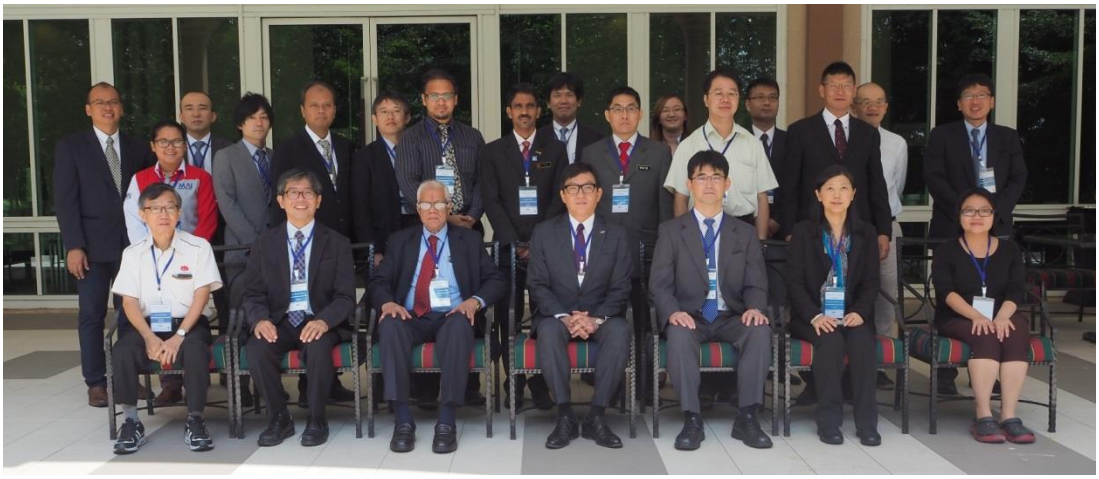
1. First Working Group Meeting of the Economic Research Institute for ASEAN and East Asia (ERIA) Research Project on Survey on Vehicle Recycling in the ASEAN Region

The First Working Group Meeting of the ERIA Research Project on Survey on Vehicle Recycling Systems in the ASEAN Region was held on 2 April 2015 in Jakarta, Republic of Indonesia. The meeting was attended by government officials, think-tanks and persons with relevant knowledge and experience on End-of-Life Vehicle (ELV) recycling from India, Japan, Indonesia, Malaysia, Thailand and Viet Nam. The meeting was chaired by Dr Michikazu Kojima, Senior Research Fellow at Japan External Trade Organization (JETRO).

Time	Program
8：30	Registration
9：00 (10 minutes)	Opening remark
9：10 (10 minutes)	1. Briefing on the objective, program, schedule, and expected output of the research project
9：20 (30 minutes)	2. Introduction of result of preliminary survey of current status in member countries
9：50 (40 minutes)	3. Presentation from WG members: 1st session ＊20 minutes for each expert
10:30 (20 minutes)	Coffee break
10:50 (40 minutes)	3. Presentation from WG members: 2nd session
11:30 (60 minutes)	Lunch
12:30 (40 minutes)	3. Presentation from WG members: 3rd session
13:10 (20 minutes)	4. Presentation on 1st field survey by Secretariat
13:30 (20 minutes)	5. ELV recycling and legislation in non-WG member Asian countries (China, Korea, Taiwan, among others)
13:50 (20 minutes)	6. Current status of ELV recycling in Japan, (dismantling technologies, used parts trading), shipment of used cars and parts to ASEAN countries
14:10 (20 minutes)	Coffee break
14:30 (20 minutes)	7. Background, development, and operation of ELV legislation in Japan
14:50 (20 minutes)	8. Voluntary activities of private sectors before ELV legislation in Japan
15:10 (80 minutes)	9. Discussion and plan of 2nd WG meeting
16:30	Closure of the meeting

WG members and observers presented on current status and challenges in their countries.

2. Second Working Group Meeting of the ERIA Research Project on Survey on Vehicle Recycling in the ASEAN Region



The Second Working Group Meeting of the ERIA Research Project on Survey on Vehicle Recycling Systems in the ASEAN Region was jointly organised by the ERIA, Mitsubishi Research Institute (MRI) and Regional Resource Centre for Asia and the Pacific (RRC.AP) on 21 August 2015 in Putrajaya, Malaysia. The meeting was participated by government officials, experts, think-tanks, and observers with relevant knowledge and experience on ELV recycling from India, Japan, Indonesia, Malaysia, Thailand and Viet Nam. The meeting was chaired by Dr Michikazu Kojima, Senior Research Fellow at JETRO.

Time	Program
8:30	Registration
9:00 (10 minutes)	Opening remark
9:10 (10 minutes)	1. Briefing on the objective, program, schedule, expected output of the 2nd WG meeting
9:20 (25 minutes)	2. Points of discussion in 1st WG meeting. Presentation of the results of the survey on current ELV recycling systems and legislations, and challenges in ASEAN countries and India by Secretariat.
9:45 (25 minutes)	3. Presentation on 2nd field survey by Secretariat
10:10 (20 minutes)	4. Presentation from Dr Abe
10:30 (10 minutes)	Coffee break
10:40 (50 minutes)	5. Expert's discussion ・Design for Recycling (DfR), End-of-Life/Service of Vehicle

Time	Program
	(including inspection system)
11:30 (90minutes)	5. Expert's discussion ・ELV Dismantling Facility/Reuse of Parts
13:00 (120minutes)	Lunch break
15:00 (60 minutes)	5. Expert's discussion ・Downstream Recycling and Treatment Facility, other items
16:00 (10 minutes)	Coffee break
16:10 (60 minutes)	5. Expert's discussion ・Overall discussion and recommendations
17:10 (20 minutes)	6. Presentation of Final Report structure by Secretariat and discussions
17:30	Closure of the meeting

WG members and observers discussed challenges and policy measures to address them according to the flow of ELV generation, treatment, and disposal.

1) **ELV dismantling facility (crushing facility)**

The importance of the demonstration facility centre was highlighted as a good model and tangible result of the project that may be replicated to countries in the region.

2) Reuse of used parts

It was cited that most of the developing countries use imitation auto parts or aftermarket auto parts. The control and regulation of the quality of reused parts is not easy for developing countries since the reused auto parts do not meet the standards of the vehicles and are not comparable with the genuine and brand new auto parts. Used parts are uncontrollable and there are concerns on the risk and safety issues of the used auto parts for vehicles. The traceability of the used parts is also becoming a very big concern, taking into consideration the quality control process. It was raised that the safety concerns on the used parts could be a danger if awareness is not raised.

Some of the observations of the experts include: The generation of spare parts is limited. There is a need to import spare parts as the use of used parts or imitation auto parts are evident in the region. In addition, used auto parts are not cheap. Although the owners of the cars can repair at lower cost, there is a need to also take into account the safety and environmental issues. Quality check of these reused auto parts has to be done.

Downstream recycling and treatment facility

Downstream recycling is expensive. Downstream recycling in Indonesia is not possible due to safety issues. It was stressed that these practices cause water and air pollution. The country needs to raise awareness and seek support from international organisations to address the current situation.

It was stressed that the treatment of plastic and rubber from ELVs is not good in some countries. The recovery of rubber could release toxic fumes as well as pollute the environment. It was remarked that the sustainability of ELV recycling centres will depend on the price of material, and thus, it was suggested to have a 10–50 years policy as it will take a long time to have the change of monetary value of material to be recycled.

Indonesia categorised three focused factors in downstream recycling, including tires, that are used for 10 years and that cannot be reused for safety concerns. However, it was found that the tire's waste product can be mixed with asphalt for roads, giving the tires added economic value.

Support from the private sector to bear the cost of downstream recycling could be explored, including cost-sharing mechanisms.

The conduct of research and development on ELV waste recycling and its estimated market value in ASEAN region was suggested. Technological options for sustainability which could also contribute to sharing of data and information on the study of ELV recycling should be conducted.

Demarcation of roles and responsibilities among players

It was proposed that the promotion of design for recycling of CFCs, airbags as well as the Extended Producer Responsibility be made to enhance the car owner's and car maker's responsibility. It was also suggested that the importer, in addition to carmakers, be added as one of the stakeholders. Considering the minimum quality standards, the inclusion of a retirement scheme to cover the implementation of safety standards was also proposed. The government could collect fees from car owners for downstream recycling, especially to bear the cost of hazardous waste in ASRs, bearing in mind that investing in downstream recycling is expensive.

The attendees were very impressed with the way the report on expected policy measures was presented.

On the matter of information on the preparation, development and execution of ELV recycling law, the first step should be to identify the problem or issues to solve. For example, the Teshima Case, one of the largest and most famous illegal dumping cases in Japan. Consultation will follow in developing the ELV recycling law.

Expected policy measures

It was suggested that, as per Recommendation 3, data on the number of vehicles, the average life of the vehicles, the extent of the problems, the estimates, among others, be included. This will be incorporated in the final report of the ASEAN ELV recycling systems. The behaviour of vehicle users in each country should also be included. What is ELV in Indonesia is not in the same as in Japan.

It was also suggested that issues or problems on ELVs in the region be inserted in the background on the draft recommendations.

Future actions on ELVs in ASEAN

Some future directions were proposed at the meeting. These include: 1) forecasting/estimating the number of ELVs or the average age of the vehicles that should be on the road; 2) establishing demonstration centre facilities; and 3) improving the infrastructure of ELVs in the country. The report could reflect the benefits of ELV recycling by quantifying the benefits, such as how many jobs are created, how much investment is being made (economic impacts), how much pollution will be reduced to assist decision makers and or policymakers. Engaging high-level policymakers in the discussions on the ASEAN ELV recycling is also an option.

The Working Group members extended their appreciation to the secretariat for the high quality reports and presentations. It was highlighted that the Japanese experience on ELV recycling system is a worthwhile model to replicate in ASEAN countries.

It was also proposed that capacity building through consultation workshops on ELV recycling is essential for some countries in ASEAN. This could be through tailor-made forums, depending on the needs of the country.

Annex II

Country Reports

Country reports are available in a supplementary electronic file. Click here to view the reports: Country Reports.

1. India
2. Indonesia
3. Lao People's Democratic Republic
4. Malaysia
5. Mongolia
6. Myanmar
7. Pakistan
8. Philippines
9. Republic of Korea
10. Russia
11. Taipei
12. Thailand
13. United Arab Emirates
14. Viet Nam

Annex II

Country Reports

1. India

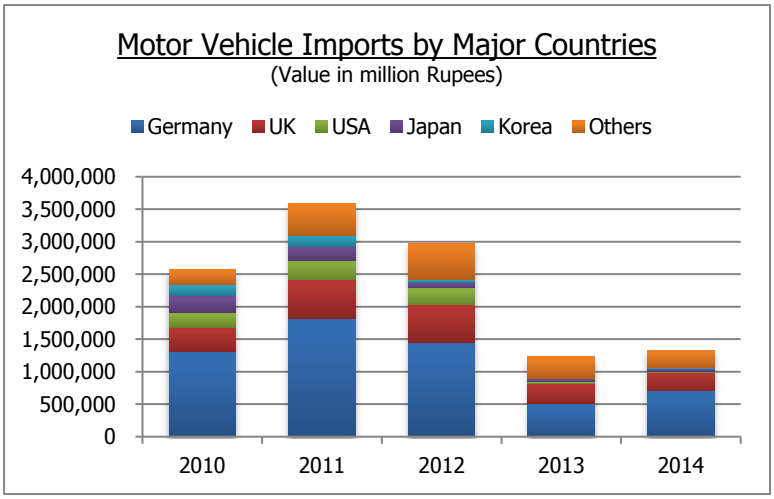
Country :	India
1. Current status of automobile recycling in the targeted country	

(1) Imports and exports from Japan and other countries: used cars

Import

The following graph shows India's automobile imports, including used cars, for 2010-2014. The big suppliers during this period were Germany and the UK.The decline in imports from 2013 is said to be due to the increased tax on imported Sports Utility Vehicles (SUVs).

Figure A-I.1: India's Automobile Imports



UK = United Kingdom; USA = United States of America.

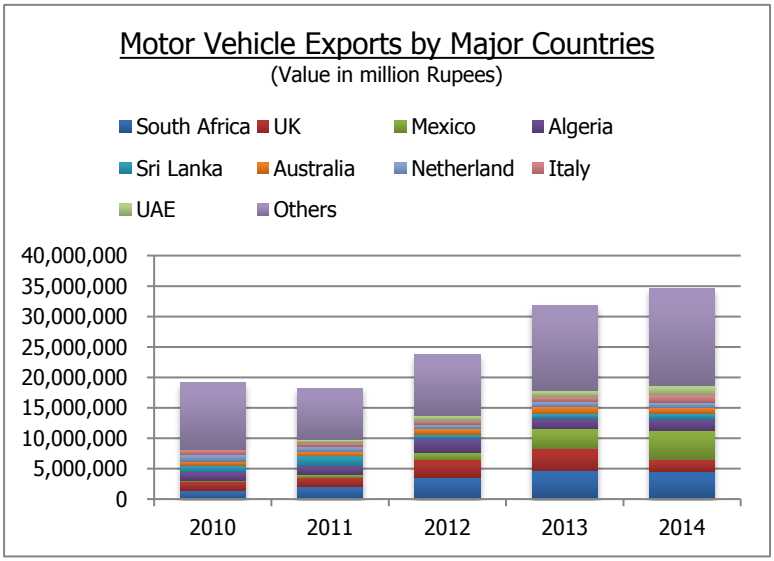
Source: UN Comtrade Database.

Country :	India

Export

The volume of export of motor vehicles from India was smaller than that of its import volume. Destinations of the vehicles were Saudi Arabia, UK, Mexico, Algeria, Sri Lanka, Australia, Netherlands, Italy, UAE, and others.

Figure A-I.2: India's Automobile Exports



UAE = United Arab Emirates, UK = United Kingdom.

Source: UN Comtrade Database.

Reference

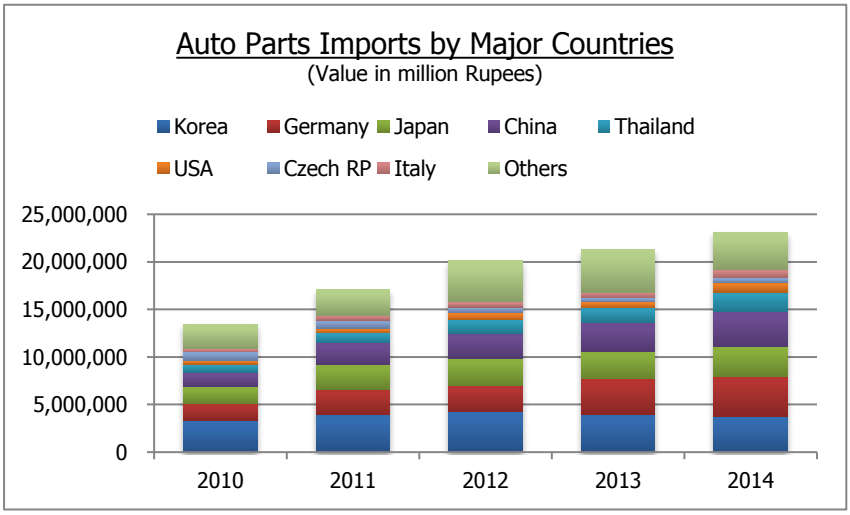
United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(2) Imports and exports from Japan and other countries: used parts

The two graphs below show major importers and exporters of auto parts (HS code: 8707 - 8708), including used parts, for 2010 - 2014.

Country :	India

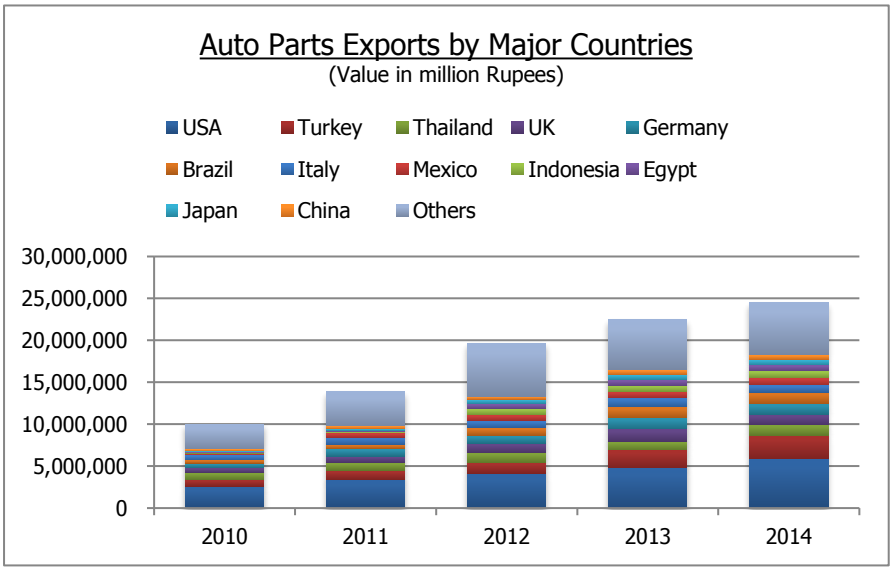
Figure A-I.3: India's Auto Parts Imports



Czech RP = Czech Republic, USA = United States of America.

Source: UN Comtrade Database.

Figure A-I.4: India's Auto Parts Exports



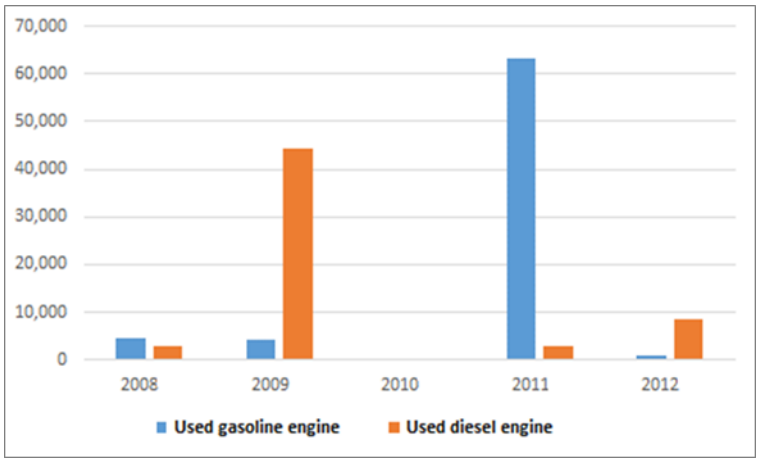
UK = United Kingdom, USA = United States of America.

Source: UN Comtrade Database.

Country：	India

The graph below shows estimates of India's used engine exports between 2008 and 2012. While no exports were found in 2010, more than 40,000 diesel units in 2009 and more than 60,000 gasoline units in 2011 were exported.

Figure A-I.5: Estimates of India's Export of Used Engines



Source: UN Comtrade Database.

Reference

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(3) Plans and regulations relating to import regulations

Trade Control

All items, including tanks and armoured fighting vehicles, can be imported by the Ministry of Defence.

The importation of chassis with two-stroke engines of three-wheeler vehicles (tempo, auto rickshaw, and others) is banned.

Country：	**India**

Motor cars of any cubic centimetre, and microbus, minibus, jeeps, including other old vehicles, and tractors, are importable under the following conditions:

1. The vehicle must not be more than five years old in the case of shipment.
2. Old vehicles can be imported only from the country of its origin. Old vehicles from any third country cannot be imported, except those which are to be used personally. In the case of import from a third country, a certificate of registration and certificate of cancellation of registration (from the country of use) will have to be submitted to the Customs authority.
3. A certificate containing age, model number, and chassis number of the old car will have to be submitted to the Customs authority from the Japan Auto Appraisal Institute (JAAI) for cars imported from Japan, or from recognized automobile associations for imports from other countries.
4. The date/age will be calculated from the first day of the next year of manufacture of the chassis.
5. For cars that have been imported from Japan, the date of manufacture will be ascertained/determined after examining the chassis book published by JAAI. For cars imported from other countries, the date of manufacture will be determined by examining the chassis book published by the country's government-approved automobile association. No old car or vehicle can be imported from a country that does not publish chassis books.
6. With respect to catalytic converters in petrol-driven cars and connection of diesel particulate filters in diesel-driven cars, action will be taken as per S.R.O.29-law /2002 dated 16 February 2002 issued by the Ministry of Environment and Forest.
7. No car can be imported without seat belt.
8. Wind shield glass and window glasses on both sides of the driver's seat must be transparent so that the inside of the car is visible.

Country：	India

Subject to the fulfillment of conditions laid down in clauses (2) to (6) above, old taxicabs from 1,250 cubic centimetres to 2,000 cubic centimetres that are less than three years old can be imported.

Motorcycles that are more than three years old and above 150 cubic centimetres are banned. However, this limit is not be applicable to the Police Department. For the importation of three-year old motorcycles, the period is calculated from the first day of the calendar year to the next manufacturing year. To determine the age of old motorcycles, certificates from internationally recognised companies such as PowerSport Institute and National Board of Revenue-approved inspections can be accepted as alternatives to the registration cancellation certificate.

The importation of remanufactured, rebuilt, and/or used parts is not permitted.

Duties and Taxes

- Customs Duty: In India, the basic law for levy and collection of customs duty is Customs Act 1962. It provides for levy and collection of duty on imports and exports, import/export procedures, prohibitions on importation, and exportation of goods, penalties, offences, among others.

  -The basic tariff applied to cars is 60 percent (overall duty is 100 percent)

  -The basic tariff applied to trucks is 10 percent.

  -The basic tariff for auto parts (Chapter 84 and 87) is 7.5 percent.

- Basic Excise Duty: This is the duty leviable under the first schedule of the Central Excise Tariff Act 1985.

- Special Excise Duty: This is the duty leviable under the second schedule of the Central Excise Tariff Act 1985. At present, this is leviable on very few items.

- National Calamity Contingent Duty: Normally known as NCCD. This duty is levied as per section 136 of the Finance Act 2001, as a surcharge on specified goods.

- Excise Duties and Cesses leviable under the Miscellaneous Act: On certain specified

Country：	India

goods, in addition to the aforesaid duties, a prescribed rate of excise duty and cess is also leviable.

- Education cess on excisable goods is levied in addition to any other duties of excise chargeable on such goods, under the Central Excise Act 1944 or any other law in force.

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(4) Plans and regulations relating to vehicle registration

New Car Registration

The registration of motor vehicles in India is governed by the country's Motor Vehicles Act of 1988. Motor vehicles cannot be used unless they are registered. Every owner of a motor vehicle must have their vehicle registered by authorities in his/her residence or place of business where the vehicle is normally kept.

Section 41 of the Act details the steps to register a motor vehicle in India. An application by or on behalf of the owner of a motor vehicle for registration shall be accompanied by documents, particulars and information, and shall be made within a period as may be prescribed by the central government. The registering authority shall issue a certificate of registration to the owner of a motor vehicle.

Country：	India

Re-registration

The Central Motor Vehicles Rules 1989 stipulates the regulation on renewal of certificate of registration. An application for the renewal of a certificate of registration for a motor vehicle, other than a transport vehicle, shall be made to the registering authority more than 60 days before the date of its expiry, accompanied by the appropriate fee as specified in rule 81.

Deregistration

There is no formal deregistration system in operation. AIS-129 proposes a formal deregistration system to be implemted along with a destruction certificate for ELVs.

Inspection

There is no inspection system for private vehicles. Only commercial vehicles are subject to inspection/fitness checking, which is authorized by the State Transport Department. Article 62 of the Central Motor Vehicle Rules 1989 prohibits testing stations from conducting vehicle inspection without permission from the registering authority.

Insurance

Third party insurance is comulsory for all vehices.

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Country：	India

(accessed September 2015).

The Central Motor Vehicles Rules 1989. http://www.tn.gov.in/sta/Cmvr1989.pdf (accessed September 2015).

(5) Handling of imported used cars and/or accident status quo cars

Imported Used Cars

According to the Motor Vehicle Act 1988, the importation of used cars is allowed. However, due to the high tariff and complicated procedure, it is almost impossible to import them.

Rules and regulations on imported used cars are follows;

- Imported used cars must have been manufactured within three years.
- Right-and drive cars are allowed to be imported only from designated ports.
- Imported cars must be usable on the road for at least five years and accompanied by submission of documents that prove they are able to be fixed at repair facilities in India for the first five years.

Accident Status-quo Cars

Accident cars are auctioned off in India. Currently, the informal sector is taking in ELVs, but the industry is reported to have many problems. The working condition is very bad for the estimated 100,000 recycling workers with severe health threats. Little treatment is done for hazardous materials, resulting in air, water, and soil pollution in these informal recycling centres situated in city centres. The testing of a formal mechanised recycling process has been started at the Recycling Demo Unit of the Global Automotive Research Center which can properly treat batteries, oils, airbags, and other materials.

Country：	India

References

Captain N.S. Mohan Ram, Chairman. Recycling sub-group, Society of Indian Automotive Manufacturers, *Recycling ELVs –India Report.* http://www.npo-jara.org/irt/pdf/SIAM_IRT2014.pdf (accessed September 2015).

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

(6) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: end-of-life vehicle

Volume

With the rapidly increasing number of new cars, there is a concurrent need for modern facilities for recycling and recovering materials from old and used cars that reach their end-of-life. The ELV market of India is expanding. It was reported that the cumulative number of ELVs reached 3,900 thousand in 2014.

According to EX Research Institute's survey, the estimated number of ELVs from 2008 to 2012 is as follows:

Table A-I.1: Estimated Number of ELVs in India (in thousands)

Year	2008	2009	2010	2011	2012
No. of ELV	1,780	4,763	139	2,434	-1037

ELV = end-of-life vehicle.

Source: EX Research Institute. *Survey on recycling law and business in Asia 2014*.

Another organisation estimates that, at current percentages of dismantling, 718,000 vehicles are expected to be dismantled by 2020 and 1.8 million by 2030. These percentages are however

likely to go up in the future. If all ELVs were to be dismantled, the number would stand at 8.7 million by 2020 and 26.6 million by 2030.

Table A-1.2: Estimated Number of ELVs in India (million)

ELVs by 2020-2030 (mn nos)		
Vehicles	**2020**	**2030**
Passenger vehicles	0.68	2.63
LCV	0.22	0.78
M & HCV	0.24	0.23
Scooters	1.05	6.31
Bikes	5.77	15.15
Moped	0.41	1.02
Three wheelers	0.31	0.51
Total Vehicles	**8.68**	**26.63**

HCV = heavy commercial vehicle, LCV = light commercial vehicle, M = power driven vehicles for passengers, mn nos = million number.

Source: Feedback Business Consulting Services, Report on Understanding Automobile Recycling Practices in India.

Model Years

In India, cars are driven for 15-20 years until they can no longer be cajoled into life.

Prices

A study of EX Research Institute indicates the purchase price of ELV ranges from Rs50,000 to Rs200,000.

Distribution

Old vehicles are repaired by the informal sector and those that cannot be repaired are sent to dismantling centres as ELVs. Bulk disposers such as companies and governmental institutions sell ELVs at auctions. Individual owners trade their old cars in for a new one at car dealers or they go to the local dismantling centres.

Country：	India

Processing Situation

Used cars have been traded by small-scale dealers or acquaintances in India. However, situation has changed recently. Major automobile manufacturers such as Maruti Suzuki, Toyota and Tata launched the program dealing with used cars, which supports the expansion of the ELV market.

Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity. The working condition is very bad for the estimated 100,000 recycling workers who face severe health threats. Furthermore, there is not enough space for a facility. Vehicles are dismantled in scrap yards located inside the cities using hand tools, hammers, and the like. Historically, these locations were in the city outskirts but they are now in busy residential areas, often in the heart of the city.

Around 410,700 tons of scraps (metals, aluminum and plastics) are sent to scrap dealers and around 7, 800 tons of rubber and plastics that cannot be recycled are dumped in open garbage areas.

Currently, dismantling is centered on the informal sector, offering employment to nearly 15,000 people directly and 80,000 people indirectly.

There is not a single shredder in operation in India for ELVs. The small volumes do not make a shredder economically viable to operate. The Ministry of Steel is proposing to install shredders where ELV volumes are guaranteed.

References

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Feedback business consulting services. *Report on understanding Automobile Recycling Practices in India.*

G.D. Sivakumar, S. Godwin Barnabas, S. Anatharam. *Indian Automobile Material Recycling Management.* http://www.rroij.com/open-access/indian-automobile-material-

Country：	India

recyclingmanagement.pdf (accessed September 2015).

(7) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: recycled parts

Volume

Used parts are mainly generated domestically due to prohibition of import of used motor vehicle parts. However, the number of used engines exported to India was about 50 thousand in 2008, about 350 thousand in 2010, and about 300 thousand in 2011.

Distribution, flow, and processing situation

Generally speaking, useful spares are recovered by using basic tools and no specialised equipment, refurbished and sold. Parts such as bumpers, head lamps, bonnets, steering wheels, batteries, among others, are used. Metal and plastic items are sold to scrap dealers and the rest are disposed through 'kabbadi wallahs' or dumped in open garbage areas.

Rewinding of motors, starters, alternators, and the like is done in a crude manner by the informal sector. There is no organised industry for remanufacturing used car parts.

AIS-129 controls the quality management of the component parts deemed to be non-reusable.

References

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Feedback business consulting services. *Report on understanding Automobile Recycling Practices in India.*

Country：	India

(8) Volume, distribution, flow, model years, sales prices, processing situation, items on trading and resources: steel and non-ferrous metals

Steel scraps are in high demand in India. A lot of steel scraps have been imported from other countries. The amount of imported steel scraps in India reached a record high of 8,170 thousand tons in 2012. As a breakdown, 2,681 thousand tons (35 percent) was from EU, 1,960 thousand tons (24 percent) was from Asia, 1,737 thousand tons (21 percent) was from Africa, and 1,135 thousand tons (16 percent) was from the US. It should be noted that the amounts have been dramatically increasing from only 4,600 thousand tons in 2010.

The table below shows volume of domestic generation of steel scrap.

Table A-1.3: Volume of Steel Scrap Generation in India

Year	2008	2009	2010	2011	2012
Steel Scrap (ton)	1,348	3,865	7,336	10,953	9,897

Source: Nikkan Shikyo Tsushin sya.

There are more than 700 electric furnace companies in India. However, while there is a fluctuation in the price of steel scrap, direct reduced iron coal and hot metal are used more as raw materials rather than steel scrap.

Steel can be taken from air filters, oil filters, switches, and clutch disks. Steel and aluminum are from brake shoes. Steel, brass and coppers are from battery terminals.

Generally, in India, scrapped metal items such as sheet metals, aluminum and plastics are retrieved and reused. Unusable items such as rubber parts, excluding tires, insulation material, glass, among others, are disposed at municipal garbages.

A lot of disposed catalysts of vehicles are disposed by the informal sectors such as Saraks and Hindestan Pt. (details are unknown).

Rubber is used as fuel for electric furnace.

Country：	India

Reference

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

(9) Distribution volume, flow, model years, sale prices, and processing methods during dismantling (batteries, tires, and waste fluids, among others)

Generally, little treatment is done for hazardous materials, resulting in air, water, and soil pollution in recycling facilities.

Batteries:

Batteries are sold to spare shops and the like, though there are formal regulations concerning disposal of used batteries. Regulations exist for return and recycling of batteries, but these are not strictly enforced.

Tires:

Scrap tires are either retreaded, sold to small industries, or discarded into garbage dumps. Scrap tire collectors and traders collect and transport scrap tires from tire shops to retreaders, recycling facilities, or to the nearest landfill sites.

Engine Oils:

Engine oils are used as fuel for industrial furnaces and boilers, or as recycled oil after distillation. Oil without the process of distillation is used as lubrication for crane wires and gears.

Wasted Oils

Several kinds of wasted oils such as transmission oil, coolants, power steering oil, brake oil, hydro oil and gear oil are mixed and heat treated. Then, it is used as lubrication for gears after chemical congelation.

The testing of the formal mechanised recycling process has been started at the Recycling Demo Unit of Global Automotive Research Centre which can properly treat batteries, oils, airbags, and other materials.

Country：	India

Reference

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

(10) Factual survey of end-of-life two-wheeled vehicles

While the sale of new cars and commercial vehicles declined in the country, powered two-wheelers saw modest growth of 2.3 percent in financial year 2012-13.

According to the Society of Indian Automobile Manufacturers (SIAM), in the 12 months to the end of March 2014, demand for two-wheeled transportation climbed 7 percent to 16.9 million, and in the first half of this financial year, growth more than doubled to 16 percent to record sales of 8.17 million. That figure represents nearly one-fifth of the world's total motorcycle, scooter and e-bike sales.

According to automotive supplier Bosch, volumes will continue to grow. The company expects the two-wheeler market in India to reach 27 million units by 2020.

The study team could not acquire the information on end-of-life motorcycles in this study. However, as the motor cycle is one of the subjects of the Draft Automotive Industry Standard for End-of-Life Vehicles drafted by SIAM, the regulation on end-of-life motorcycles is considered to be concretised and strengthened.

Reference

Automotive Manufacturing Solutions. *India: Two wheels still good.* http://www.automotivemanufacturingsolutions.com/focus/india-two-wheels-still-good (accessed September 2015).

Country：	India

(11) Type of operation and number of recycling-related companies

Type of Operation

Both large-scale organised and small-scale informal sector companies deal with ELVs in India. The former buy and sell bulk ELVs at auctions, and then sell them to scrap dealers once they have picked the reusable parts. The latter manually deal with ELVs which were picked and cannot be reused.

Shredder

There is not a single shredder in operation in India for ELVs at this time.

Other related companies

Batteries:

Small recyclers that dominate the Indian market mostly rely on coal to fuel crude furnaces. Furthermore, the quality of lead derived from these operations is insufficient to be used in producing high-quality long-life lead batteries.

According to a study of the Occupational Knowledge International conducted in 2010, there are number 336 registered recyclers for lead batteries in India. However, most of these facilities are small and very few are likely to operate efficiently and with sufficient pollution controls.

Tires:

There are waste tire recycling plants in India. Fab India is a manufacturer with a waste tire recycling plant and a pioneer in the field of designing, developing and quality manufacturing recycled tires with more than 20 years' experience. The company is located at Ahmedabad, Gujarat.

Divya International is also a manufacturer of recycled waste tires and spare parts that has a professional approach aimed at result orientation. The company installs quality pyrolysis machineries across India. Divya International today is one of the leading manufacturers of pyrolysis plants in India.

Country：	India

S&J Granulate Solutions Private Limited is a company that started its production in its new fully automated Eldan tire recycling plant in 2012. The plant, which is located in the Vapi region, Gujarat, India, has currently the highest capacity among such facilities in India. The production line is capable of processing up to 5,000 kilograms of shredded used tires per production hour.

References

Fab India. http://www.pyrolysisplant.in/about-us.html (accessed September 2015).

Divya International. http://divyaint.com/divya-sadf/about-us.aspx (accessed September 2015).

Eldan Recycling. http://www.eldan-recycling.com/content/fully-automated-tyre-recycling-plant-india (accessed September 2015).

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Occupational Knowledge International. *Lead Battery Recycling in India: Insufficient to prevent widespread contamination, lead poisoning, and ensure future lead supplies.* http://www.okinternational.org/docs/Lead%20Battery%20Recycling%20in%20India.pdf (accessed September 2015).

(12) Management situation of recycling-related companies

The study team could not acquire information on the management situation of recycling-related companies in India.

Reference

N/A

Country：	India

2. Current challenges and considerations in automobile recycling laws and institutional systems in vehicle recycling

(1) Challenges in the vehicle recycling system (illegal dumping, inappropriate processing of waste, stringent situations at final disposal sites, dismantling technology, safety, efficiency, and recycling rates)

The following are the challenges in the vehicle recycling system in India:

- Unavailability of adequate collection systems for certain waste materials. In the case of ELVs, the collection infrastructure is not in place.
- Lack of technology to identify, separate, and recover quality recyclables economically from the waste stream. Separation and cleaning of the desired materials at a high enough purity for recycling can be complicated and costly, depending on the characteristics and composition of the waste stream. A clear example is the separation and cleaning of plastics from ASRs.
- Incompatibility of different materials. For example, most polymers are not compatible with each other, and the separation from each other can be challenging and costly. Researches on compatibilizers conducted by the Vehicle Recycling Partnership (VRP) and others indicate that compatibilizers such as block-co-polymers may compatibilize some mixtures of commingled plastics without the presence of polyvinyl chloride (PVC) like municipal solid wastes.
- The market value of the recovered materials (i.e. available amounts, market price of the recovered material, and the like). The price of recycled plastics and foam has been fluctuating and, in many cases, is dependent on export of the materials overseas.

Against these challenges, a draft of AIS-129 is being prepared by the SIAM to be approved by the government. The objective of AIS-129 is to effectively regulate the ELVs. The scope of target of AIS-129 is diverse, covering items such as collection and dismantling of ELVs, heavy metal restriction and dismantling information, and type approval of vehicle regarding the 3R principles.

Country：	India

References

Automotive Industry Standard 129.

G.D. Sivakumar, S. Godwin Barnabas, S. Anatharam. *Indian Automobile Material Recycling Management.* http://www.rroij.com/open-access/indian-automobile-material-recyclingmanagement.pdf (accessed September 2015).

(2) Trend in vehicle recycling policy and related automobile recycling laws, and the enforcement, presence and details of related institutions.

a) Status of institutional system collateral for improper processing of three designated recovery items (fluorocarbons, airbags, and ASRs)

Fluorocarbons

CFCs not retrieved during the dismantling process are released in the air as there is no CFC collecting facility.

Airbags

The study team could not acquire detailed information. However, the testing of a formal mechanised recycling process has been started at the Recycling Demo Unit of Global Automotive Research Centre which can properly treat airbags.

Automobile Shredder Residues

Currently, ASRs are not properly disposed. According to Feedback Business Consulting Services, in its *Report on understanding Automobile Recycling Practices in India*, large landfills will be required to handle the scrap, unless dismantling processes are improved to reduce scraps discarded in garbage dumps through auto shredder usage and post ASR treatment. Improved infrastructure in the system (use of auto shredders) can help recycle 85 percent of the total weight of the vehicle. With shredding, 15 percent of the scrap alone will find its way in landfills

b) Demarcation of roles (obligation and economic burden) among production officers (manufacturers and importers), related operators, vehicle users, and government agencies

Country：	India

(including local governments)

The current roles and responsibilities among stakeholders related to the regulation of the automotive industry are as follows:

- Importers – subject to Customs formalities (e.g. required documents, fees, re-export, registration)
- Manufacturers – subject to design/technical standards and regulations, vehicle registration, and taxes. Multinational companies in India are promoting Design for Recycle (DfR) as per their global standards. Two major Indian car companies also make their export vehicles comply with EU standards. The entire production of Maruti Suzuki Limited complies with DfR standards.
- Users – compliance with transport regulations and standards (e.g. emission standards, periodic inspection)
- Government Agencies
    - Ministry of Road Transport and Highway – in charge of new car registrations, licensing, inspection and management of exhaust gas.
    - Ministry of Environment, Forestry and Climate Change – in charge of protecting the environment by ensuring compliance with environmental laws, establishing proper guidelines and plans, and coordination of relevant policies and management of hazardous wastes
    - Central Pollution Control Board – in charge of managing hazardous wastes and setting the standards for their treatment and disposal
    - State Pollution Control Board – in charge of making the inventory of hazardous wastes and monitoring of compliance by handing certifications on hazardous wastes.
- SIAM – in charge of the coordination of manufacturers in India, and proposals on ELV registration and technical standards.

Country：	India

References

Captain N.S. Mohan Ram, Chairman, Recycling sub-group. Society of Indian Automotive Manufacturers, *New Kid on the Block in Automotive Recycling India.* http://www.a-r-a.org/article.asp?paper=102&cat=166&article=804 (accessed September 2015).

DENSO and JAPIA-CLEPA Material Regulation Event, *Indian ELV.* Feedback business consulting services, *Report on understanding Automobile Recycling Practices in India* EX Research Institute, *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

(3) Presence or absence of environmental regulations (such as landfill and incineration ban, and heavy metals use ban)

There is no automobile recycling law in India so far, however, India is now focusing on creating a practicable end-of-life policy such as safe vehicle recycling and scrapping.

SIAM has taken a proactive approach and focused its attention to the issue. It has established a special group to deal with recycling of ELVs and proposed the draft AIS-129 to the government.

Draft AIS-29 requires dismantlers to possess the equipment and facilities for 'depollution' of ELVs. AIS-129 incorporates a provision for accreditation of dismantling standards after they meet specified standards.

AIS-29 also formulates technical standards for the safe disposal of ELVs and the reduction of heavy metals in vehicles.

The following regulations stipulate general waste management in India.

The Environment（Protection）Act 1986, amended 1991

The Act is a basic law of environmental protection. The Act stipulates that the central government has the power to take all necessary measures for the purpose of protecting and improving the quality of the environment; and preventing, controlling, and abating environmental pollution. The act also stipulates that no person shall handle or cause to be

Country：	India

handled any hazardous substances.

The Hazardous Wastes (Management and Handling) Rules 1986, amended 2000, 2003, 2008

The rules are the primary regulations addressing the management of hazardous wastes in India. These rules were established under the Environment (Protection) Act 1989, which gives the central government the power to 'take all such measures as it deems necessary or expedient for the purpose of protection and improving the quality of the environment and preventing, controlling and abating environmental pollution'.

The rules require a person or facility to handle hazardous wastes. Any person who is involved in handling hazardous waste must apply to a State Pollution Control Board (SPCB) for a grant of authorisation. This includes any person involved in the 'generation, processing, treatment, packaging, storage, transportation, use, collection, destruction, conversion, offering for sale, transfer, or the like of hazardous wastes. After receiving an application, an SPCB may grant or deny an authorisation. An SPCB may grant an authorisation if it is satisfied that the applicant has: (1) appropriate facilities; (2) technical capabilities; and (3) equipment to handle hazardous waste safely. If an SPCB grants an authorisation, it may set out conditions for the applicant to follow in the authorisation. Authorisations must be granted within 120 days of the application, and are valid for five years.

In addition to persons handling hazardous wastes, people who recycle or reprocess hazardous wastes must apply to SPCB for a grant of registration. The SPCB may grant registration if it is satisfied that the applicant (1) utilises environmentally sound technologies; and (2) possesses (a) adequate technical capabilities, (b) requisite facilities, and (c) equipment to recycle, reprocess or reuse hazardous wastes.

The grant of authorisation must be renewed every five years. SPCBs may renew an authorisation if there has been no report of violation of the Environment（Protection） Act (EPA) or related rules, or violation of the conditions set forth in the original grant of authorisation. While SPCB has the discretion not to renew an authorisation, in practice, it is expected that renewals will be granted if there have been no reported violations. The Central Pollution Control Board (CPCB) may renew a registration.

Country：	India

The Batteries (Management and Handling) Rules 2001

The Batteries (Management and Handling) Rules 2001 applies to the handling of batteries and their components. Batteries are defined under the rules to include lead-acid batteries that contain metal and are a source of electrical energy. Manufacturers, importers, assemblers, and reconditioners have specific responsibilities under the rules, including stated procedures for collection, recycling, and transportation. A battery recycler must register with an SPCB for a five-year licence. To obtain a registration as a battery recycler, an applicant must possess consents under the Air and Water Act, valid authorisation under the Hazardous Wastes Rules, registration with their District Industries Centre, and documentation of their installed capacity. Under the rules, registration is granted by the joint secretary of the Ministry of Environment, Forestry and Climate Change (MOEF), while the SPCBs are responsible for ensuring compliance with the Hazardous Wastes Rules and the Air and Water Acts, as well as certifying installed capacity. Renewal of registration will depend on the recycler's compliance status. Recyclers must also submit annual returns to the SPCB using a specific form set out in the rules, along with all records relating to the receipt of used batteries.

Both the EPA and the Hazardous Wastes Rules give SPCB the power to impose penalties. Under the EPA, anyone who 'fails to comply with…any provision of [the EPA], or the rules made or orders or directions issued thereunder' is subject to fines (up to Rs1), imprisonment (up to five years), or both for each failure. Additional fines may be imposed (up to Rs5,000 per day) if a failure continues after the first conviction. If it continues for more than a year after the conviction, a violator is subject to imprisonment for a period of up to seven years. The Hazardous Wastes Rules allow SPCBs to impose civil fines on occupiers and operators if they violate any of the provisions. Before an SPCB may impose a fine, however, it must first get approval from the CPCB.

Hazardous wastes requiring registration for recycling/reprocessing identified in the Hazardous Wastes (Management and Handling) Rules 1986, as amended in 2008, are listed in the table below:

Country：	India

Table A-1.4: Hazardous Wastes Requiring Registration for Recycling/Reprocessing

No.	List of Hazardous Wastes
1	Brass Dross
2	Copper Dross
3	Copper Oxide mill scale
4	Copper reverts, cake and residue
5	Waste Copper and copper alloys in dispersible form.
6	Slags from copper processing for further processing or refining
7	Insulated Copper Wire Scrap/copper with PVC sheathing including ISRI-code material namely "Druid"
8	Jelly filled copper cables
9	Spent cleared metal catalyst containing copper
10	Spent catalyst containing nickel, cadmium, zinc, copper, arsenic, vanadium
11	Zinc Dross-Hot dip Galvanisers slab
12	Zinc Dross-Bottom Dross
13	Zinc ash/skimmings arising from galvanising and die casting operations
14	Zinc ash/skimming/other zinc bearing wastes arising from smelting and refining
15	Zinc ash and residues including zinc alloy residues in dispersible form
16	Spent cleared metal catalyst containing zinc
17	Lead-acid battery plates and other lead scrap/ashes/residues not covered under Batteries (Management and Handling) Rules, 2001. [*Battery scrap, namely: Lead battery plates covered by ISRI, Code

Country：	India
	word ‘Rails’ Battery lugs covered by ISRI, Code word ‘Rakes’. Scrap drained/dry while intact, lead batteries covered by ISRI, Code word ‘Rains’.
18	Components of waste electrical and electronic assembles comprising accumulators and other batteries included on list A, mercury-switches, activated glass cullets from cathode-ray tubes and other activated glass and PCB-capacitors, or any other component contaminated with Schedule 2 constituents (e.g. cadmium, mercury, lead, polychlorinated biphenyl) to an extent that they exhibit hazard characteristics indicated in part C of this Schedule.
19	Paint and ink Sludge/residues
20	Used Oil and Waste Oil - As per specifications prescribed from time to time.

ISRI = Institute of Scrap Recycling Industries Incorporated, PCB = polychlorinated biphenyl, PVC = Polyvinyl chloride.

Source: Hazardous Wastes (Management and Handling) Rules 1986, amended 2008.

References

Automotive Industry Standard 129.

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Environmental Law Institute, *Enforcing Hazardous Wastes Rules in India - Strategies and Techniques for Achieving Increased Compliance.* https://www.eli.org/sites/default/files/eli-pubs/eli-nlsiu-enforcing-hazardous-wastes-rules-india-handbook.pdf (accessed September 2015).

Annex II

Country Reports

2. Indonesia

Country :	Indonesia

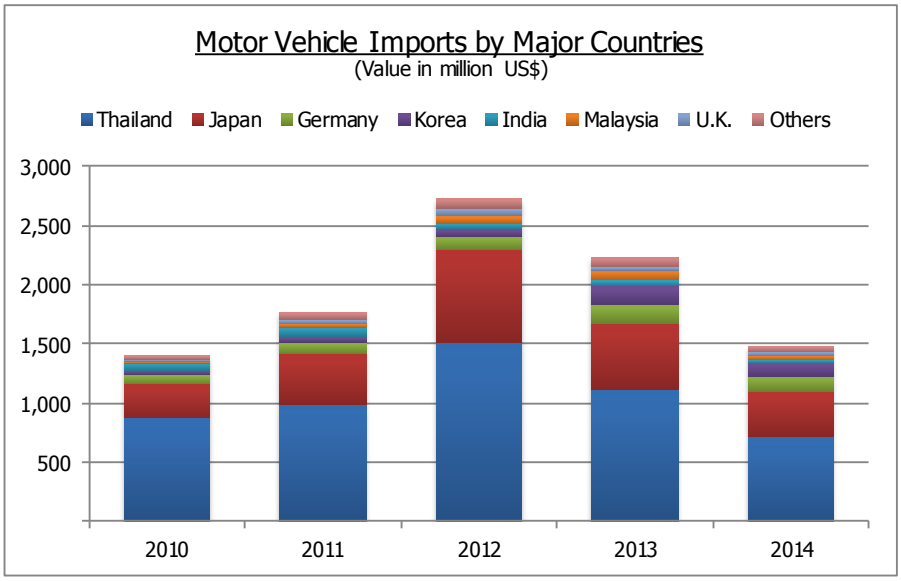
1.The current status of automobile recycling in the targeted countries

(1) Import and export situation from Japan and other countries: used cars

Import

The cumulative bar graph below shows automobile imports (HS code: 870321 - 870390), including used cars, to Indonesia for 2010 - 2014. Indonesian imports of vehicles in 2012 surged 155 percent to US$2.7 billion compared to 2011 due to the country's high private consumption. Thailand has been the biggest supplier during the period followed by Japan, which accounted for more than 50 percent in average of the total, while the value dropped in 2013 and 2014.

Figure A-II.1: Indonesia's Automobile Imports



UK = United Kingdom.

Source: UN Comtrade Database.

Country : **Indonesia**

Table A-II.1: Number of Used Passenger Motor Cars Exported from Japan

Year	2010	2011	2012	2013	2014
Indonesia	5,762	3,647	3,491	2,790	3,434
World	672,627	699,881	830,703	947,990	1,059,617
Share of Indonesia	0.9%	0.5%	0.4%	0.3%	0.3%

Source: Trade Statistics of Japan, Ministry of Finance.

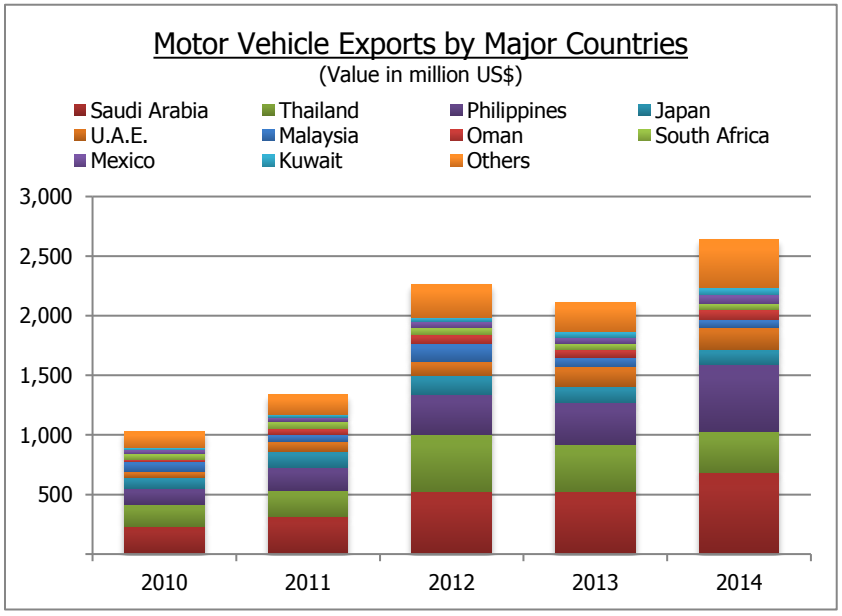
Table A-II.2: Number of Imported Used Cars Estimation

Year	2009	2010	2011	2012	2013
Total	8,701	16,595	10,368	10,040	7,929

Source: Yano Research Institute.

Export

Figure A-II.2: Indonesia's Automobile Exports



UAE = United Arab Emirates.

Source: UN Comtrade Database.

Country：	Indonesia

The country's annual automobile exports growth has reached a figure of more than US$2 billion in the past three years, indicating a continuous improvement in performance.

References

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

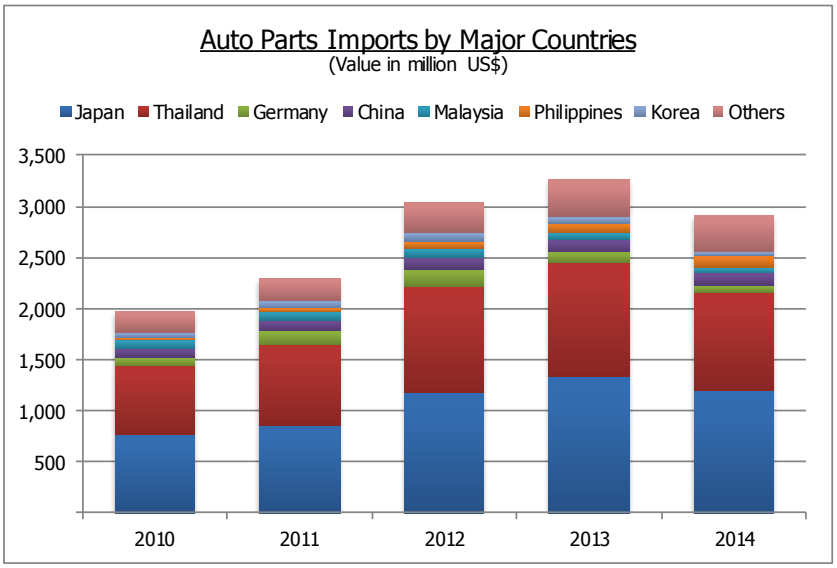
(2) Imports and exports from Japan and other countries: used parts

Although the importation of used car parts is prohibited in Indonesia, used parts are still imported, mainly from Singapore, especially for functional parts such as engine, though they are suspected to have originated from Malaysia. Direct imports from Japan and other countries are also reported. According to the trade statistics of Japan, car parts imports from Japan reach ¥298,664 million.

The two cumulative bar graphs below show imports and exports of auto parts (HS code: 8707 - 8708), including used parts, to Indonesia for 2010-2014. The total volume of imports has steadily grown for the past years, but decreased in 2014.

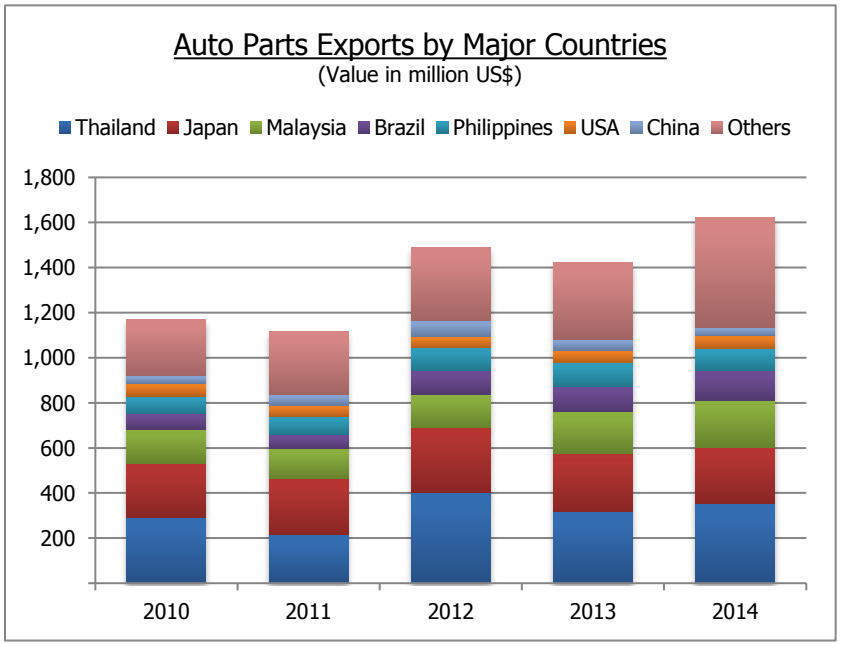
Country :	Indonesia

Figure A-II.3: Indonesia's Auto Parts Imports



Source: UN Comtrade Database.

Figure A-II.4: Indonesia's Auto Parts Exports

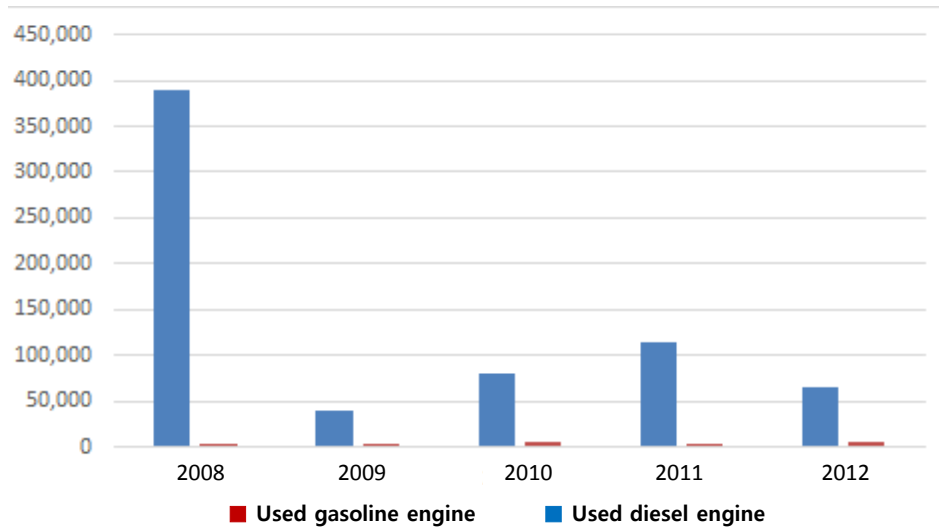


USA = United States of America.
Source: UN Comtrade Database.

Country :	Indonesia

Used Engines

Figure A-II.5: Import of Used Engines



Source: Department of Statistics.

References

Department of Statistics. http://www.bps.go.id/ (accessed September 2015).

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(3) Plans and regulations relating to import regulations

Trade Control

Tariffs:

- Tariffs on completely built-up (CBU) passenger vehicles range from 65, 70, and 80 percent, depending on engine displacement.
- A 45 percent tariff is applied to CBU Commercial vehicles.

Country： **Indonesia**

- CBU pickup trucks and buses tariff rates range from 5, 40, 45 percent, depending on engine size.
- Tariffs on non-passenger car kits are a uniform 25 percent.
- Tariffs on auto components and parts imported for local assembly of passenger cars and minivans are a uniform rate of 15 percent.

Duties and Taxes

- In addition to the duty and luxury tax, Indonesia applies a 10 percent value-added tax (VAT).

Import Bans and Quotas:

- The importation of used vehicles and automotive parts is prohibited.

The Indonesian Government raised import tariffs on more than a thousand items, including cars, on 23 July 2015. Under the new tariffs, the duty on cars was fixed at 50 percent, from a range of 10 percent to 40 percent previously.

Currently, duty on imported parts ranges from 0 percent to 40 percent. The government has committed to working towards a 0 percent tariff on all auto parts imports by 2020.

Table A-II.3: Duties and Taxes for Automobile Parts

Bodies, parts and accessories of the motor vehicles	HS code	Unit	Import Rate
Bodies (including cabs), for the motor vehicles of headings 87.01 to 87.05.			
- For the vehicles of heading 87.03:	8707.10	Kg	40%
- Other:	8707.90	Kg	5 - 40%
Parts and accessories of the motor vehicles of headings 87.01 to 87.05.			
- - - - For vehicles of tariff lines 8704.10.28.00 with mass of 1.2 t or	8708.40.2710	Kg	0%
- - - - For vehicles of tariff lines 8704.10.28.00 with drive axle diameter of 120 mm or more	8708.50.2710	Kg	0%

- - - - For vehicles of tariff lines 8704.10.28.00 with diameter of 1,000 mm or more	8708.70.3910	Kg	0%
Other than the above		Kg	10%

HS = Harmonised system, Kg = kilogram, mm = millimeter.

Source: Indonesian Customs.

Other

Indonesia does not have specific regulations on the number of years on the road of used vehicles.

Reference

Indonesia Customs.
http://www.beacukai.go.id/wwwbcgoid/index.html?page=apps/browse-tarif-dan-lartas.html (accessed September 2015).

(4) Plans and regulations relating to vehicle registration

The Directorate General of Land Communications is in charge of registration and inspection systems in Indonesia. The basic law is Indonesian Law No. 22 of 2009 on Road Transport and Traffic.

New Car Registration

Under Indonesian Law No. 14, Law on Traffic and Land Transportation 1992, all motor vehicles are required to be registered. The Indonesian National Police is the agency responsible for motor vehicle and driver registration and identification. Compulsory insurance is also required.

In addition, prior to the sales and use of motor vehicles, manufacturers and importers must subject vehicles to the vehicle type approval system, also in accordance to Indonesian Law No.

Country：	Indonesia

14. This includes document application, vehicle testing and inspection, and certification by the Directorate General of Land Transport.

For registration, the Surat Tanda Nomor Kendaraan (STNK)/Vehicle Registration Number, Buku Pemilik Kendaraan Bermotor (BPKB)/Proof of Car Ownership book, and Plat Nomor/licence plates are issued to the car owners. The issuer of STNK and BPKB is the local police office.

Transfer or Selling of Licence

In case of a change in car ownership, the car owner is required to follow the change procedure of BPKB. The new owner is required to pay the registration fee.

Re-registration

Car owners are required to renew their car registration annually. The STNK and Plat Nomor are valid for five years and should be renewed after five years.

Deregistration

Car owners need to deregister their cars at police stations. In practice, car owners often sell ELVs to repair shops instead of following the deregistration procedure. In the process of deregistration, car owners are required to change the owner described in the BPKB. The process is done on a written basis only and the car owner is not required to return the Plat Nomor.

Inspection

Commercial vehicles and public vehicles are required to take the inspection every six months. However, personal vehicles are not currently the target of compulsory inspection. The introduction of the inspection system for all vehicles is currently under discussion. There are 130 inspection centres in Indonesia.

Insurance

Third-party vehicle insurance is a mandatory requirement and each individual cars and motorcycles must be insured. Therefore, a car owner cannot drive the vehicle until it is insured. Third-party vehicle insurance is included through a levy in the vehicle registration fee which is

paid to the government institution known as 'Samsat'. Third-party vehicle insurance is regulated under Law No. 34 of 1964 on Road Traffic Accident Fund. The government protects the public from traffic accident loss through the implementation of the Law No. 33 and the Law No. 34, the management of which is conducted by Jasa Raharja, a state-owned insurance company.

Penalty

In case a car owner fails to comply with the annual renewal of registration and continues to use the car, the car owner shall be subject to imprisonment not exceeding six months or a fine not exceeding Rp6 million.

Any person driving a car without the vehicle inspection certificate should be subject to imprisonment not exceeding three months or a fine not exceeding Rp3 million.

References

EX Research Institute. *Survey on recycling law and business in Asia 2014.* **http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf** (accessed September 2015).

Directorate of Road Traffic and Transport, Directorate General of Land Transport, Ministry of Transportation. *Development of Vehicle Type Approval In Indonesia.* http://www.apec-tptwg.org.cn/new/Archives/tpt-wg39/Land/VSH/20.%205.5.3_Development%20of%20Vehicle%20Type%20Approval%20System_Indonesia.pdf (accessed September 2015).

Sutomo, Heru Sand H. Purwoto. *Assessing Road Accident Fund in Indonesia.* http://www.easts.info/publications/journal_proceedings/journal2010/100426.pdf (accessed September 2015).

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(5) Handling of imported used cars and/or accident status quo cars

Country :	Indonesia

Some imported used cars and accident cars sold by insurance companies are broken up and vehicle dismantlers and 'bengkels', which are small-scale car repair shops in Indonesia take these parts. In some cases, accident cars are sold to the scrap trading companies through the auction. They take parts from accident cars or treat them as steel scraps.

Reference

Field Survey of the Study Team.

(6) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: end-of-life vehicle

Volume

The number of ELVs was estimated at 124,002 per year in 2013. Yano Research Institute forecast the number of ELVs as follows:

Table A-II.4: Forecast of the number of ELV in Indonesia

Year	2013	2014	2015	2016	2017	2018	2019	2020
No. of ELV	124,002	152,723	178,524	176,370	160,389	175,493	218,337	248,676

ELV = End-of-life vehicle.

Source: Yano Research Institute.

Price

As an example, a pickup truck from the 80s was priced Rp11,000,000 including repair cost.

According to the field survey conducted by EX Research Institute, the purchase price of ELV ranges from Rp1 million. An interviewee in the field survey said that he purchased his ELV at Rp3,900 per kilogram.

Distribution

Car owners continue to use old cars. If used cars become older, they are likely to circulate from

Country：	Indonesia

urban to rural areas, or to be exported to neighbouring countries. Old vehicles deemed to be unusable are still treated as 'repairable' for years without being repaired.

In Indonesia, the existence and necessity of the automobile dismantling industry are not recognised. However, there are some sites where ELVs are gathered such as Simatupang. In such a site, vehicles are used as sources of parts, and the remnant car body is manually cut into steel scraps which are resold to iron recyclers. These vehicles are procured by car dealers, individuals, insurance companies and so on.

Processing Situation

Generally, the informal sector plays a central role in the operation of waste collection/recycling. Used parts are taken off and bodies are dismantled manually by gas burners. In Indonesia, there is no official vehicle shredder location.

Steel scraps, which are resold to iron recyclers, and non-ferrous metals are sent to aluminium product manufactures.

References

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Field Survey of the Study Team.

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(7) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: recycled parts

Distribution, Flow, and Sale Prices

Although there is prohibition on the importation of used parts, used parts are imported from Japan and Singapore. In some cases, domestic used parts are taken from accident cars and used cars. There are many used parts dealers in Indonesia. Used parts are sold in the agglomerated market of 'bengkels', and there are car repair shops and parts dealers in the market. In some

Country：	Indonesia

cases, end-users buy the used parts in the market.

The supply of ELVs from which parts are taken has a wide variety of pathways, including import, reselling from dealers who received old used cars, brokerage, and personal transaction.

Used parts are sold as follows:

- Used Battery: The price is about Rp50,000 if the brand new parts are priced at Rp350,000
- Used Handle: The price is Rp40,000 for a Toyota and Rp22,000 for a Mercedes.

In Indonesia, a few companies remanufacture alternators, starters, and the like. Remanufacturers are required to register the year of the product, which leads to quality control at a certain level and provides one-year guaranty. Remanufactured parts prices are about 50 percent of the brand new parts.

References

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Field Survey of the Study Team.

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(8) Volume, distribution, flow, model years, sale prices, processing situation, items on trading and resources: steel and non-ferrous metals

Domestic car scraps occupy only a small fraction of raw materials used in Indonesian ironworks where cheaper imported scraps dominate. Other metals are recovered in crude ways such as open incineration for wire harnesses. The remnant car body is manually cut into steel scraps. Iron recyclers buy and process these scraps. Recyclable materials such as glass, tires, large plastic parts, among others, are processed using separate recycling techniques.

Country：	Indonesia

1) Steel

There are more than 10 smelting companies in Indonesia where 60 percent of scraps are used as raw materials for recycling, e.g. Madura company.

There are not enough steel scraps for steel production in the country. The table below shows the volume of steel scraps generated domestically. The country largely depends on imports. The top three suppliers of ferrous scrap to Indonesia in 2012 were USA (40 tons), Australia (39 tons), and EU (23 tons).

Table A-II.5: Volume of Steel Scrap Generation in Indonesia

Year	2008	2009	2010	2011	2012
Steel Scrap (ton)	1,105	1,296	1,222	584	-131

Source: Nikkan Shikyo Tsushin sya.

As the receiver of the steel scraps, there are several electric furnace companies in Indonesia.

Table A-II.6: Electric Furnace Companies in Malaysia (1,000 ton per year)

Company	Location	EAF capacity	Steel making capacity (1000t/year)
Master Steel	Jakarta	30t×1,50t×2	600
(PT Kesa)	Jakarta	80t×1	300
(Pulogadung)	Jakarta	60t×1	200
(PT Spa)	Surabaya	40t×1	200
		Total of Master Steel	1,300
Inti General	Semarang	25t×1	150
Inter World	Jakarta	35t×1	200
Jakarta Steel	Jakarta	35t×1	200
Toyogiri Iron & Steel	Jakarta	25t×1	150

Jakarta Catra	Jakarta	80t×1	300
Gunung Garuda	Jakarta	125t×1	400
Ispat Indo	Surabaya	80t×1	600
Djatim Taman Steel	Surabaya	25t×1, 30t×1	200
Gunung Gahapi	Medan	40t×1	250
Growth Sumatra	Medan	-	300
Kurakatau Steel	Cilegon	65t×4,125t×6	1,600
		Total of steel making capacity	5,650

EAF = electric arc furnace, t = ton.

Source: Steel Plantec research.

2) Non-ferrous Metals

The volume of automobile catalysts generated, including that of commercial vehicles, was about 470 tons in 2011.

Aluminium is the main source of recycling materials in Indonesia. Most of the materials collected are mixed metal materials like copper and bronze.

References

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Field Survey of the Study Team.

Ministry of Environment, Japan. *Feasibility Study on biomass utilization for arc furnace in Indonesia.* http://www2.gec.jp/gec/jp/Activities/cdm-fs/2007/2007JPSteelPlantec_jIndonesia_rep.pdf (accessed September 2015).

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

Country :	Indonesia

(9) Distribution, volume, flow, model years, sale prices, and processing methods during dismantling (batteries, tires, and waste fluids, among others)

Batteries:

There are many battery recyclers in Indonesia. Many of them are from the informal sectors. Batteries are recycled but not all batteries are recycled. Battery is treated as valuable resource. There are some recyclers that dismantle the battery into lead and plastic, and fabricate ingots from the dismantled lead.

Tires:

Used tires are recycled in Indonesia. Recycling is mainly conducted by the informal sector but companies such as Xinxiang Huayin Renewable Energy Equipment Company Limited introduced advanced technology to change waste tires to fuel oil.

Waste Oils:

Approximately 529 tons of oils are accumulated and resold to recycling shops. Waste oil is treated as a valuable resource. The research of EX Research Institute showed that collected oils are finally accumulated into four waste oil recyclers, which contain Pennzoil, an American company, and Agip, an Italian company. The waste oil recyclers are required to get a licence from the Department of Transportation, Indonesia.

CFCs:

CFC is generally not recovered even though recovery instruments are distributed to some factories. The Narogong factory of PT Holcim Indonesia is the first factory of cement kilns which directly destroy CFCs.

Country：	Indonesia

References

EX Research Institute. *Survey on recycling law and business in Asia 2014.*
http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Field Survey of the Study Team.

Yano Research Institute, *ASEAN Automobile Recycling 2014.*

(10) Factual survey of end-of-life two-wheeled vehicles

The study team could not acquire the information on end-of-life motorcycles in this study.

Reference

N/A

(11) Type of operation and number of recycling-related companies

Dismantlers:

The informal sector plays a central role in the operation of waste collection/recycling. The formal sector collectors are in charge of industrial and hazardous wastes which are sent to formal recyclers. Other wastes such as municipal wastes go through a complex system of informal waste management where mobile door-to-door scavengers (pemulung) and community-based crews collect wastes which are sold to 'lapaks', along with traded recyclable items (cans, plastics and others). Lapaks function as intermediaries between collectors and 'bandars', the informal dealers from whom the wastes eventually reach formal and informal recycle factories. These intermediaries perform the function of collection, selection, separation, cleansing, and pre-treatment.

Downstream Recycling Companies:

PT. Daiki Aluminium Industry Indonesia was established in Kawasan Industri kiic, JL. Maligi Ⅷ LOT T-2, Kawawang 41361, Indonesia in 2010. From 2011, the company started the melting of

aluminium scraps and the production of alloy for aluminium die-casting.

Other Related Companies

Battery recyclers:

Gramitrama Battery

PT. Gramitpama Battery, which is based in Sidoarjo, is a national privately owned company that was established in 1975. The company first produced battery plates and now supplies both domestic and international customers with good raw materials made through the use of the latest technology.

Tire recycling companies:

PT. Buana Eka Sakti Tangguh is located in Jl. Lodan Raya Jakarta, Jakarta. The company has 11 to 50 employees and the revenue is less than US$ 100,000.

PT. Baretec Indonesia has innovative and most advanced technology for refurbishing batteries. It has a patent for the production method and chemicals and its world patent is pending now. The company can supply all kinds of refurbished lead-acid batteries for cars, ships, heavy equipment, golf carts, and many others.

Reference

Kojima, Michikazu. 3R Policies for Southeast and East Asia. http://www.eria.org/RPR-2009-10.pdf (accessed September 2015).

(12) Management situation of recycling-related companies

Scavengers are typically paid Rp15,000 to Rp25,000 per day. They are quite often reliant on credit from Lapaks who would pay them beforehand for future transactions. Lapaks have warehouses, vehicles, and a small number of workers. Many of these warehouses were started by former scavengers and junkmen (waste traders). Lapaks desire to be brokers or even dealers (bandars) who enjoy a relatively large scale of operation, including pre-treatment. One iron and metal dealer yields Rp5,000,000 profit per month which is 30 to 50 percent of revenue. Some

Country：	Indonesia

bandars even perform industry-level recycling.

Large portions of scraps come from automobiles. Most of the recycling businesses are located in northeastern Java.

Reference

Kojima, Michikazu. 3R Policies for Southeast and East Asia. http://www.eria.org/RPR-2009-10.pdf (accessed September 2015).

2. Current challenges and considerations in automobile recycling laws and institutional systems in vehicle recycling

(1) Challenges in vehicle recycling systems (illegal dumping, inappropriate processing of waste, stringent situations at final disposal sites, dismantling technology, safety, efficiency, and recycling rates)

There are currently no provisions on automobile recycling and/or the management of ELVs in Indonesia. In addition, the following issues surrounding the waste management sector in general could also indicate potential challenges for vehicle recycling in Indonesia (Chaerul, Tanaka and Shekdar, 2007):

- lack of national policy and legal framework for municipal solid waste (MSW) management
- low coverage service for waste transportation
- use of improper waste storage at generation points
- lack of appropriate final disposal practices.

Dismantling operation is being done by the informal sector. Components and scraps are circulated through the informal route. Furthermore, vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity.

Country :	Indonesia

Environmental measures such as prohibition on illegal dumping of waste and collection of CFCs, and the like are insufficient. Metallic component recycling is done manually. This causes labour safety issues.

Reference

Field Survey of the Study Team.

(2) Trend in vehicle recycling policies and related laws in automobile recycling laws, and the enforcement, presence, and details of related institutions.

a) Status of institutional system collateral for improper processing of three designated recovery items (fluorocarbons, airbags, and ASRs)

Fluorocarbons

There is no proper facility to collect the fluorocarbon in most of the automobile garages or repair shops. Most of the refrigerants are released within the working areas. CFC is generally not recovered even though recovery instruments are distributed to some factories. CFC is defined as a B3 substance under Act No.32/2009 and Government Regulation No.18 of 1999 concerning the Hazardous Waste Management. B3 means a substance or material that may, either directly or indirectly, contaminate and or damage the living environment, and/or may harm the living environment, health, human survival, and other living creatures.

Airbags

There is no guarantee on the functionality of the used restraint component with inflator contents (i.e. airbags, belt pre-tensioners). Even though the electrical telltale shows normal function (no airbag light 'on' on the cluster), it may only show normal resistive value of the component.

Currently, the proper treatment of the airbag is not regulated.

Country：	Indonesia

Automobile Shredder Residues

There is no official shredder location in Indonesia. Metallic component recycling is done by manual cutting. The shredding process is not developed due to the limited number of ELVs.

b) Demarcation of roles (obligation and economic burden) among production officers (manufacturers and importers), related operators, vehicle users, and government agencies (including local governments)

- The structural framework of the automotive industry in Indonesia consists of the following players:
  - Regulators: Ministry of Industry (main), Ministry of Trade, Ministry of Transportation, State Ministry for the Environment, Ministry of Finance, Ministry of Energy and Mineral Resources, and Ministry of Home Affairs
  - Financing: Banks and Multi-finance Companies
  - Automotive Industry: Principals, Brand Holding Sole Agents ('ATPMs'), Sole Distributors, and Main Dealers/Dealers
  - Automotive Aftermarket: Components/parts, Maintenance, Insurance
  - Customers: Individual users and Corporates
  - Association of Indonesian Automotive Industries ('GAIKINDO')
  - Importers/Manufacturers: subject to tariffs and taxes, vehicle type approval, registration
  - Users: compliance to road transport regulations, including licences and periodic inspection
  - Government Agencies:
  - Directorate General of Land Transport – certification for vehicle type approval
  - National Police – in charge of vehicle and driver registration/ identification

References

Field Survey of the Study Team.

International Association of Traffic and Safety Sciences. *Changes in Traffic Safety Policies and Regulations in Indonesia.*

Country：	Indonesia

http://www.iatss.or.jp/common/pdf/en/iatss/composition/7CountriesReport_en_02Indonesia.pdf (accessed September 2015).

KPMG. *Indonesia's Automotive Industry: Navigating 2014.* https://www.kpmg.com/ID/en/IssuesAndInsights/Documents/Indonesias-Automotive-Industry-Navigating-2014.pdf (accessed September 2015).

Ministry of Environment, Japan. *Feasibility Study on biomass utilization for arc furnace in Indonesia.* http://www2.gec.jp/gec/jp/Activities/cdm-fs/2007/2007JPSteelPlantec_jIndonesia_rep.pdf (accessed September 2015).

Ministry of Environment, Japan. Feasibility Study on Biomass Utilization for arc furnace in Indonesia. http://www.apec-tptwg.org.cn/new/Archives/tpt-wg39/Land/VSH/20.%205.5.3_Development%20of%20Vehicle%20Type%20Approval%20System_Indonesia.pdf (accessed September 2015).

United States Department of Commerce International Trade Administration, Office of Transportation and Machinery. *Compilation of Foreign Motor Vehicle Import Requirements.* http://trade.gov/static/autos_report_tradebarriers2011.pdf (accessed September 2015).

(3) Presence or absence of environmental regulations (such as landfill and incineration ban, and heavy metals use ban)

There are currently no provisions on automobile recycling and/or the management of ELVs in Indonesia.

Generally, industrial and hazardous wastes related to ELVs are regulated by Law No.32 of 2009 on Environmental Protection and Management: industrial waste and hazardous waste, and related regulations.

There are myriads of regulations and legislations in Indonesia that are related to or directly govern waste management and protection in the country. These can be classified into five categories, namely:

1. General Environmental Legislation (GEL) - legislation accompanied by implementing

Country :	Indonesia

regulations governing environmental management in general and covers all sectors, such as Law No. 23/1997 on Environmental Management

2. Sectoral Environmental Legislation (SEL) – legislation accompanied by implementing regulations governing certain sectors closely related to environmental management, such as:
    a. Law No. 32/2009 for Industrial Waste
    b. Law No. 18/2008 for Municipal Solid Waste (MSW)
    c. Regulation No. 85/1999 for Hazardous Waste Management
    d. Regulation No. 18/2009 for Licensing for Waste Management
    e. Regulation No.74/2001 for Hazardous and Toxic Management
3. Ratified Environmental Convention (REC) - including international treaties such as:
    a. Basel Convention (hazardous wastes)
    b. Convention on Climate Change
4. Provincial Environmental Legislation (PEL)
5. Local Environmental Legislation (LEL).

The Ministry of Environment is in charge of waste management and Act No.32/2009 and Regulation No.18 of 1999 concerning the Hazardous Waste Management defines B3 as waste. B3 means a substance or material that may, either directly or indirectly, contaminate and/or damage the living environment, and/or may harm the living environment, health, human survival, and other living creatures.

Article 59, paragraphs 1 - 6 of Law No. 32/2009 stipulate the management of hazardous waste in the following manner:

- Everyone that produces hazardous waste must conduct hazardous waste management.
- The management of expired hazardous materials must follow the hazardous waste

management stipulations.

- In the event where everyone is unable to perform their own hazardous waste management, it can be done by someone else.
- Hazardous waste management activity must have permission from the Minister, Governor, or Regent/Mayor in accordance to their authority
- The Minister, Governor, or Regent/Mayor must mention environmental requirements that must be met, along with responsibilities that must be obeyed by hazardous waste manager within the permit.
- The decision on permit/licence grants must be publicly announced.

There stipulations on penalties for violation of Article 59 mentioned above in articles 102 and 103.

- Article102: Anybody treating B3 waste without permit shall be subject to imprisonment of one year at the minimum and three years at the maximum, and a fine amounting to Rp1,000,000,000 at the minimum and Rp3,000,000,000 at the maximum.
- Article103: Anybody producing B3 waste and not conducting the treatment as referred to article 59 shall be subject to imprisonment of one year at the minimum and three years at the maximum, and a fine amounting to Rp1,000,000,000 at the minimum and Rp3,000,000,000 at the maximum.

References

The Indonesian Center for Environmental Law (ICEL). *Environmental Compliance and Enforcement in Indonesia Rapid Assessment.* http://www.aecen.org/sites/default/files/ID_Assessment.pdf (accessed September 2015).

UNCRD Implementation of 3R in Indonesia. http://www.uncrd.or.jp/content/documents/RT2_03_Indonesia.pdf (accessed September 2015).

Annex II

Country Reports

3. Lao People's Democratic Republic

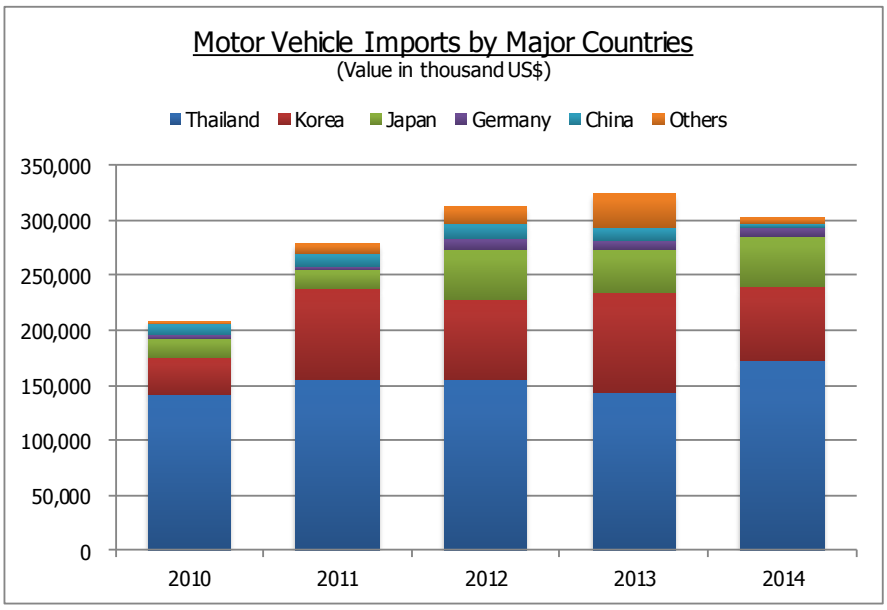
Country :	**Lao PDR**
1. Current status of automobile recycling in the targeted country	

(1) Imports and exports from Japan and other countries: used cars

Import

The cumulative bar graph shows automobile (HS code: 870321 - 870390) imports, including used cars, to Lao PDR for 2010-2014. The big suppliers during this period were Thailand, Korea, and Japan. The total import in value was over US$3 million in 2014.

Figure A-III.1: Lao PDR's Automobile Imports



Lao PDR = Lao People's Democratic Republic.

Source: UN Comtrade Database.

Country：	Lao PDR

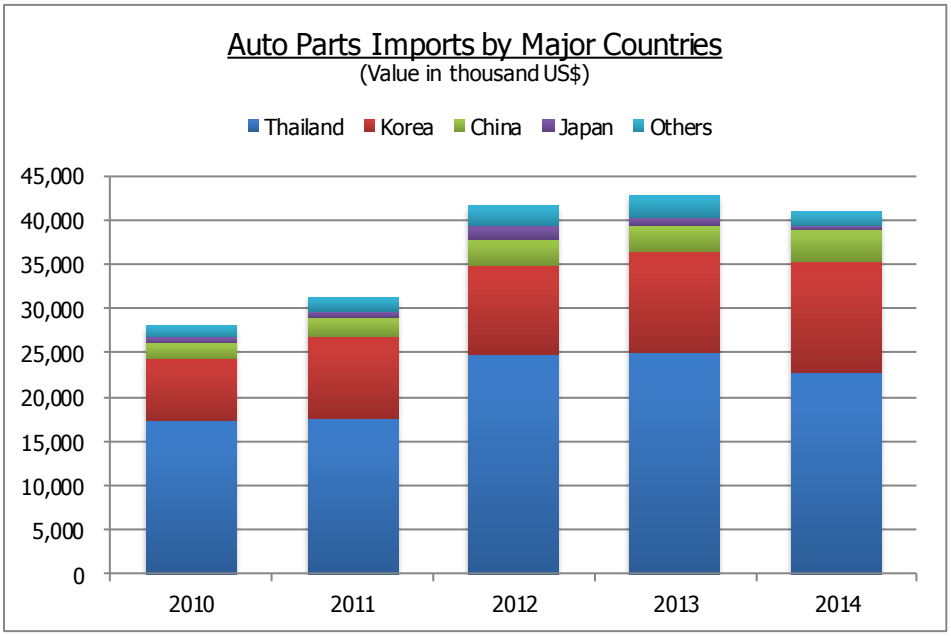
Reference

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(2) Imports and exports from Japan and other countries: used parts

The graph below shows major importers of auto parts, including used parts, for 2010-2014. The majority of used parts were imported from Thailand and Korea.

Figure A-III.2: Lao PDR's Auto Parts Imports



Lao PDR = Lao People's Democratic Republic.

Source: UN Comtrade Database.

Reference

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

Country：	Lao PDR

(3) Plans and regulations relating to import regulations

Trade Control

In Lao PDR, regulations relating to importation state that only diplomats can import vehicles into Lao PDR duty free, and they may do so by obtaining a letter from the Ministry of Foreign Affairs verifying their status and requesting that Customs permit duty free import.

However, the the procedures to import a vehicle into Lao PDR for a non-diplomat are time consuming and tedious. Vehicles are subject to duties assessed on the type, age, and engine size of the vehicle, and can be as high as 300 percent of the new purchase value of the vehicle.

All types of mechanised vehicles imported to be registered and used permanently in Lao PDR must have structures that comply with the technical standards of the production factories, steering wheels on the left hand side, and qualities that comply with the technical standards issued by the Ministry of Communications, Transport, Post and Construction.

On the other hand, specific regulations are issued to define the conditions and technical standards of vehicles that are authorised to be imported for registration and use in Lao PDR, including the import of vehicle accessories for assembling in Lao PDR, in compliance with relevant laws and regulations.

Duties and Taxes

Table A-III.1: Duties and Taxes for Automobile Parts

Bodies, parts and accessories of the motor vehicles	HS code	Unit	Import Rate
Bodies (including cabs), for the motor vehicles of headings 87.01 to 87.05.			
- For the vehicles of heading 87.03:	8707.10		
- - For go-karts and golf cars, including golf buggies	8707.10.10	Kg	40%
- - For ambulances	8707.10.20	Kg	40%
- - Other	8707.10.90	Kg	40%

- Other: - - For vehicles of heading 8702:	8707.90		
- - For vehicles of heading 8701	8707.90.10	Kg	20%
- - - For motor cars (including stretch limousines but not including coaches, buses, minibuses or vans)	8707.90.21	Kg	40%
- - -Other	8707.90.29	Kg	40%
- - For vehicles of heading 8705	8707.90.30	Kg	20%
- - Other	8707.90.90	Kg	20%
Parts and accessories of the motor vehicles of headings 87.01 to 87.05.	8708	Kg	10%

HS = Harmonised system, kg = kilogram.

Source: Department of Import and Export, MOIC.

References

Atlas International. *Importing Personal Property Into Laos.* http://webportal.atlasintl.com/Customs%20Docs/laos.pdf (accessed September 2015).

Department of Import and Export MOIC. http://www.laotradeportal.gov.la/index.php?r=site/index (accessed September 2015).

International Association of Movers, *Customs Regulations and Information for Imports.* https://www.iamovers.org/files/newimages/member/shippers/laos.pdf (accessed September 2015).

(4) Plans and regulations relating to vehicle registration

In the management of land traffic, the Ministry of Communications, Transport, Post and Construction in Lao PDR is in charge of the management and inspection of vehicle registrations, licence plates, and driving licences throughout the country.

New Car Registration

The Law on Land Transport in Lao PDR distinguishes between vehicles owned by a transport company and those owned and used by individuals and organisations.

Country：	Lao PDR

Different regulations apply according to how a vehicle is classified.

Vehicles used for transport enterprises and specialised transport both require the following:

- registration as a transport vehicle;
- valid licence plates;
- compliance with technical requirements for transport;
- relevant insurance (Law on Insurance No. 11/90/PSA dated 18 December 1990, Article 37);
- Payment of annual road usage fees.

The Decree on the promulgation of the Law on Land Traffic stipulates that all types of mechanised vehicles of civilians, including heavy machinery, such as bulldozers, excavators, motor graders, compactors, and other heavy machinery, shall be registered and shall have licence plates in accordance with the regulations issued by the Ministry of Communications, Transport, Post and Construction. Only authorised state organisations have the authority to produce and issue driving licences, vehicle registrations, and licence plates.

The vehicle registration certificate, driving licences, and licence plates are issued by the communications, transport, post and construction divisions at each province, Vientiane prefecture or special zone district.

Inspection

All vehicles are required to be inspected every year, except the new vehicles which do not have any technical problems for the first two years. All transport vehicles shall receive technical inspections strictly at the technical inspection stations that are determined by the Ministry of Communications, Transport, Post, and Construction.

Insurance

Insurance for transport vehicles goods and passenger transport vehicles of all sizes, and vehicles for specialised and personal transport, including various types of trucks, for use within the country must have insurance, particularly third party insurance. Vehicles used for international or cross-border transport must have, in addition to third-party insurance, insurance covering the driver and goods being transported.

Country：	Lao PDR

Penalties

According to the Article 44 of the Law on Land Transport, the fines are stipulated in the following manner:

- Any individual committing any of the following violations shall be fined from ₭3,000 to ₭10,000:
  -No vehicle operator's permit accompanying the vehicle;
  -No bill of lading;
  -Not carrying out transport on designated roads;
  -No certificate of payment of fees and taxes regarding transport business;
  -No driver's licence for light transport and specialised transport business services.
- Any individual committing any of the following violations shall be fined from ₭15,000 to ₭30,000:
  -Transport business licence has expired;
  -No transport vehicle technical inspection certificate;
  -No insurance for vehicle;
  -No driver's licence for heavy transport, in the case of drivers providing services in transport enterprises and specialised transport.

References

Embassy of the Kingdom of the Netherlands in Kuala Lumpur Malaysia website. http://Malaysia.nlambassade.org/binaries/content/assets/postenweb/t/thailand/nederlandse-ambassade-in-bangkok/import/landeninformatie/laos/met-de-auto-naar-laos (accessed September 2015).

J&C Services. *Vehicle Technical Inspection Moved To New Location.* http://jclao.com/vehicle-technical-inspection-moved-to-new-location/ (accessed September 2015).

Katahira & Engineers International, *New Mechanism Feasibility Study for Urban Transport Management in Vientiane, Lao PDR.* http://gec.jp/gec/en/Activities/fs_newmex/2011/2011newmex06_eKEI_Laos_rep.pdf (accessed September 2015).

Onnavong, Bounta. Division of Transport Techniques and Environment, Department of Transport, Ministry of Public Works and Transport Lao PDR. *Efforts on Environmentally Sustainable Transport "EST" in Laos.* http://gec.jp/gec/jp/Activities/unfcccconf/sb34se/3-MPWT.pdf (accessed September 2015).

Country：	Lao PDR

(5) Handling of imported used cars and/or accident status quo cars

Imported Used Cars

The importation of used cars was prohibited by the government in June 2012, when the increasing number of used vehicles on the capital's roads was considered to cause problems such as traffic congestion and air pollution due to its poor fuel efficiency.

While the study team could not acquire detailed information on trading of used cars, there are several websites that sell used cars at the auction.

References

Hirotaka Yamakawa, Guest Researcher, Institute for International Studies and Training. *Rapidly Changing Laos New cars and even traffic jams in Vientiane.* http://www.iist.or.jp/en-m/2014/0232-0932/ (accessed September 2015.)

The Jakarta. *Laos puts brakes on secondhand car imports.* http://www.thejakartapost.com/news/2012/06/25/laos-puts-brakes-secondhand-car-imports.html#sthash.1hwP9kHd.dpuf (accessed September 2015).

(6) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: end-of-life vehicle

Generally, in Lao PDR, car owners continue to use old cars even if there is an inspection system. So, the domestic generation of ELV is low and it is difficult to estimate the number of ELVs.

There is no specific registration scheme for vehicle dismantling and it is difficult to effectively regulate the industry. It seems that car dismantling is actually done by the informal sector, and components and scraps are circulated through the informal route.

Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity.

Country：	Lao PDR

Dismantling is conducted mainly by hand and threatens labour safety. Little treatment is done for hazardous materials, resulting in air, water, and soil pollution.

(7) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: recycled parts

Volume

The automotive scrap volume required to promote ELV recycling is insufficient. Imported used parts cause environmental pollution due to the lack of environmental measures from import dealers. Rebuilt parts are not popular due to the lack of awareness of parts dealers and their low quality. Metallic component recycling is done manually. This causes labour safety issues**.**

In the newsletter of the Embassy of the Republic of Korea in 2009, the government of Lao PDR required second-hand vehicle assembly plants in Lao PDR to meet industrial operation standards or face shutdown. At that time, there were about 80 small- to medium-scale second-hand vehicle assembly plants in Lao PDR. According to the newsletter, the government adopted the policy because it believed that if the car assembling factories meet industrial standards, they will be able to supply safer and more environmentally appropriate cars to their customers. Furthermore, many government officials have expressed concerns that allowing second-hand vehicles to run in Lao PDR is not healthy, adding that the second-hand vehicles create greater amounts of air pollution and noise.

Against this government decision, the owners of assembly plants insisted that the small number of officially-registered vehicle parts importers has led to a shortage of raw materials, affecting production and potentially leading to the laying off of workers.

Reference

Weekly Economic News of Lao PDR, Embassy of Republic of Korea, 24–28 August 2009.
http://lao.mofat.go.kr/webmodule/common/download.jsp?boardid=1552&tablename=TYPE_LEGATION&seqno=fc8fd8f8007c07bfe400afb1&fileseq=04efc101bfacf88f98020ff8

accessed September 2015).

(8) Volume, distribution, flow, model years, sales prices, processing situation, items on trading, and resources: steel and non-ferrous metals

Steel scrap and non-ferrous scrap, which are not necessarily from vehicles, are exported to neighbouring countries such as Viet Nam, Thailand and others.

Table A-III.2: Steel Scrape Export from Lao PDR to Foreign Countries 2010

Import / Export	Vietnam	Cambodia	Laos	Thailand	Myanmar	China
Vietnam		0	0	12	0	102
Cambodia	17093			78070		70
Laos	456			0		0
Thailand	7058	0	0	61	0	10527
Myanmar	O			767		0
China	55548	0	0	122	35	82112

(unit: ton)

Lao PDR = Lao People's Democratic Republic.

Source: Presentation material on Working Group 2 Policy Research for Industrial Development and Recycling Mechanism for Sound Resource Circulation.

Table A-III.3: Copper Scrape Export from Lao PDR to Foreign Countries 2010

(unit: ton)

Import / Export	Vietnam	Cambodia	Laos	Thailand	Myanmar	China
Vietnam		0	0	12	0	49
Cambodia	65			1396		0
Laos	10			64		0
Thailand	464	0	5		0	22585
Myanmar	0			0		0
China	984	0	0	229	0	615

Source: Presentation material on Working Group 2 Policy Research for Industrial Development and Recycling Mechanism for Sound Resource Circulation.

Country：	Lao PDR

Other

There is an observed flow of recyclable wastes from Lao PDR to neighbouring countries. These include: paper to Thailand, plastics to China or Viet Nam, and batteries, circuits, and aluminum to Viet Nam.

References

Kojima, Sakata and Hatsukano. *Presentation on material on Working Group 2 Policy Research for Industrial Development and Recycling Mechanism for Sound Resource Circulation.* http://www.iges.or.jp/en/archive/wmr/pdf/activity20121213/6-1_GMS.pdf (accessed September 2015).

(9) Distribution volume, flow, model years, sale prices, and processing methods during dismantling (batteries, tires, and waste fluids, among others)

Batteries:

As indicated in (8) above, lead-acid battery is imported by the Vietnamese.

While there is no local manufacturing in Lao PDR, batteries are imported into Lao PDR. Its main uses are for automobiles and for domestic power supply. There is no formal recycling programme in Lao PDR. The informal sector is very involved in recycling. Lead is recovered and the cases are reused.

Reference

United Nations Environment Programme. http://www.unep.or.jp/ietc/Publications/Integrative/EnTA/AEET/Final_Report/2.asp (accessed September 2015).

Country：	Lao PDR
(10) Factual survey of end-of-life two-wheeled vehicles The study team could not acquire the information on end-of-life motorcycles in this study. **Reference** N/A	
(11) Type of operation and number of recycling-related companies The study team could not acquire information on the operation and number of recycling-related companies. **References** N/A	
(12) Management situation of recycling-related companies The study team could not acquire information on the management situation of recycling-related companies. **References** N/A	
2. Current challenges and considerations in automobile recycling laws and institutional systems in vehicle recycling	
(1) Challenges in vehicle recycling systems (illegal dumping, inappropriate processing of waste, stringent situations at final disposal sites, dismantling technology, safety, efficiency, and recycling rates) Lao PDR does not have an adequate legal system or equipment for the treatment of hazardous wastes. Some report emission of hazardous wastes from components such as batteries and	

Country：	Lao PDR

crankcase oils. Non-valuable resources are not properly collected and, in some cases, illegally dumped. Metallic component recycling is done manually. This causes labour safety issues.

According to a study conducted by the United Nations Environment Programme (UNEP), hazardous waste management is ranked as a high priority area in Lao PDR. National legislation specifically addressing hazardous and chemical wastes does not exist, and is therefore a priority for development. Although Lao PDR is a signatory country to international agreements such as the Basel and Stockholm Conventions, the country lacks adequate capacity to discover, monitor, and address breaches due to the failure of institutions to coordinate activities or share information. In particular, the responses note that some information concerning the chemical composition of products is confidential to the private sector and not accessible by government institutions. The capacities of hazardous waste management institutions in Lao PDR thus need to be strengthened.

Officials of the government of Lao PDR added the following challenges in their solid waste management:

- Inadequate legal framework and unclear institutional responsibilities.
- Institutions envisaged to be established in accordance with law are sometimes not established, nor given the proper mandate in accordance with the law (if established), neither are they given a budget to enable them to function in accordance with the law. New legislation is often drafted without proper reference to other legislation.
- A considerable amount of waste is illegally dumped into the drainage channels and rivers.
- Collection vehicle fleet is old and subject to frequent breakdowns.
- The institutional and administrative structure is not well established.
- Public education systems and participation programs are not established.

References

Thevarack Phonekeo and Phouthasom Inthavong, *Solid Waste Management in Laos.*

http://www.iges.or.jp/jp/archive/wmr/pdf/activity100728/5_Lao_Day1_Session2.pdf

(accessed September 2015).

Country：	Lao PDR

United Nations Environment Programme.

http://www.unep.org/gpwm/InformationPlatform/CountryNeedsAssessmentAnalysis/Laos/tabid/106530/Default.aspx (accessed September 2015).

(2) Trend in vehicle recycling policies and related automobile recycling laws, and the enforcement, presence, and details of related institutions.

a) Status of institutional system collateral for improper processing of three designated recovery items (fluorocarbons, airbags, and ASRs)

Fluorocarbons

The study team could not acquire detailed information on this domain.

Airbags

The study team could not acquire detailed information on this domain.

Automobile Shredder Residues

The study team could not acquire detailed information on this domain.

b) Demarcation of roles (obligation and economic burden) among production officers (manufacturers and importers), related operators, vehicle users, and government agencies (including local governments)

The current roles and responsibilities among stakeholders related to regulations on the automotive industry are as follows:

- Importers
  - Securing required documents for import of vehicles
  - Finishing the Customs formalities
- Manufacturers
  - In Lao PDR, there are not automotive manufacturers, although there are some parts makers such as Toyota Boshuku Lao Company Limited

Country：	Lao PDR

- Users
  - Compliance with road transport regulations (Law on Land Transport)
- Government Agencies
  - The Ministry of Communication,, Transport, Post and Construction – in charge of new car registration, licensing, and inspection
  - The Ministry of Natural Resources and Environment – in charge of protecting the environment by ensuring compliance with the environmental law, and of environmental issues related to solid waste management
  - The Department of Housing and Urban Planning of the Ministry of Public Works and Transport Communications – in charge of urban planning and urban development, and municipal solid waste management
  - The Urban Development and Administrative Agency of each city is directly responsible for collection and disposal of urban solid waste.

Reference

IGES Working Paper No. SCP-2012-01, *A guide for improving municipal solid waste management and promoting urban organic waste utilization in Lao PDR.* http://pub.iges.or.jp/modules/envirolib/upload/4132/attach/Attachment3_Guideline-UOWM-Lao-Eng.pdf (accessed September 2015).

(3) Presence or absence of environmental regulations (such as landfill and incineration ban, and heavy metals use ban)

Lao PDR is in its early stages of starting the ELV recycling system and considering ELV recycling regulations. The following regulations stipulate waste management in Lao PDR:

- The National Constitution (1991)
  -All Lao citizens must protect the environment and natural resources: land, subterranean, forests, fauna, water resources, and atmosphere.
- The Environmental Protection Law (1991, 2013 revised)
  -All kinds of littering are forbidden. Waste disposal sites must be allocated and waste should be separated before disposal. The government must support implementation of technologies for the waste treatments, reuse, and recycling. It is forbidden to

import, transport and carry any kind of hazardous waste over land, water, and sky borders of Lao PDR.

- Decree on Implementation of the Environmental Protection Law.

Furthermore, the National Environmental Action Plan (NEAP) envisages the gradual expansion of the waste management program from large to smaller towns. However, there is no quantitative target. The general direction of NEAP includes:

- Increasing coverage of waste collection service in urban areas.
- Cost recovery, including payments by households, depending on the level of service.
- Investment on equipment.
- An emphasis on organisation and community mobilisation will help reduce the capital and operation costs of waste management systems.

The Environmental Protection Law requires operators to strictly apply methods and measures regarding pollution control such as use of appropriate technology and equipment installation, prevention, solution, treatment-sterilisation, improvement, and rehabilitation of the environment that is affected by air, soil, and water pollution. An operator must release, discharge, dispose, burn, burry, or demolish wastes and rubbish in areas identified by regulations. The production, importation, utilisation, transportation, storage, and demolition of toxic chemicals or radioactive residues should strictly comply with specific regulations and standards.

In addition, persons, legal entities, and organisations producing toxic and hazardous wastes due to their own production and business operations shall comply with the law and should keep, eliminate, bury, and treat waste in accordance with the standards and regulations.

The law also stipulates that environmental inspecting agencies shall have the following rights and duties:

- Develop environmental inspection programs or annual plans to ensure that investment projects or activities shall not create environmental impacts exceeding the standards;

Country：	Lao PDR

- Inspect pursuance of environmental policies, strategies, programs, projects, and regulations;
- Inspect environmental status of investment projects or activities, based on environmental management and monitoring plans, via sector-wide coordination and collaboration with local authorities;
- Inspect pollution and disturbance in accordance with the National Environmental Quality Standards and the National Pollution Control Standards;
- Propose the line sectors to issue orders regarding suspension or termination of investment projects and activities upon recognising severe environmental impacts that are not resolved; and
- Coordinate with other concerned organisations for conducting their inspections.

Infringement of these law, restrictions, and contractual terms as stipulated in concession contracts or environmental compliance certificates shall be fined in accordance with the relevant regulations. Fine rates, which depend on each case, are identified by the specific regulations.

References

IGES Working Paper No. SCP-2012-01, *A guide for improving municipal solid waste management and promoting urban organic waste utilization in Lao PDR*. http://pub.iges.or.jp/modules/envirolib/upload/4132/attach/Attachment3_Guideline-UOWM-Lao-Eng.pdf (accessed September 2015).

Unofficial Translation Environmental Protection Law (Revised Version). http://www.laolandissues.org/wp-content/uploads/2012/03/Environmental-Protection-Law-2013English.pdf (accessed September 2015).

Annex II

Country Reports

4. Malaysia

Country :	Malaysia
1.The current status of automobile recycling in the targeted countries	

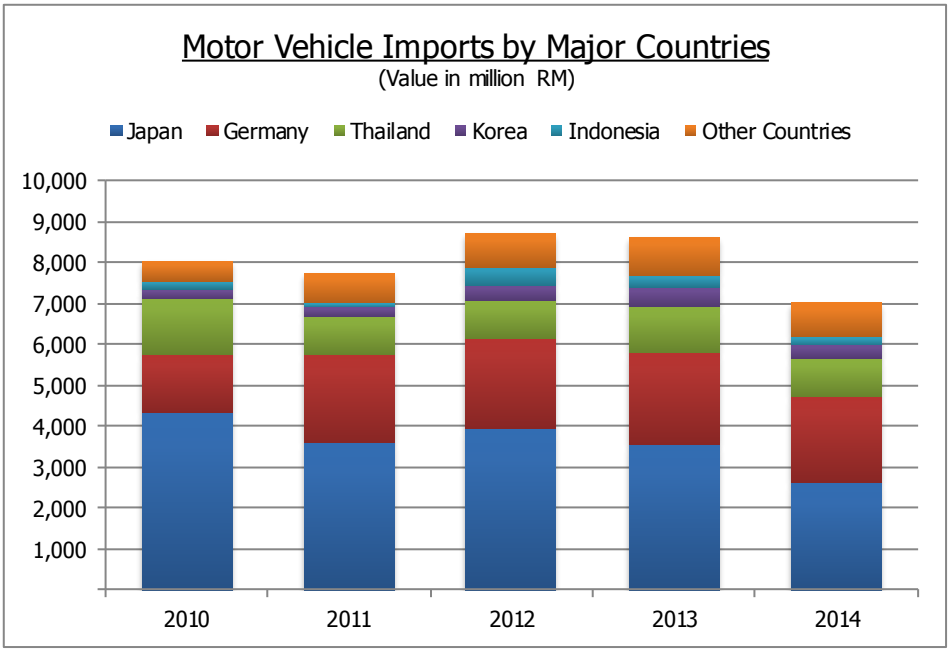
(1) Imports and exports from Japan and other countries: used cars

Import

The following graph shows Malaysia's automobile (HS code: 870321 - 870390) imports, including used cars, for 2010-2014. The biggest supplier during this period was Japan, which accounted for nearly 45 percent while the share has been decreasing. The total import in value was about RM7 billion in 2014.

Figure A-IV.1: Malaysia's Motor Vehicle Imports

(value in million RM)



Source: Department of Statistics, Malaysia.

Country :	Malaysia

Table A-IV.1: Number of Used Passenger Motor Cars Exported from Japan

Year	2010	2011	2012	2013	2014
Malaysia	21,960	19,557	21,641	25,122	25,544
World	672,627	699,881	830,703	947,990	1,059,617
Share of Malaysia	3.3%	2.8%	2.6%	2.7%	2.4%

Source: Trade Statistics of Japan, Ministry of Finance.

Table A-IV.2: Number of Imported Used Cars in Malaysia

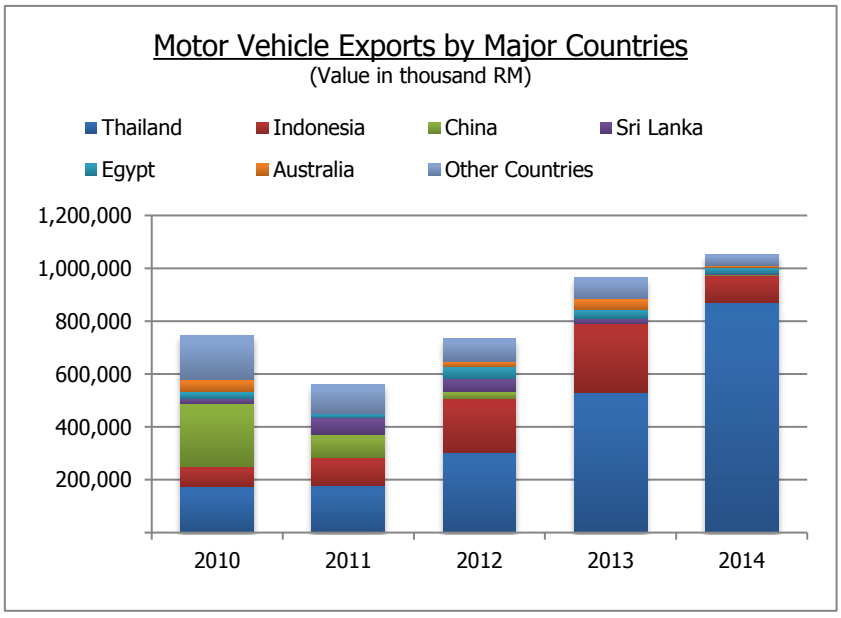
Year	2009	2010	2011	2012	2013
Total	22,285	28,678	24,006	25,666	35,879

Source: Malaysia's Trade Statistics.

Export

The following graph shows Malaysia's automobile (HS code: 870321 - 870390) exports, including used cars, for 2010-2014.

Figure A-IV.2: Malaysia's Motor Vehicle Exports



Source: Department of Statistics, Malaysia.

Country :	Malaysia

Table A-IV.3: Number of Used Vehicles Exported from Malaysia

Year	2009	2010	2011	2012	2013
Total	297	377	325	701	800

Source: Malaysia's Trade Statistics.

References

Department of Statistics, Malaysia. http://trade.stats.gov.my/tradeV2/ (accessed September 2015).

Malaysia's Trade Statistics. http://www.matrade.gov.my/en/malaysian-exporters/services-for-exporters/trade-a-market-information/trade-statistics (accessed September 2015).

Trade Statistics of Japan Ministry of Finance. http://www.customs.go.jp/english/index.htm (accessed September 2015).

(2) Imports and exports from Japan and other countries: used parts

Import

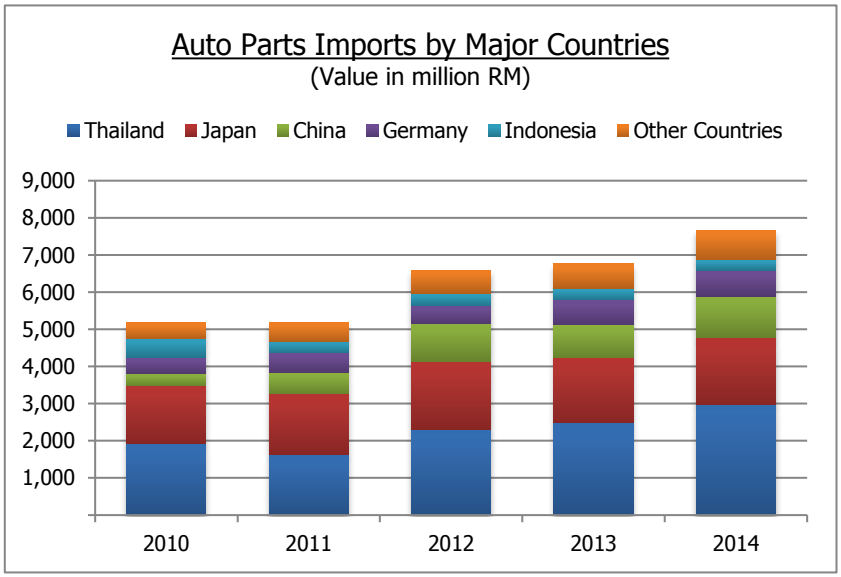
Used parts imported from overseas accounted for 90 percent of the total used parts. Of those, approximately 30 percent were sold in Malaysia and 70 percent were re-exported (14 percent to ASEAN region, 24 percent to Africa, 24 percent to Middle East, and 8 percent to others).

Imported parts from Japan occupied about 90 percent of used parts circulated in the market in Malaysia. Based on the proportion, the market volume of used parts was about ¥23.166 billion (estimated figure) from the world, with about ¥20.849 billion from Japan.

The two graphs below show major importers and exporters of auto parts (HS code: 8707 - 8708), including used parts, for 2010-2014.

Country :	Malaysia

Figure A-IV.3: Malaysia's Auto Parts Imports



Source: Department of Statistics, Malaysia.

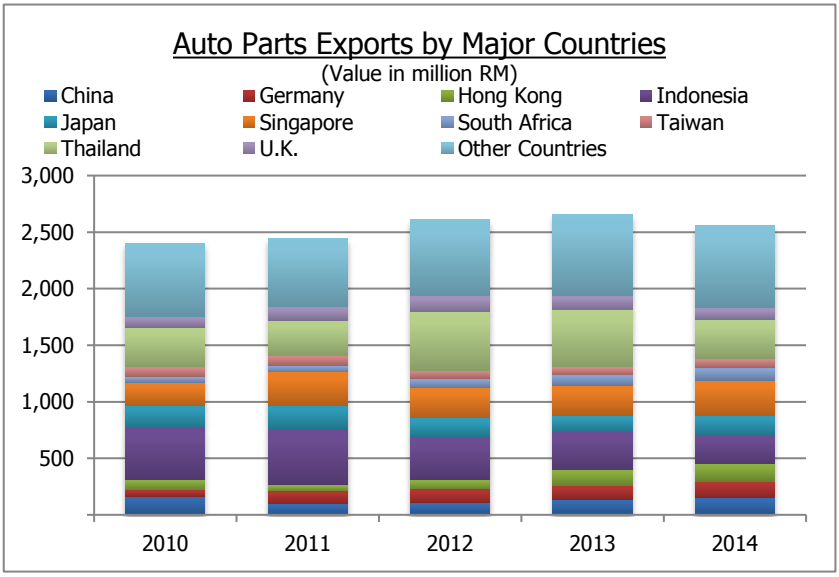
Japan was the largest exporter of bodies, including cabs, for four years but it became the second (surpassed by Germany) in 2014. As for other parts, including bumpers, brakes and steering wheels, Thailand was the biggest supplier, which accounted for nearly 40 percent, and Japan accounted for around 27 percent of the total.

Export

A large volume of Malaysia's exports went to neighbouring countries, although its trade partners were spread around the globe.

Country :	Malaysia

Figure A-IV.4: Malaysia's Auto Parts Imports

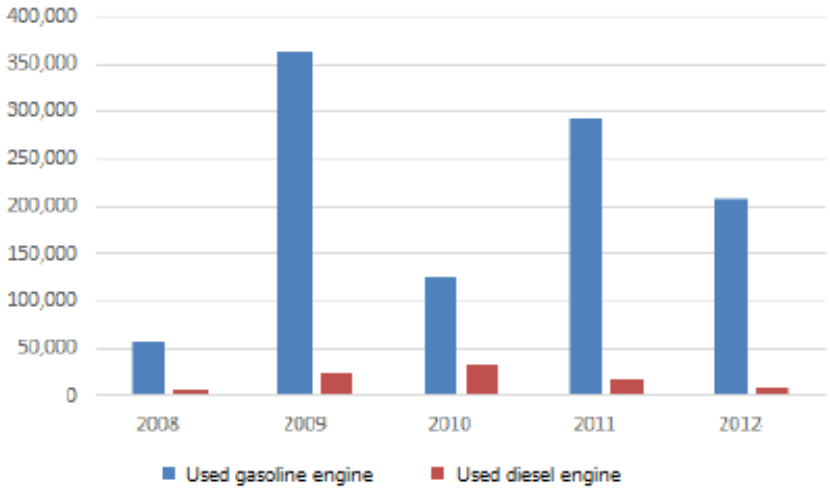


UK = United Kingdom.

Source: Department of Statistics, Malaysia.

The two graphs below show the import and export of used engines in Malaysia for 2008-2012.

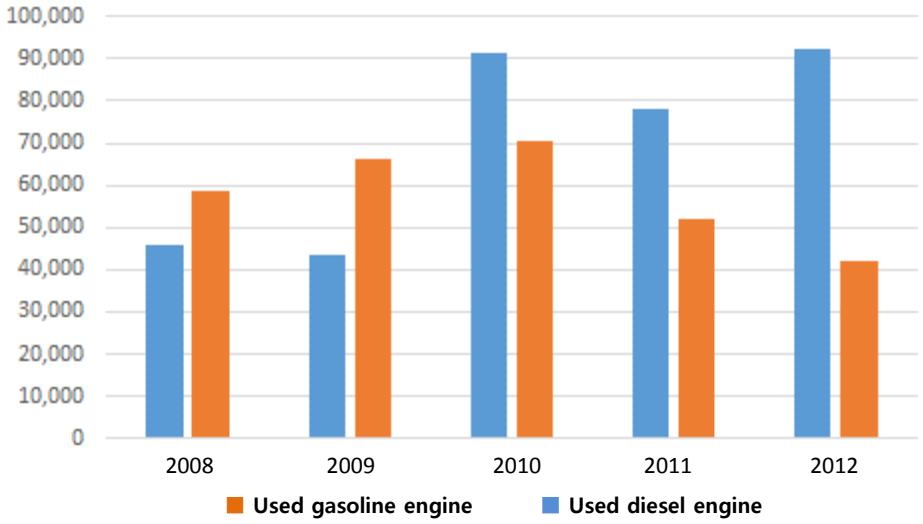
Figure A-IV.5: Import of Used Engines



Source: United Nations Commodity Trade Statistics Database

Country :	Malaysia

Figure A-IV.6: Export of Used Engines



Source: United Nations Commodity Trade Statistics Database.

References

Department of Statistics, Malaysia. http://trade.stats.gov.my/tradeV2 /(accessed September 2015).

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

Yano Research Institute. ASEAN Automobile Recycling 2014.

(3) Plans and regulations relating to import regulations

Trade Control

Importing a car into Malaysia is very expensive. Import duty must be paid on any vehicle imported to Malaysia. These rates can be quite high and excise duties can be up to 100 percent when importing a foreign vehicle.

To import a car, an application must be made to the Ministry of International Trade and Industry (MITI) for an Approved Permit (AP). This is an importing licence. The car to be imported must have been registered in the home country of the person applying (if the importer is a foreigner).

Conditions and procedures that need to be complied with by companies that apply for an AP

Country :	Malaysia

to import motor vehicles:

Eligibility:

- Companies that hold existing allocation of AP for Completely Built-Up (CBU) motor vehicles
- Franchisees of CBUs
- Local assembly of multi-sourcing companies (Completely Knocked Down – CKD).
- Vehicle importation (others)
  - classic cars with car age of more than 25 years
  - vintage cars with car age of more than 50 years.

The AP system was expected to be abandoned with the introduction of a ban on used car import for commercial purpose from 2016. However, the AP system is still valid as of November, 2016.

Vehicle import on individual basis:

One AP for each individual – classic/vintage vehicle category

- Only Malaysian citizens may apply or foreigners with a valid work permit for the country
- The vehicle being imported shall be registered under the applicant's name and registration is not transferrable within five years from the date of registration in Malaysia
- The vehicle must be certified by a recognised body from the exporting country where the said vehicle is categorised as classic/vintage vehicle
- The vehicle on individual basis may only be imported for personal use; the car cannot be sold or transferred in Malaysia.

Malaysia allows its local ELV recycling companies to import ELVs from other countries. These vehicles require clearance from the Royal Malaysian Customs office. According to the law, any

importation of vehicles will require an importation AP. Normally, ELV recyclers will choose and import the vehicle using their own means of transportation.

All businesses need to obtain a Business Licence to import and/or export scrap materials. The Malaysian Government takes a measure to prevent resources from going out of the country. The measure ensures that any resource used in Malaysia should be processed and recycled in the country. Therefore, scrap purchase prices in Malaysia are low.

Duties and Taxes

Import duty and taxes are due when goods, including used cars and parts, are imported to Malaysia by either a private individual or a commercial entity. Malaysia uses the Cost, Insurance and Freight (CIF) valuation method, which means that the import duty and taxes payable are calculated from the total shipping value of the item, including the cost of freight and insurance during shipping. Some duties are also calculated based on their weight or volume.

The rates of duty vary according to the type of goods imported or exported. The table of import duty for auto parts below shows the import rate of various vehicle parts as of September 2015. In terms of duty concessions, the Government of Malaysia provides concessional tariff rates for a wide range of goods in line with Malaysia's commitment arising from its bilateral and multilateral trade negotiations with other nations.

The table below shows the import and excise duties for motor cars (including station wagons, sports cars, and racing cars).

Table A-IV.4: Import Duties for Passenger Cars

Engine Capacity (cc)	Import Duty				Excise Duty
	CBU*1		CKD*2		CBU & CKD
	MFN*3	ATIGA*4	MFN	ATIGA	
Up to 1,799	30%	0%	10%	0%	75%
1,800 - 1,999	30%	0%	10%	0%	80%
2,000 - 2,499	30%	0%	10%	0%	90%
Above 2,500	30%	0%	10%	0%	105%

ATIGA = ASEAN Trade in Goods Agreement, CBU = Complete built-up, CC = cubic centimetre, CKD = Complete knock down, MFN = Most Favoured Nation.
Source: Malaysia Automotive Association, Information on Duty Structure.

Country :	Malaysia

Table A-IV.5: Duties and Taxes for Automobile Parts

Bodies, parts, and accessories of the motor vehicles	HS code	Unit	Import Rate
Bodies (including cabs), for the motor vehicles of headings 87.01 to 87.05.			
- For the vehicles of heading 87.03:	8707.10	Kg	0 - 30 %
- Other:	8707.90	Kg	0 - 30 %
Parts and accessories of the motor vehicles of headings 87.01 to 87.05.			
- Bumpers and parts thereof:	8708.10	Kg	0 - 25%
- Other parts and accessories of bodies (including cabs):	8708.20	Kg	0 - 30%
- Brakes and servo-brakes; parts thereof:	8708.30	Kg	5 - 30%
- Gear boxes and parts thereof:	8708.40	Kg	0 - 25%
- Drive-axles with differential, whether or not provided with other transmission components, and non-driving axles; parts thereof:	8708.50	Kg	0 - 30 %
- Road wheels and parts and accessories thereof:	8708.70	Kg	5 - 30%
- Suspension systems and parts thereof (including shock- absorbers):	8708.80	Kg	5 - 30%
- Other parts and accessories:	8708.90	Kg	0 - 30%

HS = Harmonised System, Kg = kilogram.

Source: Royal Malaysian Customs Department.

Customs Order 2011, Value of Imported Completely Built-Up Motor Vehicles (Used), specifies dutiable imported used motor vehicles and their custom duties. The Order is applicable for completely built-up (CBU) motor vehicles (used), excluding motorcycles, imported by open AP holders. The table below shows the value of cost, insurance, and freight of some Japanese brand cars.

Country :	Malaysia

Table A-IV.6: Value of cost, insurance, and freight of selective Japanese brand cars

Bland/Model	Engine Capacity (cc)	Age 12 months and not exceeding 24 months	Age 24 months and not exceeding 36 months	Age 36 months and not exceeding 48 months	Age 48 months and not exceeding 60 months	Age 60 months and above
Toyota						
Corolla Axio L	1,797	RM30,846	RM26,894	RM22,941	RM18,988	RM17,011
Crown Sedan	1,998	RM45,688	RM39,756	RM33,824	RM27,893	RM24,927
Prius A type	1,496	RM38,777	RM33,767	RM28,757	RM23,746	RM21,241
Suzuki						
Kei A	658	RM13,062	RM11,481	RM9,899	RM8,317	RM7,527
Wagon	658	RM24,765	RM21,623	RM18,481	RM15,339	RM13,768
Subaru						
Impreza	1,994	RM53,426	RM46,463	RM39,499	RM32,536	RM29,054
Nissan						
Moco	658	RM18,444	RM16,145	RM13,846	RM11,546	RM10,397
Elgrand	3,498	RM54,700	RM47,567	RM40,433	RM33,300	RM29,733
Lexus						
LS600h	4,968	RM205,919	RM178,623	RM151,327	RM124,031	RM110,383

cc = cubic centimetre.

Source: Customs (Values of Imported Completely Built-up Motor Vehicles (Used) Order 2011.

Goods and Services Tax (GST) applies to all imported goods.

References

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Customs (Values of Imported Completely Built-up Motor Vehicles (Used) Order 2011.

Country :	Malaysia

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Royal Malaysian Customs Department. http://www.customs.gov.my/front.html (accessed September 2015).

(4) Plans and regulations relating to vehicle registration

In Malaysia, the Road Transport Department (RTD), under the umbrella of the Ministry of Transport, is in charge of new car registration, transfer or selling of licence, re-registration, and deregistration of vehicles under the Road Transport Act 1987 and Motor Vehicle (Registration and Licensing) Rules 1959.

New Car Registration

Any new or imported vehicle is required to be registered with the Malaysian Road Transport Department which is in charge of undertaking registration and licensing of drivers and all motor vehicles and trailers in Malaysia. The application for the registration of a motor vehicle should be submitted in a prescribed form to the Director of each registration area or each division of the Road Transport Department.

All cars should be registered. The owner's registered address and registration number are connected.

Users are required to pay RM100 stamp fee as registration fee.

Transfer or Selling of Licence

Within seven days after a change of possession, car owners have to inform the Director of the registration area, and a certification of registration should be sent to the new owner by original owner.

The new owner shall, within seven days after such change of possession, forward to the Director a statement in the prescribed form together with the registration certificate.

Country :	Malaysia

Re-registration

In case of reregistration, car users follow the procedure at post office with the car licence. Users are required to pay RM30 for re-registration at the post office. Car users are required to renew the registration annually.

Deregistration

Deregistration of cars in Malaysia is not compulsory. However, car owners can deregister a car. Also, if renewal of registration is not conducted for more than two years, a car is automatically deregistered. No certification of disposal of car is required for deregistration.

The owner who deregisters the car is able to request for a reimbursement of the paid road tax.

Inspection

Only a commercial vehicle is required to undergo annual inspection under the Road Transport Act. Random inspection is conducted on the road. Penalty is imposed on a commercial car, if it does not have a sticker indicating that it has been inspected annual.

There is no inspection system for private vehicles. But the plan to introduce an inspection system for private cars is often proposed in the connection with the deregistration policy. It is very possible that an inspection system for private vehicles will be introduced in Malaysia.

Vehicles are inspected at the inspection site by a private company which is authorised by the Malaysian Government to take all mandatory inspections.

Puspakom, the only authorised private company, has 83 inspection centres around the country performing more than 3 million inspections annually. The company is also in charge of the inspection of imported cars (both brand new and used ones) on behalf of Royal Malaysian Customs.

Country :	Malaysia

Table A-IV.7: Tax for Owning Vehicles

Fee		Details
1	Registration fee	Should be paid on registration, re-registration
2	Road tax	Should be paid upon owning a car
3	Compulsory insurance	Certification of paying issuance is required for renewal of registration.

Source: Yano Research Institute.

Tax

Road tax is compulsory in Malaysia. Driving without paying it results in severe penalties. The amount of road tax depends on engine capacity, fuel type, place of registration, and whether the car is for private use or commercial use. The tax is purchased either from the Road Transport Department or through the Internet. Car users are required to pay this tax when renewing their annual registration.

The table below shows the road tax structure for a standard vehicle (sedan, hatchback, wagon, coupe, or convertible) with a private registration in Peninsular Malaysia. Most of cars fall under this category and this applies to both petrol and diesel engines.

For a 'non-standard' vehicle, namely a multi-purpose vehicle (MPV), a sport utility vehicle (SUV), or a pickup truck as well as a company-registered vehicle, a slightly different number structure applies.

Table A-IV.8: Standard Vehicles with Private Registration in Peninsular Malaysia

Engine Capacity (cc)	Base Rate	Progressive Rate (per cc)	Total Road Tax
1,000 and below	RM20.00		RM20.00
1,001 to 1,200	RM55.00		RM55.00
1,201 to 1,400	RM70.00		RM70.00
1,401 to 1,600	RM90.00		RM90.00
1,601 to 1,800	RM200.00	RM0.40	RM200.40 to RM280.00
1,801 to 2,000	RM280.00	RM0.50	RM280.50 to RM380.00
2,001 to 2,500	RM380.00	RM1.00	RM381.00 to RM880.00
2,501 to 3,000	RM880.00	RM2.50	RM882.50 to RM2,130.00
3,001 and above	RM2,130.00	RM4.50	RM2,134.50 and above

Cc= cubic centimetre.

Source: Road Transport Department (RTD).

Country :	Malaysia

Since 1 April, 2015, the Government of Malaysia started to impose GST, superseding the existing 10 percent sales tax. Therefore, any car or part which is purchased in or imported into Malaysia is subject to the six percent GST.

Insurance

Car insurance is also compulsory in Malaysia. It is a criminal offence to drive without insurance.

There are three main types of insurance available for motor insurance requirements in Malaysia. The most basic cover for legal purposes is known as Act Only Insurance. It covers only death or injury in the event of an accident. The next level is Third Party Insurance which covers accident to third party vehicles and some minor injuries. The third party and fire and theft can be added to these policies. The highest level of insurance is the full comprehensive insurance and this covers all fire, theft, accidental damage, regardless of liability, and often has clauses such as legal cover. Every driver must at least have a third party insurance. This is the lowest level of cover available which fulfils legal requirements to be able to drive a motor vehicle on public roads. Car insurance can be paid in lump sum or on a monthly automated basis via direct debit or taken from a credit card each month.

Penalty

Based on the *Road Transport Act 1987* of Malaysia, any person who fails to comply with the ACT or refuses (neglects) to do anything shall be liable.

- *Any person who is guilty of an offence under this Act shall, where no special penalty is provided, be liable in the case of a first conviction, to a fine not exceeding RM2,000 or to imprisonment for a term not exceeding six months and, in the case of a second or subsequent conviction, to a fine not exceeding RM4,000 or to imprisonment for a term not exceeding 12 months or to both.*
- *Any person who contravenes the requirements of registration shall be guilty of an offence and shall on conviction be liable to a fine not exceeding RM2,000.*
- *Any person who uses a motor vehicle after declaring that it has not been used shall be guilty of an offence and shall on conviction be liable to a fine not exceeding RM5,000.*
- *Any person who without reasonable excuse fails to comply with any requirement of the inspection shall be guilty of an offence.*

Country :	Malaysia

References

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Yano Research Institute, *ASEAN Automobile Recycling 2014.*

(5) Handling of imported used cars and/or accident status quo cars

In case cars cannot be repaired, parts are removed and bodies as scrap are sold to waste traders. This number is very small because old cars are still utilised in rural areas. In case accident cars cannot be repaired, the ownership of the car is transferred to the insurance company, and car owner receives the insurance payment. The insurance company sells accident cars to the scrap trading companies through auction.

In some cases, local municipality gathers ELVs left in the city and sells them in auctions.

References

Field Survey of the Study Team.

(6) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: end-of-life vehicle

Volume

The number of ELVs was estimated at 61,430 per year in 2013. Yano Research Institute estimates the number of ELV as follows:

Country :	Malaysia

Table A-IV.9: Forecast of the Number of ELVs in Malaysia

Year	2013	2014	2015	2016	2017	2018	2019	2020
No. of ELVs	61,430	89,319	122,512	128,107	125,242	124,969	160,146	212,464

ELV = end-of-life vehicle.

Source: Yano Research Institute.

Model year

Generally, in Malaysia, cars are utilised for 15 to 30 years. The model year of ELV ranges from the year 1985 to 2000.

Price

The price of a used car is about RM4,000 for a 1990 model, RM60,000 for a 2005 model (Toyota Carole), RM6,500 for a 1998 model (Perodua Kancil), and RM7,786 for a 1992 (Honda Accord 2.0).

According to the field survey conducted by EX Research Institute, the purchase price of ELVs ranges from RM500 to RM5,000.

Distribution

Old models of cars are sold as used cars many times by being repaired and changing parts. ELVs are seldom dismantled. In case cars cannot be utilised any more, the car owners bring them to repair shops or junkyards. Cars are dismantled there, and car parts are removed and bodies as scrap are sold to scrap trading companies. This number is very small because the old cars are generally utilised for a long time.

Actually, ELVs in Malaysia are mostly generated in rural areas. However, unusable cars are left as ELVs in the city. In some cases, local municipalities gather ELVs left in the city and sell them at auctions.

ELVs will be gradually generated in the near future. Proton started producing cars from 1984

and they produced ten thousand then. From the early 2000s, Proton started to produce more than 100 thousand. If we were to assume that the lifetime of cars is 20 years, then many ELVs will be generated from 2020.

Due to the introduction of 'Cash for clunkers', the number of dismantled ELVs in Malaysia will increase. Cash for clunkers is a new car scrapping program designed to encourage people to turn in their old cars for cash. The Malaysia Automotive Institute (MAI) is currently studying the viability of the program and is discussing with other government agencies such as the Finance Ministry, other related government bodies, and car manufacturers.

Few auto dismantlers exist in Malaysia. Since there is currently no registration system for such businesses, the number of dismantlers is hard to ascertain. According to Malaysia Automotive Recyclers Association (MAARA), the dismantling of ELVs is mainly carried out by used parts dealers and some of them have press machines.

Processing Situation

In the National Automotive Policy (NAP) 2014, the introduction of Authorised Treatment Facilities (ATFs) for ELVs is being considered. ATFs are expected to comply with the requirements of ELV regulations on dismantling. NAP 2014 also plans to add the shredding and sorting plant to the ATFs. Currently, used parts are taken off and bodies are dismantled manually using gas burners. Steel scraps are sent to recyclers and mufflers, including rare metals, are sold to recyclers. ASRs will be sent to ASR incinerators. Amsteel Mills installed shredding facilities to treat soft press imported from other countries. However, it became difficult to import and now they work much less than their capacities.

References

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September 2015).

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(7) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: recycled parts

Volume

The importation of used parts to Malaysia is very huge. Malaysia works as a hub of trade of used parts. Most used parts imported to Malaysia are re-exported to Africa and the Middle East. In Malaysia, used parts are traded in 'Used Parts Town' where more than 5,000 companies deal with used parts (Yano Report). Many Daihatsu and Mitsubishi Motors' used pars are traded in Malaysia because they collaborate with Perodua and Proton and both cars have many common parts. Remanufacturing companies for these parts also exist in Malaysia. The amount of import is larger than the domestic generation of used parts in Malaysia.

Distribution, Flow, and Sale Prices

Malaysia is said to become the global hub for used auto parts transaction. Malaysia imports 5,000 containers of used parts per month. Used parts are imported from mainly Japan and others countries such as Australia. Used parts are imported mainly as half-cuts and some are as engine and transmission, among others. Some 70 percent of used parts are re-exported and the rest are sold in Malaysia. The countries of destination are Nigeria, Egypt, Jordan, Pakistan, China, Thailand, Indonesia, Maldives, Myanmar, and Russia. Used parts are sold domestically as follows:

- Wire cables: Sold to local companies both with pealing cover and without pealing.
- Catalysers: old to local companies. The price is RM100 for each part.
- Engines: Sold to engine dealers. The engine dealers manually separate them into steel and aluminium, and sell them to electrical furnace steel manufacturers. Gear boxes are sold to the other companies. The companies buy aluminium from construction companies and can manufacturing companies and sell it to metal refineries.

Country :	Malaysia

- Batteries: treated as industrial waste.
- Suspension struts: Sold to local companies. The price is about RM33 for each part.
- Shock absorbers: Sold to local companies. The price is about RM40 for each part.
- Bonnet: Sold to local companies. The price is about RM100 for each part.

Table A-IV.10: Price Range of Automobile Parts

Parts	Sales price (RM)
Transmission	1,000 - 1,500
Nose cut	500 – 800
Axle	300 - 700
Dashboard	300 - 650
Bumper	300 - 500
Windshield	200 - 300
Bonnet	100 - 300
Radiator	180 - 250
Brake lamp	80 - 130
Fender	60 - 120
Head lamp	60 - 120
Starter	50 - 120
Shock absorber	40 - 90
Alternator	50 - 80
Engine	Several thousands
Suspension struts	33
Wire cable	No data available
Catalyser	100
Gear box	No data available

Sources: EX Research Institute; and Field survey of the study team.

Domestic clients of used parts are used parts traders or repair shops. Normally, the dealing of used parts is conducted on face-to-face basis. Sometimes, however, in some cases, the deal is conducted on the internet.

Country :	Malaysia

In Malaysia, brand new and used imitation parts circulate. Imitation parts imported from China, Taiwan, and others compete with used parts due to their low price, although they are considered to have safety problems. If the customer puts more priority on price rather than on quality, the imitation parts are selected by those customers.

Used Parts Market and Players

Several auto markets where a variety of auto dealers assemble in one place exist in Malaysia. Of those, two sizable markets, namely Kepong and Klang, are flourishing. According to MAARA, the number of business entities in the used parts trading is 5,266. While trading of counterfeit auto parts can be seen in those markets, functional parts including engines and components manufactured in Japan are dominant there.

Industry Association

There are three big used parts groups in Malaysia, namely, Feder, Sungai Sendock, and NL. Each group has approximately 10, 10, and 20 member companies respectively.

MAARA is the national association serving the auto parts recycling industry. It has more than 250 members all over Malaysia. MAARA provides industry information to its members in an effort to facilitate continuous growth and evaluation of the auto parts recycling industry. The association encourages aggressive environmental management programs to assist member facilities in maintaining proper management techniques for fluid and solid waste materials generated from the disposal of the motor vehicles. Member companies provide three-year warranty for their products as part of MAARA's policy.

References

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Country :	Malaysia

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(8) Volume, distribution, flow, model years, sale prices, processing situation, items on trading and resources: steel and non-ferrous metals

Copper and iron are mainly recycled domestically because these industries are located in Malaysia. There is also an aluminium industry in Malaysia, but aluminium scraps are both utilised domestically and exported. Plastic is also used domestically and exported.

The level of metal recycling in Malaysia is high. Shredders and separators for non-ferrous metals are introduced. There are companies refining lead from batteries and rare metals are recovered from mufflers by scrap collecting companies.

Amsteel Mills is the only company that has a shredding machinery whose capacity is 1,000 tons per day. However, the company is unable to obtain enough materials. Thus, only a few thousand tons per month are processed.

There is not enough steel scrap for steel production in the country. The table below shows the volume of steel scrap generated. Therefore, the country largely depends on imports. The top three suppliers of ferrous scrap to Malaysia are Australia, Singapore, and USA.

Table A-IV.11: Volume of Steel Scrap Generation in Malaysia

Year	2008	2009	2010	2011	2012
Steel Scrap (ton)	2,361	1,828	1,662	1,598	2,050

Source: Nikkan Shikyo Tsushin sya.

The volume of automobile catalyst generated, including that of commercial vehicles, was about 500 tons in 2011.

According to a company interviewed by the study team, aluminium scrap is sold at RM5 per kilogram, steel scrap is sold at RM800 per ton, and plastic is sold at 15 centavos per kilogram.

Malaysia has several electric furnace companies as shown in the table below.

Country :	Malaysia

Table A-IV.12: Electric Furnace Companies in Malaysia (1,000 tons per year)

Company	Crude steel	Slab	Billet	Bloom	Bar Steel
Ann Joo Resources	910	600	910		1,045
Kinsteel	1,950		1,960	500	1,950
Lion Group	4,000	2,000	2,550		2,524
Malaysia Steel Works	550		550		350
Malaysia Perwaja	1,400		750		1,150
Southern Steel	2,000		1,500		1,200
Others			30		431
Total	10,810	2,600	8,300	500	8,650

Source: JFE Techno Research.

References

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

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Yano Research Institute, *ASEAN Automobile Recycling 2014.*

(9) Distribution volume, flow, model years, sale prices, and processing methods during dismantling (batteries, tires, and waste fluids, among others)

Processing Situation

Tires:

Waste tires are not categorised as Scheduled Waste. Tire dealers usually employ private rubbish collectors to dispose their waste tires. They do not have any guidance or assistance from their principals or authorities for the proper management and disposal of waste tires. Private rubbish collectors collect waste tires, however, the extent to which these tires are disposed legally and in an environmentally friendly way is not known.

Country :	Malaysia

Scrap tire collectors and traders collect and transport scrap tires from tire shops to retreaders, recycling facilities, or to the nearest landfill sites. Although collectors charge a fee to discard scrap tires, the extent to which these tires are disposed legally and in an environmentally friendly way is also not known. Apart from that, high transportation fees are charged when there is an undefined coverage of collection.

There are three groups of scrap tire collectors/traders:

(i) Collectors that provide disposal service to the tire shops (paid service). These are for mainly unwanted tires that need to be disposed to the nearest landfill.

(ii) Collectors that buy scrap tires from the tire shops. These are mainly retreadable and reusable tires (second hand tires).

(iii) Collectors that voluntarily collect the unwanted used tires from tire shops without any charges (free disposal service). The frequency of this collection is usually not fixed, e.g. once or twice a week collection.

Scrap tire traders identify and sort scrap tires according to their usage, either to send them to tire retreaders or recycling centres. Traders are the middlemen who buy retreadable tires from collectors or directly from the tire workshops. These traders then resell retreadable tires to the retreaders, both locally and internationally. The remaining tires will go to the scrap tire treatment facilities or other usage.

Recycling and disposal are done through: 1) recovery of rubber granules/rubber powder steel wires from the scrap tires, 2) production of reclaimed rubber, 3) pyrolysis treatment, 4) used for cement industry, and 5) disposal.

1) Recovery of rubber granules/rubber powder, steel wires from the scrap tires:

Recycling of scrap tires refers to the recovery of rubber granules/rubber powder and steel wires from the scrap tires. Scrap tire recyclers like G-Cycle, located in Sungai Lalang Kedah, recover rubber granules and steel wires as end products. The rubber granules are sent to Klang and Kuala Lumpur, which will then be processed into rubber tiles as secondary products. The recovered steel wires are sold to the steel mills. Apart from that, G-Cycle has its own transportation for the collection of scrap tires.

Country :	Malaysia

2) Production of reclaimed rubber:

Reclaimed rubber production refers to the company that processes tire buffing and whole tires into rubber crumbs. This rubber crumb is then further processed into various grades and sold to end products manufacturers such as rubber tiles and rubber mats factory both locally and overseas.

This quality material in crumb form is capable of performing numerous tasks once applied to a variety of end products like rubberised asphalt for road building and building materials, sports surfaces, carpet underlay, noise and vibration insulation, rail crossings, sound barriers, industrial flooring, sealant, carpet pads, shoe soles, playgrounds and rubber matting, pond liners, conveyer belts, recycling bins, oil spill absorber, floating docks, wharf pilings and buffers, agricultural pipes, animal bedding, and fencing.

Rubplast Sdn. Bhd., located in Taiping, Perak, is a company that recycles scrap tires and processes rubber crumbs. Rubplast use rubber crumbs to manufacture end products such as rubber tiles and rubber mats in various grades. The other two identified reclaimed rubber producers are Jeng Yuan Reclaimed Rubber Sdn. Bhd. and Yong Fong Rubber Industries Sdn. Bhd., both located in Klang.

3) Pyrolysis Treatment:

Pyrolysis offers an environmentally attractive method to decompose a wide range of wastes, including scrap tires. In the pyrolysis process, the organic volatile components of tires are decomposed to low molecular weight products, liquids, or gases, which can be used as fuels or chemical source. The non-volatile carbon black and inorganic components remain as solid residues and can be recycled using other applications.

The use of pyrolysis as a method for recycling waste tire depends on the market for pyrolysis products. For this reason, the characterisation of pyrolysis products and the possibilities of their application in other processes are very important. At present, the main application for carbon black is its use as active carbon, as reinforcement in the rubber industry and as smokeless fuel. The liquid product is used as fuel or as a source of chemicals, and the gas fraction as fuel in the pyrolysis process.

Country :	Malaysia

Advanced Pyrotech Sdn. Bhd., a subsidiary company of Octagon Consolidated Berhad, has developed and operated a continuous process treatment system for waste tires by utilising pyrolysis technology. The process degrades the rubber chips into its original components and allows for the recovery of carbon black, oil, steel wires, and non-condensable flammable gases. Green Pluslink Sdn. Bhd. and Environmental Protection Technology Sdn. Bhd. are two other pyrolysis plants located in Klang.

4) Cement Industry:

The cement industry uses scrap tires as low-cost supplementary fuel due to their high-calorific value. Therefore, scrap tires are excellent materials for energy recovery. However, this process can be acceptable from an environmental point of view only in the case of controlled combustion due to the toxic emissions produced during the tire combustion process.

For example, Lafarge Malayan Cement is paid to accept and burn scrap tires as fuel in rotary cement kilns. If the company were to use local tires, they would have to pay for the collection of scrap tires. Since local sources are unreliable as supplies are inadequate and erratic in the absence of collection system, Lafarge ships in shredded tires from Singapore to fuel its cement kiln in Langkawi. YTL Cement is another cement industry that uses scrap tires as supplementary fuel.

The use of tires directly as fuel in cement kilns has the following advantages: reduced power-production costs, maximum heat recovery, and environmentally acceptable process. The disadvantages are: no material recovery, large capital investment, need for flue gas cleaning, carbon dioxide emission, and high operating costs. More research work is needed to find out the environmental impacts of the combustion of scrap tires, especially the polycyclic aromatic hydrocarbon emissions.

5) Disposal:

There are no disposal facilities specifically designed for the disposal of scrap tires in Peninsular Malaysia. Most of the landfill sites in Malaysia receive scrap tires as mixed waste with normal household waste. However, according to a few landfill operators, the number of scrap tires

Country :	Malaysia

received at landfills has reduced significantly in the past few years. Tires found at the landfills are mostly motorcycles tires.

Generally, landfills charge a tipping fee which ranges widely from RM10 per truck to RM33 per ton, depending on the landfill operator. High gate fees deter collectors from dumping scrap tires at landfills, which lead them to dumping scrap tires illegally. Apart from that, the scrap tires in landfills are usually not segregated from other domestic wastes.

Inert waste disposal facilities cater specifically to garden wastes, construction and demolition wastes, waste glasses, scrap tires, and other dry, non-leachable wastes. Two inert landfills were identified in the central region of Peninsular Malaysia. These are Dengkil Inert Landfill in Sepang and Kuang Inert Landfill in Sungai Buloh.

The burning of used tires in landfills generate tremendous amount of black smoke and toxic oils that create severe environmental and health hazards. Whole tires are bulky, taking up valuable landfill space and preventing waste compaction, which caused uneven settlement. In addition, it creates breeding grounds for mosquitoes. In any case, tires do not belong in dumpsites since they are recyclable.

Batteries:

Generally, used batteries are collected and sold to recycling companies such as Metal Reclamation Bhd (MRB).

Batteries are categorized as Scheduled Waste (SW102 Waste of lead-acid batteries in whole or crushed form). According to the Environmental Quality (Scheduled Wastes) Regulations 1989/2005, every waste generator of battery shall ensure that the scheduled waste generated are properly stored, treated on-site, recovered on-site for material or product from such scheduled wastes, or delivered to and received at prescribed premises for treatment, disposal, or recovery of material or product from scheduled wastes. Also, the recovery of material or product from waste batteries shall be done at prescribed premises or at on-site recovery facilities. Residuals from recovery of materials or products from scheduled wastes shall be treated or disposed at prescribed premises.

Country :	Malaysia

Waste oils:

Waste oils are also categorised as Scheduled Waste (SW312 Oily residue from automotive workshop, service station, oil or grease interceptor). Similar to the treatment of batteries, every waste generator of waste oil shall ensure that the scheduled waste generated are properly stored, treated on-site, recovered on-site for material or product from such scheduled wastes, or delivered to and received at prescribed premises for treatment, disposal, or recovery of material or product from scheduled wastes. Waste oil are stored and reused for waste generator sites or collected and sold by waste oil collectors.

Also, the recovery of materials or products from waste oils shall be done at prescribed premises or at on-site recovery facilities. Residuals from the recovery of materials or products from scheduled wastes shall be treated or disposed at prescribed premises.

References

Department of Environment. http://www.doe.gov.my/portalv1/ (accessed September 2015).

Field Survey of the Study Team.

Sandra Kumar A/L Thiruvangodan (2006), *Waste tire management in Malaysia.* http://core.ac.uk/download/files/452/12219650.pdf (accessed September 2015).

Yano Research Institute, *ASEAN Automobile Recycling 2014.*

(10) Factual survey of end-of-life two-wheeled vehicles

The registered number of two-wheeled vehicles in 2013 was 11,087,873. The number of sales of two-wheeled vehicles in the same year was 546,719.

Country :	Malaysia

Table A-IV.13: Number of Sales and Registration of Two-wheeled Vehicles in Malaysia

	2008	2009	2010	2011	2012	2013
Registered two-wheeled vehicles	8,487,451 (106.85%)	8,940,230 (105.33%)	9,441,907 (105.61%)	9,949,774 (105.37%)	10,559,370 (106.12%)	11,087,878 (105.00%)
Sales number of two-wheeled vehicles	532,697 (118.46%)	432,683 (81.22%)	468,175 (108.20%)	494,586 (105.64%)	537,753 (108.73%)	546,719 (101.67%)

Note: Values shown in parentheses are those compared to the previous year.

Source: Yearbook Statistics Malaysia.

The flow of two-wheeled vehicles cannot be identified by this research. According to the study team's interview, they are brought to repair shops and repair shops sell them to scrap companies.

References

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

Yearbook Statistics Malaysia.
https://www.statistics.gov.my/index.php?r=home/index&menu_id=b2ROaWpITmQ5NnAvMHVmRjRkZzlBQT09 (accessed September 2015).

(11) Type of operation and number of recycling-related companies

Dismantlers

Since the generation of ELVs is limited in Malaysia, there seems to be few ELV dismantling companies. Therefore, dismantling is mainly conducted by used parts dealers in the country.

Although the majority of companies are small, a relatively large company has a dozen to hundreds of employees. These companies annually receive 5,000 40-feet containers and dismantle and resell parts to recyclers. The revenues of the companies interviewed by the study

team range from RM4 million to RM20 million per year. Press machines and other technologies used in their procedures indicate Malaysia's dismantling advances over other ASEAN countries in this regard. It was reported that about 20 companies dismantling ELVs have dismantling licences which do not focus on ELVs. Thus, NAP 2014 is being considered as well as the establishment of ATFs. Companies with licence under the ATF framework are required to comply with waste management requirements to: store and treat ELVs in a way that does not harm the environment; remove all hazardous components and liquids; and recycle, store and dispose the parts appropriately. Approximately 40 used parts companies are located in Kepong which is a well-known site for vehicle dismantling.

Of the MAARA member companies, 70 percent are used parts sellers and 30 percent scrap sellers.

Shredders

Mega Steel is the only shedder company in Malaysia. Previously, there used to be two shredder companies. Mega Steel belongs to the Lion Group and is the only one that has blast furnace and that buys scrap from construction. The main products of other member companies of Lion Group, including Mega Steel, are:

- Mega Steel: Steel plate
- Armsteel: Steel bar and wire rod
- Antra Steel: Steel bar.

Four electrical furnace steel production companies exist in Malaysia but there are no casting companies. Steel production is top in Southeast Asia.

Downstream Recycling Companies

There are many scrapping traders for iron, copper, aluminium scrap, and plastics.

The Malaysian Iron and Steel Industry Federation (MISIF) is the national industry association for manufacturers of iron and steel products. It has 152 member companies. There are companies like Amsteel Mills who are not members of the association.

VCS Copper Industries Sdn. Bhd. is one of the largest manufacturers and exporters of high-

quality copper. It is the only company in Malaysia that recovers scrap copper and utilises it for producing products ranging in different forms of copper wires. The company produces 18,000 tons ~~MTS~~ per year.

There are numerous aluminium companies, including Press Metal Berhad and Daiki Aluminum Industry (Malaysia). Press Metal Berhad, the largest integrated aluminium producer in South East Asia, has a smelting capacity of 440,000 tons and an extrusion capacity of 190,000 tons per year.

Other Related Companies include:

Recycling of Scrap Tires

G-Cycle was founded in 1971 as a small retailer of tires, wheels, batteries, and wheel alignment servicing in Kedah, in the northern state of Malaysia. G-Cycle continues to grow by providing excellent service to its customers. Today, they use modern tire-changing equipment and wheel alignment machines to service almost all types of tires (from trailers, cars, vans to large line haul trucks, buses and coaches, earthmovers, forklifts, and container carriers).

In 2005, G-Cycle entered the tire recycling business. As tire crumb rubber has many benefits, this has led to continuous growth in processing capacity around the world, thus leading to the introduction of a modern tire recycling machine in 2008 to enhance the speed, efficiency, and quality of the production. To ensure sufficient scrap tire supply meets the increasing demand, strategic partnerships have been formed with many large and small tire retailers across Malaysia.

Today, they are capable of producing at least 300 tons of rubber and 60 tons of steel every month.

Production of Reclaimed Rubber:

Rubplast Sdn. Bhd. is a reclaimer of all types of rubber polymer. With 18 years' experience in manufacturing reclaim rubber, they have developed a premium quality product and have the capacity to produce 6,000 metric tons annually.

Pyrolysis Treatment:

Advanced Pyrotech Sdn. Bhd. develops and enhances a technology for waste tire pyrolysis. It is

also involved in developing other technologies for waste management; engineering and designing waste tire pyrolysis plants; applying intellectual property, design, and engineering to construct waste tire pyrolysis plants; and providing solutions to the disposal and management of waste tires in Malaysia and other markets. The company's activities further include the development and commercialisation of by-products from the operation of waste tire pyrolysis plants. Advanced Pyrotech Sdn. Bhd. was formerly known as KKIEC Rubber Pyrolysis (M) Sdn. Bhd. The company was founded in 1999 and is based in Petaling Jaya, Malaysia. Advanced Pyrotech Sdn. Bhd. operated as a subsidiary of K.K. Incinerator Engineering and Construction Sdn. Bhd. As on 30 July 2008, Advanced Pyrotech Sdn. Bhd. operates as a subsidiary of Octagon Consolidated Bhd.

Green Pluslink Sdn. Bhd. provides extrusion and recycling of waste tires for the production of carbon black, diesel fuel, and scrap metal. The company was founded in 2003 and is based in Kapar, Malaysia. As of 4 June 2014, Green Pluslink Sdn. Bhd. operates as a subsidiary of Destini Berhad.

Cement Industry:

Lafarge Malayan Cement is a leader of the Malaysian construction industry, contributing towards building better cities. Its solutions provide cities and townships with more housing, making them more compact, more durable, more beautiful, and better connected. Headquartered in the Klang Valley, Lafarge Malaysia has facilities that include three integrated cement plants in Langkawi, Kanthan and Rawang; a grinding station in Pasir Gudang; more than 30 ready-mixed concrete batching plants; and six aggregate quarries throughout Peninsular Malaysia. These facilities are supported by a wide network of depots, terminals, and distribution facilities connected by road, rail, and sea.

Lafarge Malaysia Berhad is today the parent of a group of companies in Malaysia and Singapore whose core businesses are in the manufacturing and sale of cement, ready-mixed concrete, and other related building materials.

YTL Cement operates two world-class integrated cement plants in Pahang and Perak as well as Clinker and Blastfurnace Slag Grinding Plants at Westport, Klang and Pasir Gudang, Johor.

YTL Cement is currently the second largest cement producer in Malaysia. It also owns an

Country :	Malaysia

integrated cement plant in Hangzhou, China, which has a production capacity of 2.0 million tons of cement per annum.

Batteries:

Recycling plants of batteries have to get licences. According to the 'Environmental Impact Assessment Guidance Document for the Construction of Scheduled Waste Recovery Plant (off-site)', recycling plants are required to submit an environmental impact assessment report to the Director General of the Environmental Quality–for consideration, as mentioned under Section 34A of the Environment Quality Act 1974 (amended1996).

Metal Reclamation Bhd (MRB) is a publicly listed company incorporated in Malaysia and has its shares listed on the Second Board of the Bursa Malaysia Securities Berhad (formerly known as The Kuala Lumpur Stock Exchange) since 4 June 1998.

The authorised share capital of MRB is RM100,000,000 comprising 100,000,000 ordinary shares of RM1.00 each while the issued and paid-up share capital is RM47,760,000 comprising 47,760,000 ordinary shares of RM1.00 each.

The table below is a list of facilities that have a licence for treatment of SW102.

Country :	Malaysia

Table A-IV.14: List of Licensed Facilities for the Treatment of SW102 Waste of Lead-Acid Batteries in Whole or Crushed Form

#	Name Of Contractor/Address	Licence No	Type of Licence	Waste Groups/Vehicle Registration No
1	Bukit Manik Enterprise: LOT 866, DEMAK LAUT INDUSTRIAL PARK, PHASE III, JALAN BAKO 3, Jalan Bako. 93050 KUCHING SARAWAK	685	Facilities : Penstoran Luar Tapak	SW102, SW206, SW305, SW306, SW307, SW312, SW408, SW409, SW410, SW416, SW417
2	E-CONCERN (M) SDN. BHD.: Lot 2979, Block 6, Kuala Baram Land District, Permy Technology Park, Jalan Tudan, Technology Park, Bandar Baru Permyjaya Tudan, 98100 Miri. 98000 MIRI SARAWAK	1708	Facilities : Penstoran Luar Tapak	SW102, SW103, SW104, SW109, SW110, SW204, SW206, SW301, SW302, SW303, SW305, SW306, SW307, SW308, SW309, SW310, SW311, SW312, SW314, SW321, SW322, SW323, SW324, SW325, SW327, SW401, SW405, SW408, SW409, SW410, SW411, SW416, SW417, SW418, SW421, SW423, SW429
3	HOM KIM WASTE MANAGEMENT S/B : LOT 1806, PADAWAN LIGHT INDUSTRIAL ESTATE, 10TH MILE, JLN PENRISSEN 93250 KUCHING SARAWAK	1720	Facilities : Penstoran Luar Tapak	SW102, SW103, SW204, SW305, SW306, SW307, SW312, SW409, SW410
4	INTERCEDAR INDUSTRY (M) SDN. BHD. (LOT 1339, BTG. KALI) : LOT 1339 BATU 29 MUKIM ULU YAM 44300 SELANGOR	1432	Facilities : Pemerolehan Kembali Luar Tapak	SW102
5	K.S. METAL (MIRI) SDN. BHD. : LOT 974, JLN LUTONG/KUALA BARAM, KMK1 98100 LUTONG MIRI 98000 MIRI SARAWAK	1710	Facilities : Penstoran Luar Tapak	SW102
6	KIEN SAN METAL (SIBU) SDN. BHD. : LOT 1448 & 4330, JALAN LANANG BARAT 96000 SIBU SARAWAK	1739	Facilities : Penstoran Luar Tapak	SW102, SW305, SW306
7	KIEN SAN METAL SDN. BHD : LOT 2214, SEC.66, JALAN BENGKAL, KAW. PERIND. PENDING,KUCHING KAWASAN PERINDUSTRIAN PENDING 93450 KUCHING SARAWAK	1700	Facilities : Penstoran Luar Tapak	SW102
8	LEGENDA BUMIMAS SDN.	3441	Facilities :	SW102, SW103, SW104,

Country :	Malaysia			
	BHD. (PENSTORAN BT) : LOT 2, JALAN 3, INDUSTRIAL ZONE 13, KOTA KINABALU INDUSTRIAL PARK, 88460 TAUARN 88460 TUARAN SABAH		Penstoran Luar Tapak	SW109, SW110, SW204, SW301, SW302, SW303, SW305, SW306, SW307, SW308, SW309, SW311, SW312, SW314, SW315, SW321, SW322, SW323, SW324, SW325, SW327, SW402, SW405, SW408, SW409, SW410, SW411, SW416, SW417, SW418, SW421, SW422, SW423, SW427, SW429, SW501
9	MAGNA-MITRE SDN. BHD. : No. 60, Jln Bintulu-sibu Junction, Bbc Industrial Estate, 97000 Bintulu, Sarawak 97000 BINTULU SARAWAK	1698	Facilities : Penstoran Luar Tapak	SW102, SW103, SW109, SW110, SW201, SW202, SW203, SW302, SW305, SW306, SW307, SW309, SW310, SW311, SW312, SW314, SW315, SW318, SW322, SW323, SW327, SW403, SW408, SW409, SW410, SW411, SW418, SW421, SW422, SW429, SW430
10	MBL METAL SDN. BHD. : LOT 2026, BLOCK 31, KEMENA LAND DISTRICT, JALAN SUNGAI NYIGU, BINTULU 97013 BINTULU SARAWAK	1741	Facilities : Penstoran Luar Tapak	SW102, SW305, SW306
11	METAL RECLAMATION (INDUSTRIES) SDN. BHD. : LOT 6, 8 & 9, SEKSYEN 6, PHASE 1A, TAMAN PERINDUSTRIAN PULAU INDAH, WEST PORT, WEST PORT 42920 SELANGOR	3196	Facilities : Pemerolehan Kembali Luar Tapak	SW102, SW104, SW204
12	MNA METAL RESOURCES SDN. BHD. : LOT 112, LORONG PERMATA 1/4 KAWASAN PERINDUSTRIAN ARAB MALAYSIAN ARAB MALAYSIA INDUSTRIAL PARK, 71800 NEGERI SEMBILAN	2055	Facilities : Pemerolehan Kembali Luar Tapak	SW102
13	PETRONAS CARIGALI SDN. BHD. : LABUAN SUPPLY BASE BUILDING, RANCA-RANCA INDUSTRIAL ESTATE, P.O.BOX 80040,WILAYAH PERSEKUTUAN LABUAN PO BOX 80040 87010 LABUAN W.P LABUAN	4266	Facilities : Penstoran Luar Tapak	SW102, SW103, SW109, SW110, SW201, SW203, SW301, SW305, SW306, SW309, SW310, SW311, SW322, SW323, SW327, SW403, SW404, SW408, SW409, SW410, SW417, SW418, SW421, SW422, SW429, SW430

Country :	Malaysia			
14	PETRONAS GAS BERHAD (SEREMBAN) : KM 11, JALAN SEREMBAN/TAMPIN SUNGAI GADUT KM 11, JALAN SEREMBAN-TAMPIN 71450 NEGERI SEMBILAN	2077	Facilities : Penstoran Luar Tapak	SW102, SW103, SW104, SW109, SW110, SW305, SW306, SW321, SW409, SW410, SW417, SW422
15	PETRONAS GAS BERHAD : LOT 1, JALAN JEMUJU LIMA 16/13E, KAWASAN PERINDUSTRIAN SEKSYEN 16 40200 SELANGOR	1413	Facilities : Penstoran Luar Tapak	SW102, SW103, SW104, SW109, SW110, SW305, SW306, SW321, SW409, SW410, SW417, SW422
16	PETRONAS GAS BERHAD : PEJABAT OPERASI SERANTAU GURUN KM 1, JALAN JENIANG, KM 1 JALAN JENIANG, GURUN KEDAH 08300 KEDAH	2435	Facilities : Penstoran Luar Tapak	SW102, SW103, SW104, SW109, SW110, SW305, SW306, SW311, SW321, SW409, SW410, SW417, SW422
17	PETRONAS GAS BHD - PASIR GUDANG RO: PLO 332 JLN PERAK 4 KAW. PERINDUSTRIAN PASIR GUDANG PLO 332, JALAN PERAK 4, KAWASAN PERINDUSTRIAN PASIR GUDANG, 81707 PLENTONG JOHOR	2323	Facilities : Penstoran Luar Tapak	SW102, SW103, SW104, SW109, SW110, SW311, SW321, SW409, SW410, SW417, SW422
18	PETRONAS GAS BHD - SITIAWAN RO : PEJABAT OPERASI SERANTAU SITIAWAN LOT 33263 JALAN DATO AHMAD YUNUS 32000 PERAK	1843	Facilities : Penstoran Luar Tapak	SW102, SW103, SW104, SW109, SW110, SW305, SW306, SW311, SW321, SW409, SW410, SW417, SW422
19	PETRONAS GAS BHD. - SCHEDULE WASTES STORAGE FACILITIES : LOT 1952 MUKIM KERTEH WILAYAH PANTAI TIMUR 24300 KERTEH TERENGGANU	2403	Facilities : Penstoran Luar Tapak	SW102, SW103, SW104, SW109, SW110, SW305, SW306, SW311, SW321, SW409, SW410, SW417, SW422
20	SRI TITIAN INDUSTRIES (M) SDN. BHD. : LOT 66, JALAN PERMATA 1/2 KAWASAN PERINDUSTRIAN ARAB MALAYSIAN 71800 NEGERI SEMBILAN	4971	Facilities : Pemerolehan Kembali Luar Tapak	SW102
21	SYARIKAT SEKITARAN OPTIMUM : LOT 714, DEMAK LAUT INDUSTRIAL PARK, OFF JALAN BAKO 93050 KUCHING SARAWAK	1663	Facilities : Penstoran Luar Tapak	SW102, SW103, SW104, SW206, SW305, SW306, SW322, SW401, SW402, SW408, SW409, SW410, SW417
22	TOD, PETRONAS GAS BERHAD : KM 10, LEBUHRAYA SEGAMAT-KUANTAN 85000	2328	Facilities : Penstoran Luar Tapak	SW102, SW103, SW104, SW109, SW110, SW311, SW321, SW409, SW410,

Country :	Malaysia			
	JOHOR			SW417, SW422
23	YB ENTERPRISE : LOT 76, BLOK 6, MCLD PIASAU JAYA INDUSTRIAL ESTATE MIRI SARAWAK	1725	Facilities : Penstoran Luar Tapak	SW102, SW305, SW306, SW307, SW312, SW409, SW410
24	YOKOHAMA RECLAMATION SDN. BHD. : Lot 49, Jalan Johan 2/5 Kawasan Perindustrian Pengkalan II 31550 KINTA PERAK	4178	Facilities : Pemerolehan Kembali Luar Tapak	

SW = Scheduled Waste.

Source: Electronic Scheduled Waste Information System, Department of Environment.

The following table lists the facilities that have a licence for the treatment of SW312.

Table A-IV.15: Facilities with Licence for the Treatment of SW312 - Oily Residue from Automotive Workshops, Service Stations, Oil or Grease Interceptors

#	Name Of Contractor/Address	Licence No	Type of Licence	Waste Groups/Vehicle Registration No
1	5E RESOURCES SDN. BHD.: PLO 317 & 318, JALAN PERAK KAWASAN PERINDUSTRIAN PASIR GUDANG PASIR GUDANG 81700 JOHOR	2120	Facilities : Pemerolehan Kembali Luar Tapak	SW202, SW204, SW206, SW303, SW305, SW306, SW307, SW309, SW312, SW322, SW323, SW401, SW409, SW410, SW416, SW417, SW418
2	A & C Technology Waste Oil Sdn. Bhd.: LOT 773-B, 773B-2 & 773B-3, JALAN SS13/1K, 47500 SELANGOR	1350	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW307, SW312
3	BEYOND STATUS SDN. BHD. : LOT A2 (SEBAHAGIAN CL 205377886), RANCHA-RANCHA INDUSTRIAL ESTATE LABUAN W.P LABUAN	4275	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW309, SW310, SW312, SW408
4	BUKIT MANIK (SIBU) ENTERPRISE: LOT 586, BLOK 1, SG. MERAH TOWN DISTRICT NO.11, JLN GETAH, OFF JLN DING LIK KONG 96000 SIBU SARAWAK	1680	Facilities : Penstoran Luar Tapak	SW305, SW306, SW307, SW312
5	Bukit Manik Enterprise: LOT 866, DEMAK LAUT INDUSTRIAL PARK, PHASE III, JALAN BAKO 3, Jalan Bako. 93050 KUCHING SARAWAK	685	Facilities : Penstoran Luar Tapak	SW102, SW206, SW305, SW306, SW307, SW312, SW408, SW409, SW410, SW416, SW417
6	CHEMALAYA SDN. BHD. : Plo 128 Jalan Rimba 3 Tanjung	2331	Facilities : Pemerolehan	SW104, SW110, SW204, SW305, SW306, SW307,

Country :	Malaysia			
	Langsat Industri Complex Tanjung Langsat Industrial Complex 81700 Pasir Gudang JOHOR 81700 JOHOR		Kembali Luar Tapak	SW311, SW312, SW314, SW409, SW410, SW422
7	DAYA CLARIMAX SDN. BHD. : LOT 38, JALAN SUNGAI PINANG 5/1, PULAU INDAH INDUSTRIAL PARK (FASA 2) PULAU INDAH INDUSTRIAL PARK (FASA 2) 42920 SELANGOR	3117	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW307, SW309, SW312, SW314, SW322, SW323, SW409
8	DOUBLE CORPORATE SDN. BHD.: LOT 38, JALAN INDUSTRI 3/1 TAMAN PERINDUSTRIAN TEMERLOH 28400 MENTAKAB PAHANG	4406	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW307, SW312, SW314
9	E-CONCERN (M) SDN. BHD.: Lot 2979, Block 6, Kuala Baram Land District, Permy Technology Park, Jalan Tudan, Technology Park, Bandar Baru Permyjaya Tudan, 98100 Miri. 98000 MIRI SARAWAK	1708	Facilities : Penstoran Luar Tapak	SW102, SW103, SW104, SW109, SW110, SW204, SW206, SW301, SW302, SW303, SW305, SW306, SW307, SW308, SW309, SW310, SW311, SW312, SW314, SW321, SW322, SW323, SW324, SW325, SW327, SW401, SW405, SW408, SW409, SW410, SW411, SW416, SW417, SW418, SW421, SW423, SW429
10	ENVIRON WASTE MANAGEMENT (M) S/B: NO. 100, BLOCK 8, MUARA TEBAS LAND DISTRICT DEMAK LAUT INDUSTRIAL PARK, JALAN BAKO 93050 KUCHING SARAWAK	1718	Facilities : Penstoran Luar Tapak	SW305, SW306, SW307, SW312, SW322, SW323, SW409, SW410
11	HIAP HUAT CHEMICALS SDN. BHD. (LOT A4): LOT A-4, JALAN MIEL KAWASAN PERINDUSTRIAN BENTONG Kawasan Perindustrian MIEL, 28700 BENTONG PAHANG	3201	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW307, SW312, SW322, SW323, SW410, SW418
12	HOM KIM WASTE MANAGEMENT S/B: LOT 1806, PADAWAN LIGHT INDUSTRIAL ESTATE, 10TH MILE, JLN PENRISSEN 93250 KUCHING SARAWAK	1720	Facilities : Penstoran Luar Tapak	SW102, SW103, SW204, SW305, SW306, SW307, SW312, SW409, SW410
13	KRUBONG RECOVERY SDN. BHD. : Lot 2625, 2629 & 2630	1750	Facilities : Pemerolehan	SW104, SW109, SW110, SW202, SW204, SW206,

Country :		Malaysia		
	(PT1671, PT1675 & PT 1676), Kawasan Perindustrian Krubong, 75250 KRUBONG MELAKA		Kembali Luar Tapak	SW305, SW306, SW307, SW312, SW314, SW322, SW323, SW325, SW409, SW410, SW412, SW414, SW422, SW423
14	LEGENDA BUMIMAS SDN. BHD. (PENSTORAN BT) : LOT 2, JALAN 3, INDUSTRIAL ZONE 13, KOTA KINABALU INDUSTRIAL PARK, 88460 TAUARN 88460 TUARAN SABAH	3441	Facilities : Penstoran Luar Tapak	SW102, SW103, SW104, SW109, SW110, SW204, SW301, SW302, SW303, SW305, SW306, SW307, SW308, SW309, SW311, SW312, SW314, SW315, SW321, SW322, SW323, SW324, SW325, SW327, SW402, SW405, SW408, SW409, SW410, SW411, SW416, SW417, SW418, SW421, SW422, SW423, SW427, SW429, SW501
15	LUNG SENG CHEMICALS SDN. BHD. : Lot 20237, PT 1430, Kawasan Perindustrian Senawang 70450 SENAWANG 70450 SEREMBAN NEGERI SEMBILAN	2081	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW307, SW312, SW322, SW323, SW409, SW410, SW416, SW417, SW418
16	MAGNA-MITRE SDN. BHD. : No. 60, Jln Bintulu-sibu Junction, Bbc Industrial Estate, 97000 Bintulu, Sarawak 97000 BINTULU SARAWAK	1698	Facilities : Penstoran Luar Tapak	SW102, SW103, SW109, SW110, SW201, SW202, SW203, SW302, SW305, SW306, SW307, SW309, SW310, SW311, SW312, SW314, SW315, SW318, SW322, SW323, SW327, SW403, SW408, SW409, SW410, SW411, SW418, SW421, SW422, SW429, SW430
17	Malik Family Resources Technology Sdn. Bhd.: LOT T115, JALAN SUNGAI PINANG 5/17, PULAU INDAH KLEEN CENTRE, 42920 PULAU INDAH SELANGOR	1296	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW307, SW312, SW410
18	MERIDIAN RECYCLING SDN.BHD (BARU-PLANT 2 - LOT 48): LOT 48, JALAN PKNK 1/5, KAWASAN PERUSAHAAN SUNGAI PETANI 08000 KEDAH	2441	Facilities : Pemerolehan Kembali Luar Tapak	SW202, SW204, SW305, SW306, SW312, SW314, SW321, SW325, SW411, SW416, SW417, SW418
19	MODERN ENERGY SDN. BHD.: PLO 594 JALAN KELULI 9 KAWASAN PERINDUSTRIAN PASIR GUDANG KAWASAN	2282	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW307, SW311, SW312, SW314, SW315, SW327, SW409, SW410, SW416, SW417

Country :	Malaysia			
	PERINDUSTRIAN PASIR GUDANG 81700 JOHOR			
20	OLST PETRO-CHEMICAL SDN. BHD.: LOT 51878, JALAN KELULI, KAWASAN PERINDUSTRIAN PASIR GUDANG 81700 JOHOR	2292	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW307, SW309, SW311, SW312, SW314, SW409, SW410
21	PENTAS FLORA SDN. BHD.: LOT 183, JALAN 5, KOMPLEKS PERABOT OLAK LEMPIT, KOMPLEKS PERABOT OLAK LEMPIT, 42700 SELANGOR	1444	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW307, SW309, SW312, SW314, SW315, SW327, SW409, SW410
22	PETROJADI SDN. BHD. (PENUNU B.T): Stesen Janakuasa ARL Tenaga Sdn. Bhd. Jln Teluk Sepanggar, Melewa, PPM 290 88450 MENGGATAL SABAH	4854	Facilities : Insinerator Buangan Terjadual	SW305, SW306, SW309, SW311, SW312, SW314, SW410
23	SAFE & CLEAN OIL RECYCLE SDN. BHD. : LOT 11946 (LOT 1) JALAN PATAU-PATAU RANCA-RANCA INDUSTRIAL ESTATE W.P. LABUAN 87000 LABUAN W.P LABUAN	4268	Facilities : Penstoran Luar Tapak	SW305, SW306, SW307, SW308, SW309, SW310, SW311, SW312, SW313, SW408, SW409, SW410, SW417
24	SIN CHAN HOO SDN. BHD.: LOT 81, JALAN INDUSTRI 4/2, KAWASAN PERINDUSTRIAN GOPENG PERINDUSTRIAN GOPENG, 31600 KINTA PERAK	460	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW308, SW312
25	SL RECYCLING (M) SDN. BHD. (KANTHAN): NO 6, PERSIARAN PERINDUSTRIAN KANTHAN, KAWASAN PERINDUSTRIAN KANTHAN 31200 PERAK	4194	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW307, SW308, SW309, SW311, SW312, SW409, SW410
26	SOUTHERN STRENGTH (M) SDN. BHD. : PLO 60, JALAN NIBONG, KAWASAN PERINDUSTRIAN TANJUNG LANGSAT, PASIR GUDANG 81700 JOHOR	4768	Facilities : Penstoran Luar Tapak	SW104, SW110, SW202, SW204, SW206, SW305, SW306, SW307, SW309, SW311, SW312, SW314, SW322, SW323, SW325, SW401, SW408, SW409, SW410, SW416, SW417, SW418
27	SP METRO (M) SDN. BHD. : LOT 14316 - 14319 JLN PERUSAHAAN 24 OFF JLN KAMPUNG IDAMAN PANDAMARAN JAYA INDUSTRIAL ESTATE 42000 KLANG SELANGOR	1411	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW307, SW311, SW312

Country :	Malaysia			
28	SPM Oil & Gas Sdn. Bhd.: LOT PT8292, JALAN 2/4, KWSN PERINDUSTRIAN PENGKALAN 2, MUKIM SUNGAI TERAP, DAERAH KINTA KAWASAN PERINDUSTRIAN PENGKALAN 2, PERAK	1834	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW307, SW309, SW311, SW312
29	SYARIKAT PERNIAGAAN SOON LI: LOT 87, JALAN INDUSTRI 4/2, KAWASAN PERINDUSTRIAN GOPENG GOPENG INDUSTRIAL PARK, 31600 PERAK	1811	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW312
30	SYP RECOVERY & RECYCLING SDN. BHD.: LOT 2833-2834, KAWASAN PERINDUSTRIAN BUKIT RAMBAI, MUKIM TANJUNG MINYAK, MELAKA KAWASAN PERINDUSTRIAN BUKIT RAMBAI 75250 BUKIT RAMBAI MELAKA	1776	Facilities : Pemerolehan Kembali Luar Tapak	SW104, SW109, SW110, SW202, SW204, SW206, SW305, SW306, SW307, SW310, SW311, SW312, SW314, SW325, SW409, SW410, SW416, SW417, SW422
31	TEX CYCLE (P2) SDN. BHD.: LOT 8942 DAN LOT 8960, KAWASAN PERINDUSTRIAN TELOK GONG, KLANG 42000 KLANG SELANGOR	1486	Facilities : Pemerolehan Kembali Luar Tapak	SW109, SW204, SW302, SW303, SW305, SW306, SW307, SW308, SW309, SW311, SW312, SW314, SW315, SW321, SW322, SW323, SW324, SW325, SW327, SW405, SW408, SW409, SW410, SW411, SW416, SW417, SW418, SW421, SW422, SW423, SW427
32	TRIOCHEM SDN. BHD.: PLO 584, JALAN MIEL 2, OFF JALAN KELULI 9, KAWASAN PERINDUSTRIAN PASIR GUDANG, 81700 PASIR GUDANG KAWASAN PERINDUSTRIAN MIEL, 81700 BANDAR JOHOR BAHRU JOHOR	2368	Facilities : Pemerolehan Kembali Luar Tapak	SW305, SW306, SW307, SW312, SW314, SW322, SW323, SW410, SW417, SW418
33	Urban Environmental Industries Sdn. Bhd.: Lot 4, Jalan Gebeng 1/5, Kawasan Perindustrian Gebeng, 26080 PAHANG	882	Facilities : Pemerolehan Kembali Luar Tapak	SW204, SW206, SW305, SW306, SW307, SW308, SW309, SW311, SW312, SW314, SW322, SW323, SW401, SW409, SW410, SW418, SW429
34	Urban Environmental Industries Sdn. Bhd. : Lot 4, Jalan Gebeng 1/5, Kawasan	4413	Facilities : Penstoran Luar Tapak	SW204, SW206, SW305, SW306, SW307, SW308, SW309, SW311, SW312,

Country :				Malaysia
	Perindustrian Gebeng, 26080 PAHANG			SW314, SW322, SW323, SW401, SW409, SW410, SW418, SW429
35	YB ENTERPRISE: LOT 76, BLOK 6, MCLD PIASAU JAYA INDUSTRIAL ESTATE MIRI SARAWAK	1725	Facilities : Penstoran Luar Tapak	SW102, SW305, SW306, SW307, SW312, SW409, SW410

SW = Scheduled Waste.

Source: Electronic Scheduled Waste Information System, Department of Environment.

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(12) Management situation of recycling-related companies

Management Situation

Based on the interview of recycling-related companies conducted by the study team, the number of employees of recycling-related companies ranges from 15 to 120.

Their revenues vary, depending on the size and domain of business. The revenues range from RM1 million to RM20 million for the companies.

References

Field Survey of the Study Team.

Country :	Malaysia

2. Current challenges and considerations in automobile recycling laws and institutional systems in vehicle recycling

(1) Challenges in the vehicle recycling system (illegal dumping, inappropriate processing of waste, stringent situations at final disposal sites, dismantling technology, safety, efficiency, and recycling rates)

The Malaysian Government has reviewed the NAP 2014. During the review, many challenges related to ELV recycling were proposed. The gradual introduction of the ELV policy was one of the issues raised in the review. According to the MITI website, at present, there are 2.7 million passenger vehicles that are 10 years old or older on the road. Compared to other countries, Malaysia presents a very low vehicle scrap rate and relatively high average vehicle age.

As a first step towards the implementation of a full ELV policy, the NAP review introduced mandatory annual inspections as a requirement for road tax renewal for all vehicles aged 15 years or older. At present, the obligation of inspection is imposed only on commercial vehicles. Expanding the obligation of inspection to private vehicles has been discussed several times and still is under discussion among stakeholders in Malaysia.

Initially, safety and environmental concerns were raised from the practice of importing used parts and components without any restrictions or mandatory tests. Consequently, the NAP review introduced a mechanism to prohibit imports of used parts and components, effective from June 2011. MAARA raised the importance of utilising used parts as the importation of used parts has not been introduced. However, safety and environmental issues related to used parts are still discussion points.

For the regulation on dismantling, there is no specific registration scheme for vehicle dismantling and it is difficult to effectively regulate the industry.

Some ELV recyclers do not adhere to the environmental law or guidelines, causing inappropriate processing of wastes. For example, engine coolants are being discharged freely into the drains, and air-conditioning gas is being freely released into the air. This will lead to a serious impact on the environment. Furthermore, metallic component recycling is done manually. This causes labour safety issues.

In Malaysia, specific dismantlers do not exist and dismantling is mainly conducted by used parts

Country :	Malaysia

dealers. Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity. The occupational health of ELV recyclers during dismantling and down streaming processes is also a challenge. Some ELV recyclers are also working in bad conditions.

According to MAI, the development of appropriate infrastructure for promoting ELV recycling is also a challenge. The lack of standards covering the whole life of the vehicle, e.g. design, parts, dismantling process, among others, is also challenge. The enhancement of collaboration among ministries related to ELV recycling is thus expected.

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MITI. http://www.miti.gov.my/index.php/pages/view/1449 (accessed September 2015).

(2) Trend in vehicle recycling policies and related automobile recycling laws, and the enforcement, presence, and details of related institutions.

Malaysia is in its early stages of starting the ELV recycling system and is considering ELV recycling regulations. Many environmental regulations are related to ELV recycling. The Environmental Quality Act 1974 is the basic law for environmental issues. Waste management is also mentioned in this law. The law was amended in 1985, 1996, 2000, and 2001.

The NAP 2014 was crafted focusing on the objectives of enhancing the competitive advantage of the local automotive industry and developing an environmentally friendly automotive manufacturing ecosystem and its outputs. The main objectives of the document are to:

- promote a competitive and sustainable local automotive industry, including the national car companies;
- develop Malaysia as the regional automotive hub in energy-efficient vehicles (EEV);
- promote increase in value-added activities in a sustainable manner while continuously developing the local capabilities;
- promote increase in exports for vehicles and automotive components;

Country :	Malaysia

- promote participation of Bumiputera companies in the total value chain of the local automotive industry; and
- safeguard consumers' interest by offering safer and better quality products at competitive prices.

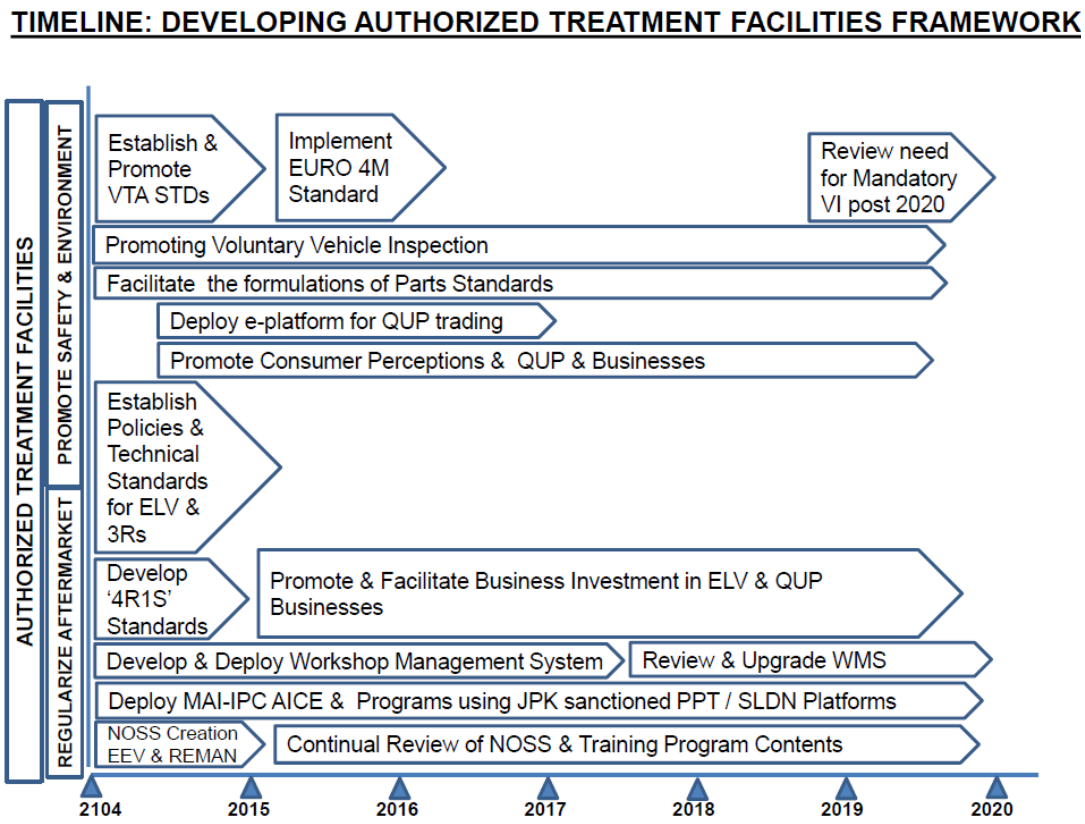
To complement the execution of NAP 2014, there are six road maps and implementation plans that have been developed and the roadmaps will be under the supervision of Ministry of International Trade and Industry (MITI) and MAI shall act as the agency that will coordinate, implement, and monitor the programmes. These road maps will serve as the guidelines to achieve the transformation objective of the local automotive industry. The outline of these road maps are as follows.

1. Malaysia Automotive Technology Road Map
2. Malaysia Automotive Supply Chain Development Road Map
3. Malaysia Automotive Human Capital Development Road Map
4. Malaysia Automotive Remanufacturing Road Map
5. Development of Automotive ATF Framework
6. Malaysia Automotive Bumiputera Development Road Map.

The development of the automotive ATF framework refers to ELV recycling. NAP 2014 will promulgate policies to introduce ELV regimes that will be supported by ATFs to enable ELV processing. NAP 2014 will promote regulations that drive 'Extended Producer Responsibility' and '4R' practices that substantially decrease the final 'waste' of a product by improving product design and through the 4Rs of 'Reduce, Reuse, Recycle and Remanufacture'. The Scientific and Industrial Research Institute of Malaysia (SIRIM) is also developing ELV standards. ELV standards will consist of general matters, hazardous wastes, dismantling, and 3R. Detailed discussions on ELV recycling schemes are also being considered by MITI.

Country :	Malaysia

Figure A-IV.7: Development of Automotive Authorised Treatment Facilities (ATF) Framework

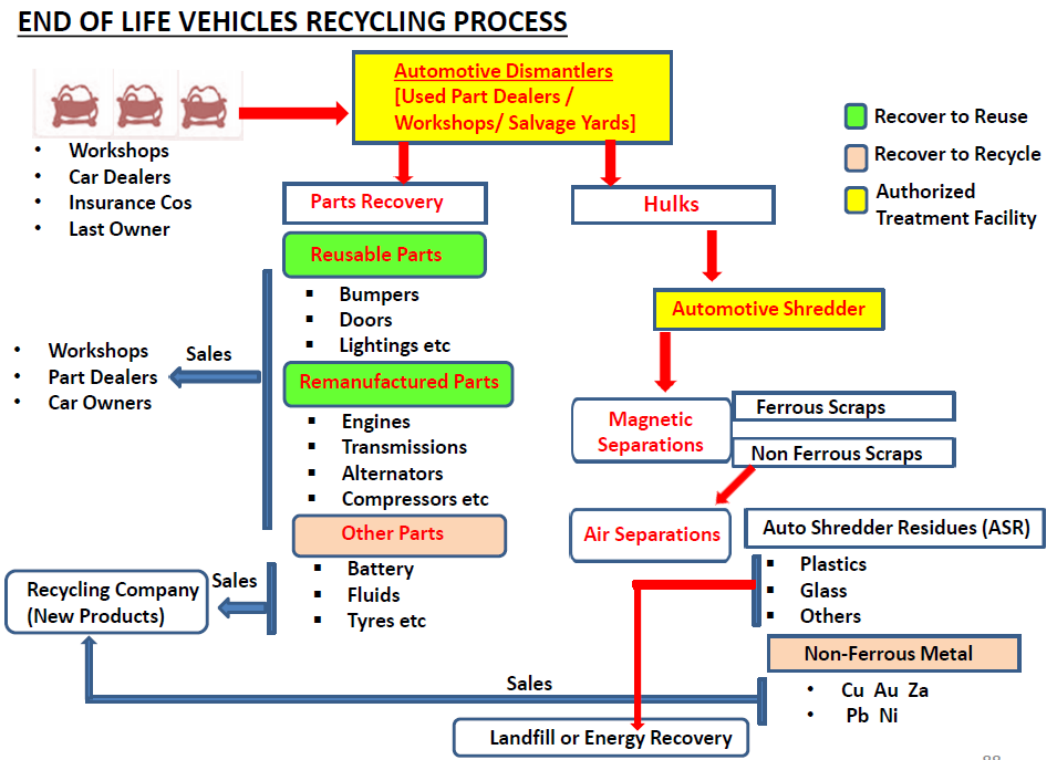


AICE = Automotive Industry Certification Engineering, EEV = Energy Efficient Vehicle, IPC = Industry lead Professional Certification, JPK = Jabatan Pembangunan Kemahiran, NOSS = National Occupational Skills Standard, PPT = Pentauliahan Pencapaian Terdahulu, QUP = Quality Used Parts, REMAN = Remanufacturing, SLDN = Sistem Latihan Dual Nasional, STDs = Standards, VTA = Vehicle Type Approval, WMS = Workshop Management System, .

Source: Malaysia Automotive Institute (MAI).

Country :	Malaysia

Figure A-IV.8 ELV Recycling Process



Au = Gold, ELV = end-of-life vehicle, Cu = Copper, Ni = Nickel, Pb = Plumbum, Zn = Zinc.

Source: Malaysia Automotive Institute (MAI).

a) Status of institutional system collateral of improper processing of three Designated Recovery items (fluorocarbons, airbags, and ASRs)

Fluorocarbons

CFCs for air-conditioners are collected by recovery equipment and stored in gas bombs. However, CFC is released in the air during confirmation of gas leak. Hydrochlorofluorocarbon (HCFC) is not currently the target of regulation. However, the Department of Environment (DOE) is considering to include the HCFC in the target and is planning to elaborate the control plan of HCFCs.

Airbags

Currently, the proper treatment of the airbag is not regulated. However, under the road map of NAP, the airbag is designated as an automotive component which is object of 'reuse'.

Automobile Shredder Residues

Shredding and sorting plants are the new addition to the proposed Malaysian ELV recycling

system. ASRs are sent to ASR incinerators. Incineration serves two purposes in the ELV recycling system: to extract the energy; and to reduce ASR weight. The by-product is a molten slag which can be used as brick or additional ingredient in concrete while the rest, if any, is sent to landfills.

The generators of ASRs are not required to have a licence as prescribed premises for waste management from DOE. Only the receiver of ASRs (treatment or disposal and transporter provider) must have a licence as stipulated under section 18 of Environmental Quality Act.

If ASRs contain heavy metals or are contaminated with coolant, oil or grease, they are considered as scheduled wastes SW104 under the Environmental Quality (Scheduled Wastes) Regulations 2005 and are subject to the regulation.

Other

All vehicles are later sent to the dismantling facilities, which are registered with MAARA. The vehicles undergo a de-pollution stage where all fluids are drained and stored for the respective recyclers.

Battery, mercury, and other pollutant agents are removed at this stage. Finally, the vehicle will be dismantled. Useable parts are harvested and enter the used spare parts market. Unusable or heavily damaged parts will be sorted according to their respective material. These will be sold to recyclers. Parts which cannot be sold or recycled will be sent for disposal.

b) Demarcation of roles (obligation and economic burden) among production officers (manufacturers and importers), related operators, vehicle users and government agencies (including local governments)

The current roles and responsibilities of stakeholders of the automotive industry are as follows:

- Importers
  - Required to apply for import permit and clearance; subject to Customs formalities (documents, fees, among others) and import tariffs
- Manufacturers
  - Subject to excise tax; manufacturing licence (for luxury cars and hybrid/electric vehicle manufacturers); technical design and safety standards for vehicles and vehicle parts; vehicle type approval
- Users
  - Compliance with road transport regulations (e.g. Road Transport Act 1987)

Country :	Malaysia

- Government Agencies
  - Ministry of International Trade and Industry (MITI) – issuance of vehicle import permit
  - Road Transport Department – in charge of vehicle type approval and enforcing road transport regulations
  - Department of Environment – in charge of control of the scheduled wastes stipulated in the Environmental Quality (Scheduled Wastes) Regulations.

In implementing NAP 2014, the current roles and responsibilities are suggested by MAI:

- Government's Responsibility
  - Establishing and revising policies and technical standards
  - Strategic development, planning of automobile industry
- Manufacturers' Responsibility
  - Recovery and treatment of products and packages
  - ELV treatment approval management system

Core Summary of ELV and Extended Producer Responsibility requirements:

- Restrictions on the use of certain heavy metals in vehicle and component manufacture
- Design for Dismantle-ability / Recyclability
- Marking of certain rubber and plastic vehicle components
- Publication of design and dismantling information
- Introduction of a Certificate of Destruction
- 'Free take-back' of vehicles put on the market by OEMs
- Licensing of Authorised Treatment Facilities, and the site and operating standards with which they must comply

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Country :	Malaysia

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(3) Presence or absence of environmental regulations (such as landfill and incineration ban, and heavy metals use ban)

Malaysia is in the early stage of the ELV recycling system and considering ELV recycling regulations. The following regulations stipulate general waste management in Malaysia.

DOE is in charge of the control of the scheduled wastes stipulated in the Environmental Quality (Scheduled Wastes) Regulations. The Hazardous Substances Division under DOE is responsible for the disposal of scheduled wastes, licensing, processing of the import/export of scheduled wastes under the Basel Convention, and examination of related documents. The application for licence is handled by the state office of DOE and the final approval is conducted by the Director General of DOE. The application fee is RM300.

Under section 45 of Environmental Quality Act 1974, the person committing the offence under the Act or the regulations should be liable to a fine not exceeding RM2,000.

Environmental Quality Act 1974 is the basic law for environmental issues. The Act deals with industrial effluents, air pollution, and soil contamination caused by the industrial activities. Waste management is also mentioned in the law. The law was revised in 1985, 1996, 2000, and 2001.

Environmental Quality (Scheduled Wastes) Regulations 1989/2005 prescribes the type of scheduled waste and the responsibilities of waste generators. The Waste Electrical and Electronic Equipment (WEEE) and waste containing dioxins were added to the list of scheduled wastes in the 2005 revision. The regulations designate 'Prescribed Premises' authorised by the Director General of DOE as the final disposal sites of scheduled wastes. Waste generators are required to take the wastes to the prescribed premises.

Environmental Quality (Scheduled Wastes Treatment and Disposal Facilities) Order 1989

prescribes the type of waste treatment and disposal facilities and licence.

Environmental Quality (Scheduled Wastes Treatment and Disposal Facilities) Regulations, 1989 also prescribes the procedures and obligations of owners of facilities to inform the amount of waste accepted, treated, stored, and disposed.

The following items refer to ELV wastes.

Table A-IV.16: Designated Wastes under Environmental Quality (Scheduled Wastes) Regulations 2005

Code	Scheduled Wastes
SW 1	Metal and metal-bearing wastes
SW 102	Waste of lead acid batteries in whole or crushed form
SW 103	Waste of batteries containing cadmium and nickel or mercury or lithium
SW 104	Dust, slag, dross or ash containing arsenic, mercury, lead, cadmium, chromium, nickel, copper, vanadium, beryllium, antimony, tellurium, thallium or selenium excluding slag from iron and steel factory
SW 2	Wastes containing principally inorganic constituents which may contain metals and organic materials
SW 202	Waste catalysts
SW 206	Spent inorganic acids
SW 3	Wastes containing principally organic constituents which may contain metals
SW 305	Spent lubricating oil
SW 306	Spent hydraulic oil
SW 311	Waste oil or oily sludge
SW 312	Oily residue from automotive workshop, service station, oil or grease interceptor
SW 323	Waste of halogenated organic solvents

Source: Environmental Quality (Scheduled Wastes) Regulations 2005.

Country :	Malaysia

References

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http://www.env.go.jp/earth/coop/oemjc/malay/j/malayj1.pdf (accessed September 2015).

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Annex II

Country Reports

5. Mongolia

Country：	Mongolia

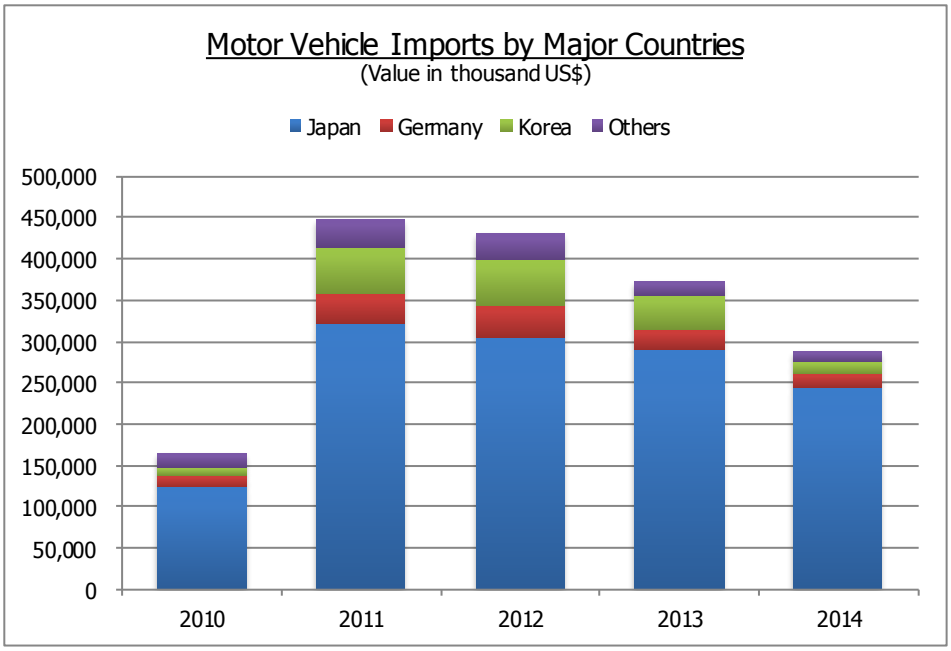
1. Current status of automobile recycling in the targeted country

(1) Import and export situation from Japan and other countries: used cars

Import

The following graph depicts Mongolia's automobile imports, including used cars, for 2010-2014. The big supplier during this period was Japan. The total import in value was nearly US$300 million in 2014.

Figure A-V.1: Mongolia's Automobile Imports



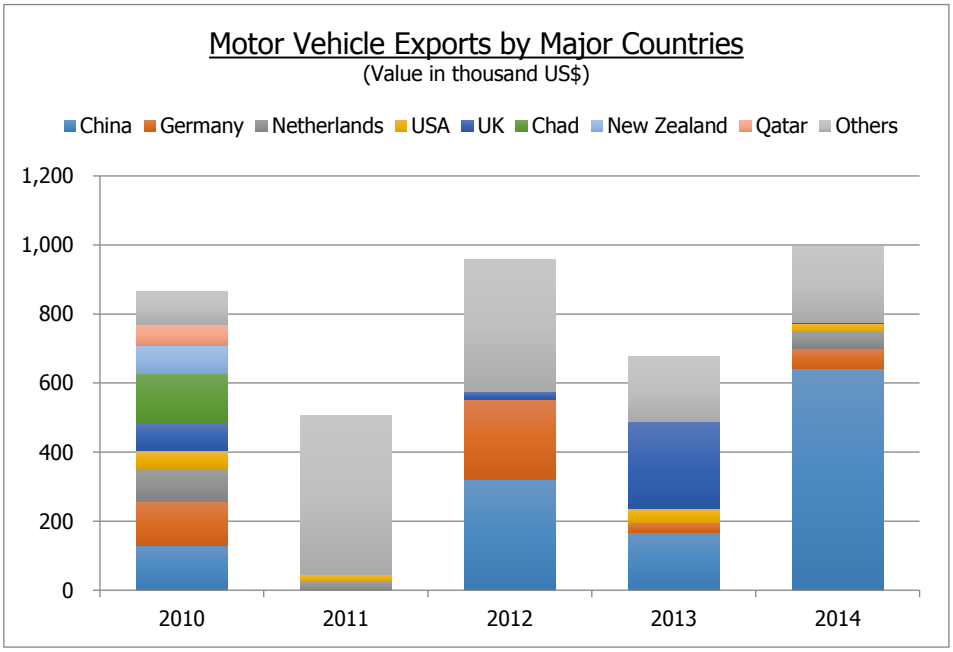
Source: UN Comtrade Database.

Export

The volume of export of motor vehicles from Mongolia was smaller than that of its import volume. Destinations of the vehicles were varied in 2010, as indicated in the following figure. However, from 2014, the presence of China as a destination country became predominant.

Country :	Mongolia

Figure A-V.2: Mongolia's Automobile Exports



UK = United Kingdom, USA = United States of America.

Source: UN Comtrade Database.

Reference

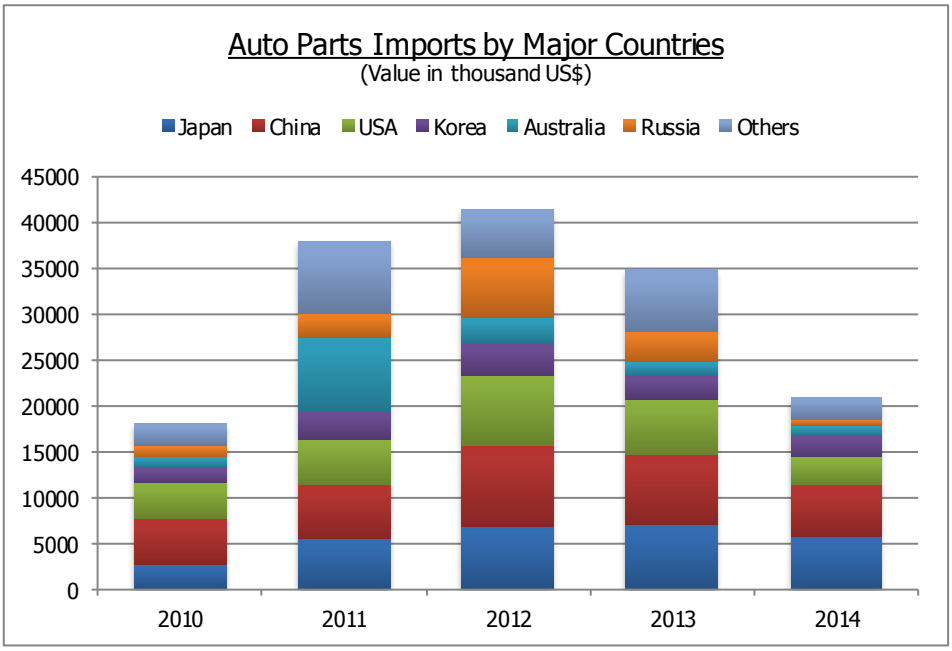
United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(2) Imports and exports from Japan and other countries: used parts

The two graphs below show major importers and exporters of auto parts, including used parts, for 2010-2014.

Country :	Mongolia

Figure A-V.3: Mongolia's Automobile Auto Parts Imports

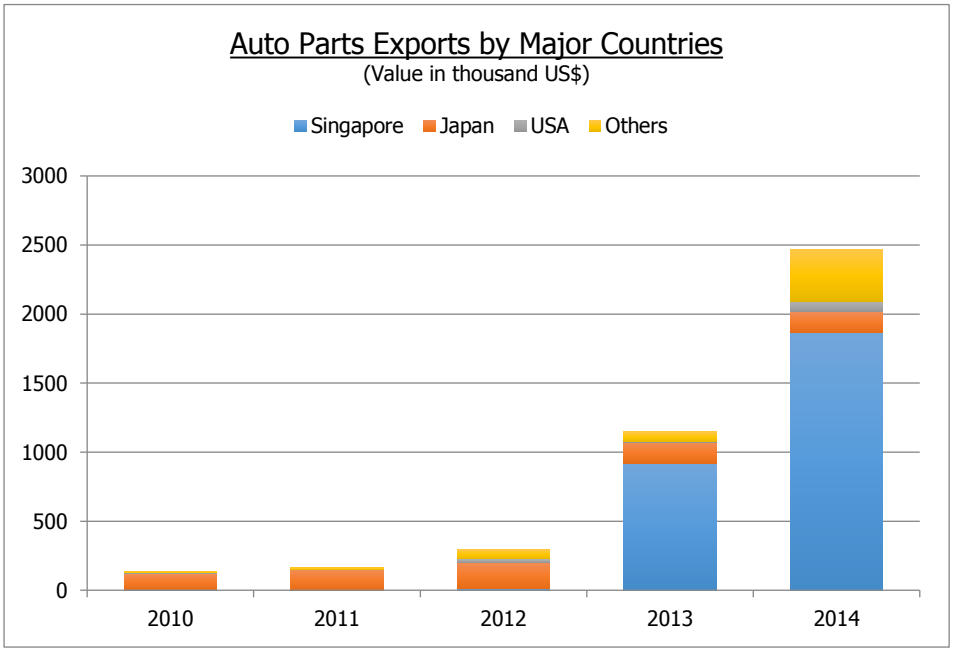


USA = United States of America.

Source: UN Comtrade Database.

Country :	Mongolia

Figure A-V.4: Mongolia's Automobile Auto Parts Exports



USA = United States of America.

Source: UN Comtrade Database.

Reference

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(3) Plans and regulations relating to import regulations

Trade Control

Documents Required

- Original Purchase Invoice
- Certificate of Title
- OBL (Ocean Bill of Lading)–

Country：	Mongolia

- List of features (manufacture, make, model, type, volumetric capacity of the engine, engine number, chassis number, fuel type, among others)

Specific Information

- Duties and taxes on the imported vehicle are to be paid. The calculations are as follows:
  - Value of the vehicle
  - Invoice price of the vehicle + freight cost + other costs
  - Duties – 5 percent of the value of the vehicle
  - Excise tax (passenger vehicles only)
  - VAT – 10 percent of the vehicle (value + duties + excise Tax)
  - Payable fee MNT7,000.

There is no importation ban on old/used vehicles in Mongolia.

Duties and Taxes

The importation of cars is subject to a standard 5 percent Customs duty and 10 percent VAT, but special excise duty is also imposed on cars based on engine capacity and year passed since manufacturing. Older and bigger cars are charged higher excise duties.

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Country：	Mongolia

Mongolian Customs Webpage. http://www.customs.gov.mn/en/2012-03-14-03-21-37/trf (accessed September 2015).

(4) Plans and regulations relating to vehicle registration

New Car Registration

The vehicle's registration number should be recorded at the State Safety Road Traffic Control Authority of Mongolia.

The Department of Auto Transport released reports that about 150-300 new private vehicles are granted licence plate numbers every day. Around 63 percent of vehicles in the country were registered and run in Ulaanbaatar (UB) city. Also, 70 percent of registered vehicles are over 10 years.

Inspection

People purchasing cars should get technical inspections before they purchase cars to ensure the integrity, serial number, manufacture date, and commissioned time period. These should match the documents. In some cases, an automobile's serial number, date of manufacture, and import dates are different. Due to these circumstances, many have suffered.

Public transportation vehicles must be inspected twice a year while others must be inspected once a year. Depending on the month that owners of vehicles had the inspection, they have to have another inspection around the same time the following year. According to the law, if vehicle owners are unable to get an inspection within the time period, they will be fined MNT5,000 to MNT30,000; officials will be fined MNT30,000 to MNT60,000; and business entities and organizations will be fined MNT100,000 to MNT250,000.

Through the project conducted by World Bank and Nordic Development Fund, 24 vehicle diagnostic inspection centres were established to check airbags and administrative units, and

to control emissions of vehicles and road safety requirements.

Environmental Control

The government has begun limited testing of tailpipe emissions in Ulaanbaatar. However, no comprehensive vehicle emissions standards and appropriate fuel quality standards have been established in the country. There is no legislation in Mongolia that sets the country's fuel standards. Leaded gasoline is still being sold in Mongolia's market.

Other

Owners are obliged to pay an annual tax (air pollution fee and vehicle excise duty) on transport facilities and vehicles once during the state technical inspection.

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Country：	Mongolia

(5) Handling of imported used cars and/or accident status quo cars

Imported Used Cars

No specific inspection is required of used imported vehicles in Mongolia. However, cars imported from Japan are checked for radiation.

There is no limit on the age of vehicles imported to Mongolia.

Cars are taxed according to their age as well as their engine size. Cars less than three years old have the lowest tax, followed by cars less than 10 years old. The Mongolian tax rate is the highest after 10 years.

Table A-V.1: Excise Duty Based on Age and Engine Size of Vehicle

Vehicle Engine (Cylinder) Capacity /in Cubic Centimetres or cc/	The Excise Duty /in USD manufactured year			
	0-3 years	4-6 years	7-9 years	10 years and over
1500 or under	500	1000	2000	6000
1501 -2500	1500	2000	3000	7000
2501 -3500	2000	2500	4000	8000
3501-4500	4500	5000	6500	10500
4501 and over	7000	7500	9000	13000

Source: Mongolian Customs.

Other

No formal recycling activity is performed on used cars after taking out usable parts but there is a plan to build a car recycling centre in Emeelt which has the capacity to recycle 50,000 cars per year.

Country：	Mongolia

References

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Annex II

Country Reports

6. Myanmar

Country：	Myanmar

1. Current status of automobile recycling in the targeted country

(1) Imports and exports from Japan and other countries: used cars

In Myanmar, the Central Statistical Office (CSO) is the sole national statistics organisation under the Ministry of National Planning and Economic Development which is in charge of compiling various data from both public and private sectors. However, only the 2010 trading data is available from site as of September 2015. Therefore, the trend analysis was carried out based on mirror data which was reported by its trading partners to the United Nations Statistics Division.

Trading

Below is a brief history of Myanmar's regulations on passenger cars:

Before 1998

Western countries applied sanctions against Myanmar, banning car imports.

1998 - 2010

Imported cars were only available for government authorities, national government organisations, and foreign embassies in Myanmar. Importation of commercial vehicles was strictly controlled. Importation for commercial purposes was not allowed.

2010 - September 2011

Importation for commercial purposes was allowed for: trucks over three tons, passenger buses with more than 15 seats, and heavy equipment.

September 2011 - May 2012

Country：	Myanmar

The Old Car Substitution Program allowed application of permits for importing cars to replace older cars (20 - 40 years old) for newer models that were manufactured after 1995.

May 2012 - May 2013

Any Myanmar citizen aged 18 years old and older were allowed one passenger car under his/her own name (for personal use only). Meanwhile, imported passenger cars for commercial purposes were still limited.

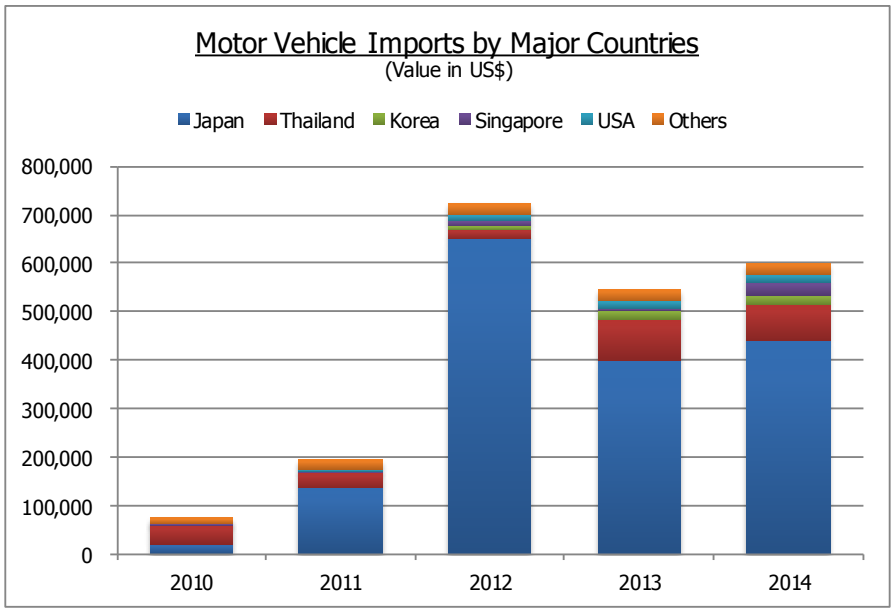
May 2013 -

The government allows individuals or companies to import light trucks less than three tons, lifting limits on imports of any kind of commercial vehicle for commercial purpose.

The cumulative bar graphs below show Myanmar's automobile (HS code: 8703) imports/exports, including used cars, for 2010-2014. Since September 2011, a system called the *Old Car Substitution Program* promoted the giving back of an old vehicle to get a new one has started. This has led to an increased activity in the country's car market. Vehicle import value in 2012 grew more than three times to US$700 thousand from a year ealier. In July 2012, the government gave the green light to allow individuals to import cars produced in 2007 and after. Myanmar's car market is currently dominated by used cars, mostly imported from Japan. As shown in the chart, Japan's share since the 2011 relaxation of import permits has been more than 75 percent on average. The number of cars imported into Myanmar in 2014 was 109,903 in total. Of those, 102,212 units were from Japan. According to Solidiandce consulting firm, passenger cars in total registered until July 2013 was 318,397 and commercial vehicles registered until July 2013 was 117,842.

Country :	Myanmar

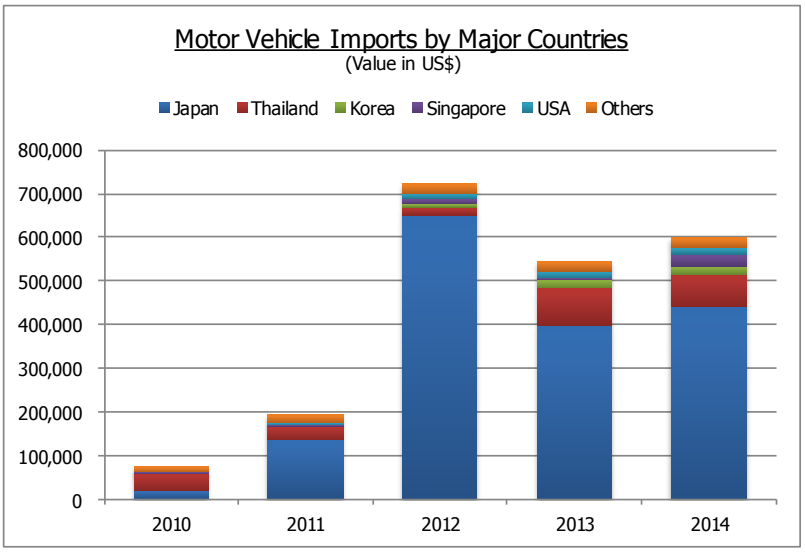
Figure A.VI-1: Myanmar's Automobile Imports (Mirror)



USA = United States of America.

Source: United Nations Statistics Division.

Figure A.VI-2: Myanmar's Automobile Exports (Mirror)



USA = United States of America.

Source: United Nations Statistics Division.

Country :	Myanmar

No specific trend in exports can be observed from the statistics.

Table A.VI-1: Number of Used Passenger Motor Cars Exported from Japan

Year	2010	2011	2012	2013	2014
Myanmar	4,503	16,822	93,044	77,697	101,766
World	672,627	699,881	830,703	947,990	1,059,617
Share of Myanmar	0.67%	2.40%	11.20%	8.20%	9.60%

Source: Trade Statistics of Japan, Ministry of Finance.

References

Trade Statistics of Japan Ministry of Finance. http://www.customs.go.jp/ (accessed September 2015).

United Nations Statistics Division. http://unstats.un.org/unsd/default.htm (accessed September 2015).

Yano Research Institute. *ASEAN Automobile Recycling 2014*.

(2) Imports and exports from Japan and other countries: used parts

The two tables below show imports/exports of auto parts (HS code: 8707 - 8708), including used parts, for 2010-2014 based on mirror data. As for imports, China has been the largest exporter during the period, accounting for 70 percent on average, followed by Thailand and Singapore.

Country：	Myanmar

Table A.VI-2: Auto Parts Import Value in thousand US$ (Mirror)

Year	2010	2011	2012	2013	2014
Import Value	42,883	107,325	98,596	151,309	151,601

Source: United Nations Statistics Division.

Table A.VI-3: Auto Parts Export Value in thousand US$ (Mirror)

Year	2010	2011	2012	2013	2014
Export Value	0	1,154	1,346	47	539

Source: United Nations Statistics Division.

References

United Nations Statistics Division. http://unstats.un.org/unsd/default.htm (accessed September 2015).

Yano Research Institute, *ASEAN Automobile Recycling 2014.*

(3) Plans and regulations relating to import regulations

Trade Control

When importing a used or new Japanese car to Myanmar, the importer must obtain an import licence from authorities in Myanmar. Government issues a very specific import licence for a vehicle of a certain age and type. This licence will state all vehicle details.

Documents required to import a vehicle into Myanmar include copy of certificate of title and registration, import permit, and proof of ownership.

Country :	Myanmar

Duties and Taxes

Only a diplomat may import a vehicle into Myanmar duty free. Private individuals are prohibited from importing a vehicle. Duty will be assessed at approximately 300 percent of the new value of the vehicle. All automobiles must be left-hand drive.

Table A.VI-4: Duties and Taxes for Automobile Parts

Bodies, parts and accessories of the motor vehicles	HS code	Unit	Import Rate
Bodies (including cabs), for the motor vehicles of headings 87.01 to 87.05.			
- For the vehicles of heading 87.03:	8707.10	Kg	1 - 5%
- Other:	8707.90	Kg	1 - 5%
Parts and accessories of the motor vehicles of headings 87.01 to 87.05.			
- Bumpers and parts thereof:	8708.10	Kg	1 - 5%
- Other parts and accessories of bodies (including cabs):	8708.20	Kg	1 - 5%
- Brakes and servo brakes; parts thereof:	8708.30	Kg	1 - 5%
- Gear boxes and parts thereof:	8708.40	Kg	1 - 5%
- Drive axles with differential, whether or not provided with other transmission components, and non-driving axles; parts thereof:	8708.50	Kg	1 - 5%
- Road wheels and parts and accessories thereof:	8708.70	Kg	1 - 5%
- Suspension systems and parts thereof (including shock absorbers):	8708.80	Kg	1 - 5%
- Other parts and accessories:	8708.90	Kg	1 - 5%

HS = Harmonised system, kg = kilogram.

Source: Myanmar Customs Department.

Country：	Myanmar

References

Japan Trade Car.com. http://www.japantradecar.com/info/Import_Regulations/Myanmar%28Burma%29.aspx (accessed September 2015).

Myanmar Visa Centre. http://myanmarvisa.org/customs-regulations.html (accessed September 2015).

Atlas International. *Importing Personal Property Into Burma (Myanmar).* http://webportal.atlasintl.com/Customs%20Docs/Myanmar.pdf (accessed September 2015).

Myanmar Customs Department. http://www.myanmarcustoms.gov.mm/ (accessed September 2015).

(4) Plans and regulations relating to vehicle registration

In Myanmar, the Road Transport Administration Department under the Ministry of Rail Transportation is in charge of new car registration, transfer or selling of licence, re-registration and deregistration of vehicles under the Motor Vehicle Law 1964, amended in 1989, and Motor Vehicle Rules 1989.

New Car Registration

Every new vehicle is required to be registered but each procedure differs, depending on what kind of car is owned or where that car came from. Registration fee, inspection fee, compulsory insurance, and imported car fee (if necessary) need to be paid for this type of registration. The regsitration application should be submitted to the Road Transport Administration Department.

Car owners need to renew their registration every year.

Transfer or Selling of Licence

People in Myanmar can change the contents of their registration by applying to the vehicle registration's bureau. This is not commonly done because it requires a registration certificate

from the original owner of the vehicle and the payment of revision fees.

Deregistration

If a car owner sends an ELV to a Myanmar Economic Corporation (MEC) factory, the owner can receive a licence to import a new used car. This system works like deregistration.

There is also a system that automatically deregisters a vehicle if the renewal of registration is not done for five years.

Inspection

Automobile inspection is mandatory in Myanmar and owners need to take their vehicles for initial inspection, renewal inspection, and transfer inspection. Renewal inspections are done every year.

These inspections are conducted in 53 inspection places supervised by the Road Transport Administration Department. Usually, inspection places are located right beside vehicle registration bureaus and people are able to take inspections and renew their registrations at the same place for a cost of about MMK20,000-MMK30,000.

The road transportation bureau is thinking of delegating this inspection work to private enterprises with adequate facilities and technologies.

Tax

Vehicle owners are required to pay a vehicle registration fee with the Road Transport Administration Department under the Ministry of Rail Transportation.

Table A.VI-5: Automobile Inspection and Registration Fees in Myanmar

Vehicle Types	Validity (Year)	Inspection Fee (kyat)		Registration Fee (kyat)	
		Owned by Departments	Private	Owned by Departments	Private
Motorcycle	2	200	4,500	500	9,000
Three-wheelers	2	-	4,500	-	9,000
Small-sized vehicle (private)	1	200	4,500	500	9,000
Large-sized vehicle (private)	1	200	4,500	1,000	13,500
Small-sized vehicle (business-use)	1	-	4,500	-	9,000
Large-sized vehicle (business-use)	1	-	4,500	-	13,500

Source: Road Transport Administration Department.

Country：	Myanmar

Table A.VI-6: Automobile Renewal Registration Fee in Myanmar

Vehicles Type	Validity (Year)	Fee (kyat)
Motorcycle	2	500
Small-size vehicle (private)	1	500
Small-size vehicle (business-use)	1	1,000
Large-size vehicle (private)	1	1,000
Large-size vehicle (business-use)	1	2,000
Heavy-size vehicle (private)	1	2,000
Heavy-size vehicle (business-use)	1	4,000
Trawlergi / Tractor (private)	1	500
Trawlergi / Tractor (business-use)	1	1,000
Farm truck (private)	1	1,000
Farm truck (business-use)	1	2,000

Source: Road Transport Administration Department.

Insurance

All drivers must have compulsory insurance and they are prohibited from using their cars on public roads if they do not have this insurance.

References

Ministry of Economy, Trade and Industry, Japan. Final Report on Feasibility Study of vehicle registration and inspection infrastructure in Myanmar. http://www.meti.go.jp/meti_lib/report/2014fy/E004186.pdf (accessed September 2015).

The Road Transport Administration Department. http://www.myanmarrtad.com/?q=en/content/87 (accessed September 2015).

Yano Research Institute. ASEAN Automobile Recycling 2014.

(5) Handling of imported used cars and/or accident status quo cars

The importation of commodities in Myanmar requires an import licence. Import licences are issued for used cars in case the previous car is dismantled or was opened in a foreign currency account. MEC has two ELV dismantling sites. Car owners bring their ELVs to these sites to get a

new licence to import a used car.

There are cases when vehicles owned by the military or a government department are sold at auctions. Vehicles purchased at auctions should be re-registered according to the registration process.

References

Field Survey of the Study Team.

The Road Transport Administration Department.

http://www.myanmarrtad.com/?q=en/article/66 (accessed September 2015).

(6) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: end-of-life vehicle

Volume

Total number of ELVs was estimated at 6,000 in 2014. The table below shows Yano Research Institute's estimates of the number of ELVs.

Table A.VI-7: Forecast of the Number of ELVs in Myanmar

Year	2013	2014	2015	2016	2017	2018	2019	2020
No. of ELVs	47,400	45,000	45,000	45,000	30,000	5,000	5,000	5,000

Source: Yano Research Institute.

Model Years

In Myanmar, the owner of a car that is 20 years old or over is entitled to have an import permit.

Country：	Myanmar

Distribution, Flow and Processing Situation

The disposal of ELVs is controlled and metals are collected by the government. The Ministry of Industry in Myanmar does not own any recycling facility for non-ferrous valuable metals so these metals are not supposed to be collected there.

Because of the replacement program announced by the Myanmar Government in 2011, there is an overwhelming amount of cars (making a 3-kilometre line) waiting to be scrapped in scrapped car plants. Before sending an ELV to a dismantling facility, the car owner requests the informal sector to take off the used parts. Brokers come to buy the used parts from car owners.

The researchers of this study could not get much information from the scrapped car plants because they are operated and supervised by MEC, which is a corporation under the Myanmar Government. However, according to the dealer in Yangon City, there are used parts dealing within the plant as well, which is making the process slower. Thus, not many cars are processed every day.

Sales Prices

According to a local person in Myanmar, a used car is sold at about MMK3,000,000 in case its brand new equivalent price is about MMK25,000,000. The study team was not able to ascertain the purchase price of ELVs.

References

Field Survey of the Study Team.

Y ano Research Institute. *ASEAN Automobile Recycling 2014.*

Country：	Myanmar

(7) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: recycled parts

Distribution

Around Yadana Street, there are areas where comparatively large-scaled parts stores gather. Other than that, there are some small-scale parts stores in districts such as Bayinnaung market.

Flow

Many of the recycled parts are imported from Malaysia and Thailand. Since Malaysia and Myanmar do have a land border, some of the items are imported from there via Thailand. Moreover, because the majority of cars in Myanmar are Japanese cars, many recycled parts are for Japanese cars, which explains why they often have the user's manual in Japanese. However, there are also engines imported from Dubai and Indian dealers import their parts from India. From this, we could draw a conclusion that parts store have their own way of buying parts, depending on their races and connections.

One of the places where those sold used parts end up is Ahlone District. This is where many maintenance service dealers from Yangon City gather and fix cars that are brought in.

Tamwe used car parts market deals with mainly imported used parts. The importation of half-cuts is prohibited. However, some shops import them illegally.

Japanese used parts dealers have a local storage and shop in Yangon. The importation of half-cuts is not allowed and, therefore, used parts such as used engines, transmissions, body parts, among others, are imported from Japan. Engines and transmissions are not sold as many as in other countries.

Normally, local used parts companies do not provide a guaranty for their quality. However, in some cases, foreign companies provide guarantees.

In addition to used parts, there are imitation parts in Myanmar that are mainly imported from China. Generally, in Myanmar, majority of used parts are imported. The domestic generation of used parts is scarce.

Country：	Myanmar

Model Years

Stores from Yadana area deal with parts made between 1988-2005.

Sales Prices

In Yadana area, used engines are sold at, for example, $450 for Toyota Probox, $1,000 for Toyota Vitz.

Doors are sold at approximately MMK50,000 for Toyota Probox (MMK80,000 with window glasses). Japanese used front lights (set of two for left and right) are approximately MMK200,000. However, there are some new imitation parts imported from China and they are about MMK35,000 each, which is quite cheaper compared to the used Japanese ones.

Industry Association

The Myanmar Automobile Manufacturers and Distributors Association (MAMDA) is an industry association that has a lot of used parts dealer members. The association was established under the Chamber of Commerce in Yangon. The association regularly sends its staff to Japan to participate in automobile repair workshops.

References

Field Survey of the Study Team.

Yano Research Institute, *ASEAN Automobile Recycling 2014.*

(8) Volume, distribution, flow, model years, sales prices, processing situation, items on trading and resources: steel and non-ferrous metals

Based on an interview conducted by the study team, Myanmar imports about 200 million tons of steel products annually. For instance, the flat products circulated in Myanmar are imported from Ukraine and India. In addition to those imported products, there are also domestic products. However, they are of low quality and are the least expensive.

In the steel scrap market, steel scrap is traded at about MMK300,000 per ton.

Country :	Myanmar

Scrapped cars taken to Myingyen are taken to an iron factory supervised by the Ministry of Technology and put into the electric furnace. This iron factory is temporarily stopping its work but it is estimated that the factory can deal with about 20 tons of iron annually.

Although irons are recycled under the strict control of the ministry, it seems that many other valuable metals are not recycled at all. In fact, there are no government-related facilities for copper and aluminum recycling. During the field survey, the study team heard that there was a copper recycling factory, but this information was not confirmed during the visit. Moreover, many people were not even aware that there were rare metals in mufflers and the mufflers were put inside the electric oven with other scrapped parts as iron scrap. Although rare metals might not be used in old models of cars made in Myanmar, if the same process were to be conducted in the future, this could become an enormous loss of resource.

References

Field Survey of the Study Team.

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(9) Distribution volume, flow, model years, sale prices, and processing methods during dismantling (batteries, tires, and waste fluids, among others)

There is a pioneer industrial lead smelter in Myanmar, the Yangon Metal Industry Company Limited (YMI). They produce 99.9 percent pure lead and other various lead alloys, antimony, and calcium for industrial applications. Every day, they take deliveries of used batteries, lead scraps, and other lead wastes from our collection points, which are then sorted, smelted, and refined into quality lead products for their industrial partners.

There are informal sector recyclers in Yangon that turn discarded tires into flip-flops, buckets, and hard-to-find spare parts for used cars. Old truck tires are transformed into rubber washers and bushings for cars and rice mills. There are around 300,000 cars on the road that are mostly second-hand and are in need of rubber bushings and washers.

Country：	Myanmar

References

Fox News.com. *Making everything from flip-flops to buckets, Myanmar tire recyclers unfazed by modernization.* http://www.foxnews.com/world/2014/07/09/making-everything-from-flip-flops-to-buckets-myanmar-tire-recyclers-unfazed-by/ (accessed September 2015).

Yangon Metal webpage. http://yangonmetal.com/company/ (accessed September 2015).

Yano Research Institute, *ASEAN Automobile Recycling 2014.*

(10) Factual survey of end-of-life two-wheeled vehicles

The study team could not acquire the information on end-of-life motorcycles in this study.

Reference

Field Survey of the Study Team.

(11) Type of operation and number of recycling-related companies

Dismantlers

As previously mentioned, the dismantling of ELVs is operated and supervised by MEC, which is a corporation under the Myanmar Government. MEC launched two ELV dismantling plants in Myanmar. Before sending ELVs to the dismantling facility of MEC, car owners request the informal sector to take out used parts. Brokers come to buy these used parts from car owners. In this case, recycling is mainly conducted by hand. Waste is finally sold to the recycling facility.

On the other hand, household waste collectors and waste pickers collect the waste product and sell it to the wholesalers, sometimes through brokers. Wholesalers sell these to the recycling facilities.

Country：	Myanmar

Other Related Companies

Battery:

As previously mentioned, Myanmar has a pioneer industrial lead smelter, the Yangon Metal Industry Company Limited (YMI). They produce 99.9 percent pure lead and other various lead alloys, antimony, and calcium for industrial applications.

References

Field Survey of the Study Team.

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(12) Management situation of recycling-related companies

The study team interviewed a number of employees of the local recycling company. Revenue varies depending on the size and domain of business.

Reference

Field Survey of the Study Team.

2. Current challenges and considerations in automobile recycling laws and institutional systems in vehicle recycling

(1) Challenges in the vehicle recycling system (illegal dumping, inappropriate processing of waste, stringent situations at final disposal sites, dismantling technology, safety, efficiency, and recycling rates)

The informal sector dismantles components and scrap of vehicles and circulated these through the informal route. Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity. Capacity building is required for the proper operation of facilities. The automotive scrap volume required to promote ELV recycling is insufficient. Regarding downstream recycling, there is a difficulty in steel production because of insufficient and

Country：	Myanmar

unstable electricity. Appropriate infrastructure like stable electricity is required for sustainable operation. Also, environmental measures such as prohibition on illegal dumping of waste and collection of CFCs and the like are insufficient.

Used parts are illegally imported from other countries. Imported used parts cause environmental pollution due to the lack of environmental measures from import dealers. Remanufacturing parts are not popular due to the lack of awareness of parts dealers and their low quality.

Non-valuable resources are not properly collected and, in some cases, illegally dumped. Metallic component recycling is done manually. This causes labour safety issues. The quality control of steel production is required to promote metal recycling by separating the plastic during the burning. Standards for steel products are also required. Valuable metals such as copper and aluminum are not utilised due to the lack of government-related facilities for copper and aluminum recycling.

The emission of hazardous wastes from components such as batteries, plastics, and waste oils cause environmental problems such as waste accumulation. Metallic component recycling is done manually. This also causes labour safety issues.

The Myanmar Government does not hold a recycling facility for valuable metals such as rare metals, coals, and aluminum which might turn out as an enormous loss in the future.

Furthermore, since the release of the replacement program for scrapped cars by the government in 2011, people had been rushing to get their scrapped car certificate as well as car importing licence. The two scrapped car plants in the country are unable to handle the excessive amounts of used cars waiting in lines.

References

Field Survey of the Study Team.

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

Country :	Myanmar

(2) Trend in vehicle recycling policies and related automobile recycling laws, and the enforcement, presence, and details of related institutions.

Myanmar is in its early stages of starting the ELV recycling system. It does not have a special regulation which focuses on ELV recycling. Furthermore, there is no comprehensive regulation on waste materials.

However, Myanmar is currently in the process of revising its policies and laws on environmental protection. The Environmental Conservation Law requires the Ministry of Environmental Conservation and Forestry (MOECAF) to put in place a comprehensive waste and pollutant monitoring scheme. MOECAF has just adopted the Environmental Conservation Rules 2014 and is in the process of developing environmental quality, starting with effluent standards. The United Nations Development Porgramme is supporting the Myanmar Government in developing its National Environmental Management Framework and Action Plan.

The updated 2012 Environmental Conservation Law and related rules empower MOECAF to act as the 'gate keeper' for business activities. The law confers powers on MOECAF to regulate and establish a 'prior permission scheme' for a range of business activities that 'may cause impact on environmental quality'.

The Environmental Conservation Law is based on the 'extended polluter responsibility', with compensation for environmental impacts to be paid to a fund to be set up by MOECAF. However, the application of the principle in the ELV recycling sysytem is uncertain at this stage.

The implementation of these laws needs to be factored into new and forthcoming rules to be developed under the 2012 Environmental Conservation Law.

a) Status of institutional system collateral of improper processing of three designated recovery items (fluorocarbons, airbags, and ASRs)

The study team could not acquire information on the treatment of fluorocarbons, airbags, and ASRs in this study.

Country：	Myanmar

b) Demarcation of roles (obligation and economic burden) among production officers (manufacturers and importers), related operators, vehicle users, and government agencies (including local governments)

The regulations on the automotive industry stipulate the roles and responsibilities of stakeholders:

- Importers
    - Securing required documents for import of vehicles
    - Finishing the Customs formalities (upon certification)
- Manufacturers
    - In Myanmar, there are very few national manufacturers of automobile like Super Seven Stars. They are requested to comply with related regulations.
- Users
    - Compliance with road transport regulations (Motor Vehicle Law and Motor Vehicle Rules)
- Government Agencies
    - Ministry of Commerce (MOC) – issuance of vehicle import permit
    - Road Transport Administration Department – in charge of new car registration, transfer or selling of licence, re-registration and deregistration of vehicle
    - Environmental Conservation Department, and Ministry of Environmental Conservation and Forestry (MOECAF) – in charge of control of wastes
    - Myanmar Economic Corporation (MEC) and Ministry of Industry– in charge of control of ELVs.

Country：	Myanmar

References

Myanmar Centre for Responsible Business. http://www.myanmar-responsiblebusiness.org/pdf/SWIA/Oil-Gas/14-Environment.pdf (accessed September 2015).

(3) Presence or absence of environmental regulations (such as landfill and incineration ban, and heavy metals use ban)

Myanmar is in its early stages of starting the ELV recycling system. The regulation on waste management stipulates the general waste management in Myanmar.

The updated 2012 Environmental Conservation Law and related rules regulate the waste management in Myanmar.

The following are the waste management duties and powers of the ministry as stipulated in section 7 of the Environmental Conservation Law:

> (g) *To specify categories and classes of hazardous wastes generated from the production and use of chemicals or other hazardous substances in carrying out industry, agriculture, mineral production, sanitation and other activities;*
>
> *(h) To prescribe categories of hazardous substances that may affect significantly, at present or in the long run, the environment;*
>
> *(i) To promote and carry out the establishment of necessary factories and stations for the treatment of solid wastes, effluents and emissions which contain toxic and hazardous substances.*

However, at its current status, the development of categories and classes of hazardous wastes and hazardous substances is a challenge for policymakers.

In addition to the above-mentioned duties and powers, section 13 of the law stipulates that the ministry should maintain a comprehensive monitoring system in the following matter:

> (b*) transport, storage, use, treatment and disposal of pollutants and hazardous*

Country :	Myanmar

substances in industries;

(c) disposal of wastes come out from exploration, production and treatment of minerals, industrial mineral raw materials and gems;

(d) carrying out waste disposal and sanitation works;

Under the law, the business operator of the worksite, factory, or workshop shall submit a prior permission application to the minisrty. The ministry may grant or refuse to issue the prior permission after scrutinising if the application conforms with the law.

The responsibilities of the business operator for waste management are as follows:

Section 14: A person causing a point source of pollution shall treat, emit, discharge and deposit the substances which cause pollution in the environment in accord with stipulated environmental quality standards.

Section 15: The owner or occupier of any business, material or place which causes a point source of pollution shall install or use an on-site facility or controlling equipment in order to monitor, control, manage, reduce or eliminate environmental pollution. If it is impracticable, it shall be arranged to dispose the wastes in accord with environmentally sound methods.

The offences and penalties of the owner or occupier of the business, worksite, factory, or workshop is as follows:

Section 31: Whoever, without the prior permission, operates business, worksite, factory or workshop which is required to obtain the prior permission under this Law shall, on conviction, be punished with imprisonment for a term not exceeding three years, or with fine from a minimum of one hundred thousand kyats to a maximum of one million kyats, or with both.

Section 32: Whoever violates any prohibition contained in the rules, notifications, orders, directives and procedures issued under this Law shall, on conviction, be

Country：	Myanmar

punished with imprisonment for a term not exceeding one year, or with fine, or with both.

References

Dr. San Oo, Director, Environmental Conservation Department. *Sustainability Roadmap for Myanmar (Environment Perspective).* http://www.ifc.org/wps/wcm/connect/c71bea80471f3b458492ec57143498e5/2.1.San+Oo.pdf?MOD=AJPERES (accessed September 2015).

Hla Maung Thein, Deputy Director General, Environmental Conservation Department MOECAF. *Myanmar Environmental Conservation Law, and Status of Environmental Rules and Guidelines Preparation.* http://www.gms-eoc.org/uploads/resources/144/attachment/3a_Thein_MOECAF_Myanmar_Env_Law_and_rules.pdf (accessed September 2015).

Annex II

Country Reports

7. Pakistan

Country：	Pakistan

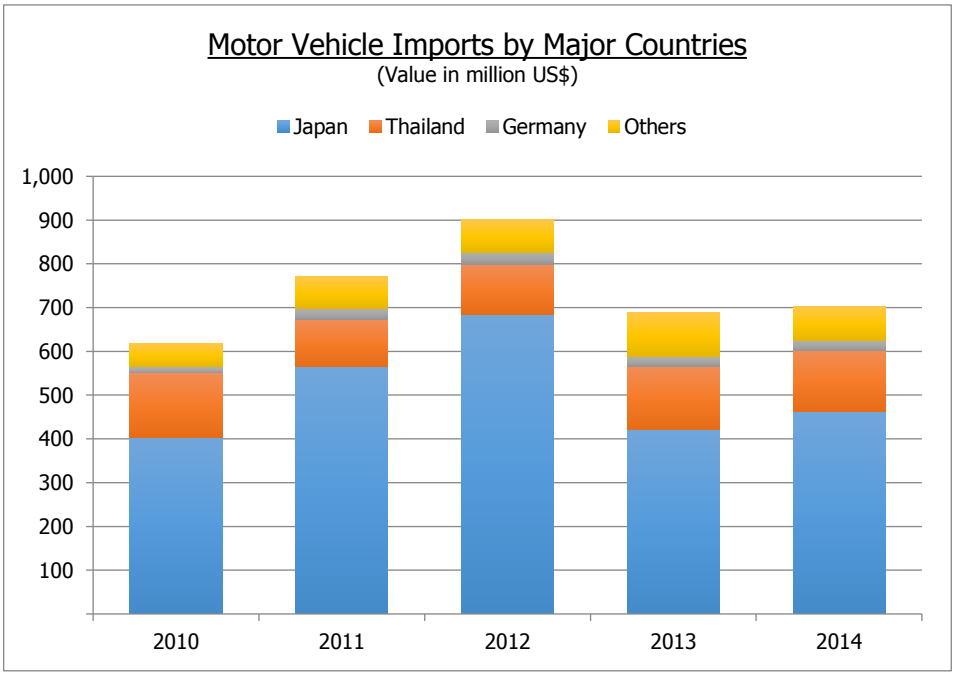
1. Current status of automobile recycling in the targeted country

(1) Imports and exports from Japan and other countries: used cars

Import

The following graph shows Pakistan's automobile imports, including used cars, for 2010-2014. The big suppliers during this period were Japan and Thailand. The total import value was over US$700 million in 2014.

Figure A.VII-1: Pakistan's Automobile Imports



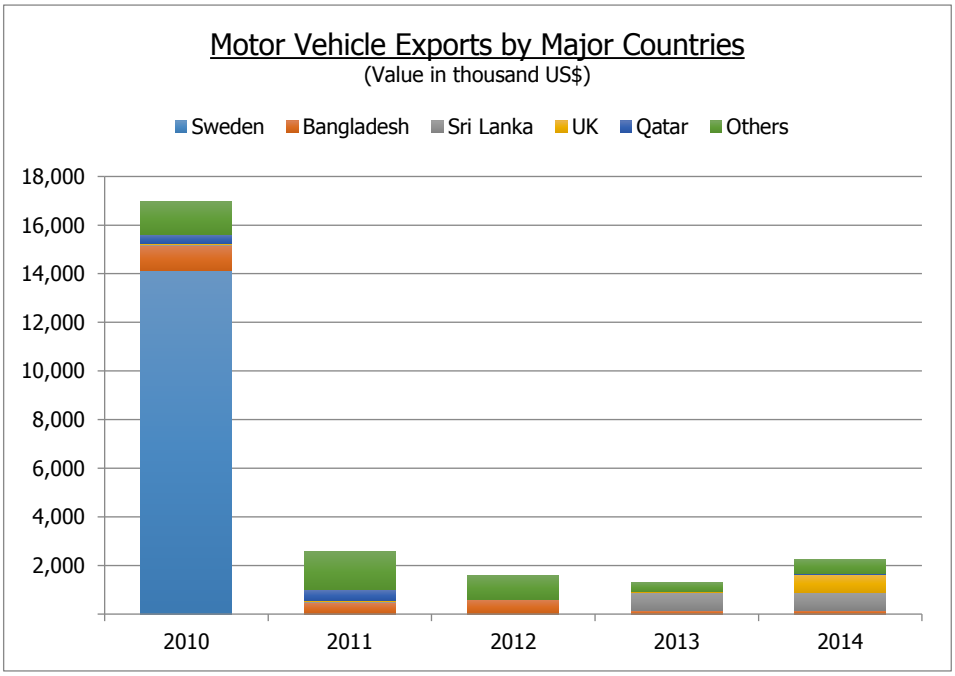
Source: UN Comtrade Database.

Country :	Pakistan

Export

The volume of export of motor vehicles from Pakistan was smaller than that of its import volume. In 2010, its vehicles' top share of destination was Sweden. However, the export of vehicles had been volatile from 2011, and it began to decline subsequently as indicated in the figure below.

Figure A.VII-2: Pakistan's Automobile Exports



Source: UN Comtrade Database.

Reference

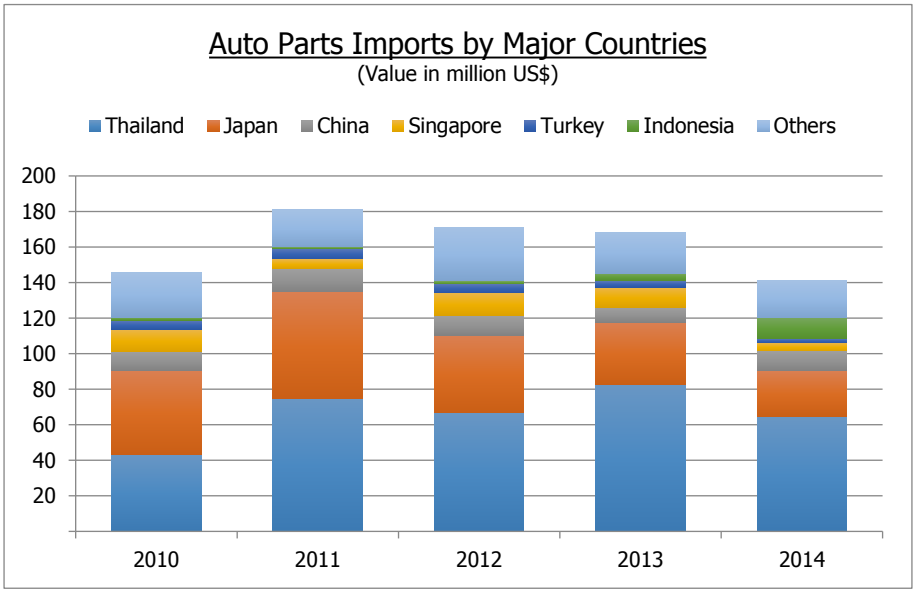
United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(2) Imports and exports from Japan and other countries: used parts

The two graphs below show major importers and exporters of auto parts, including used parts, for 2010-2014.

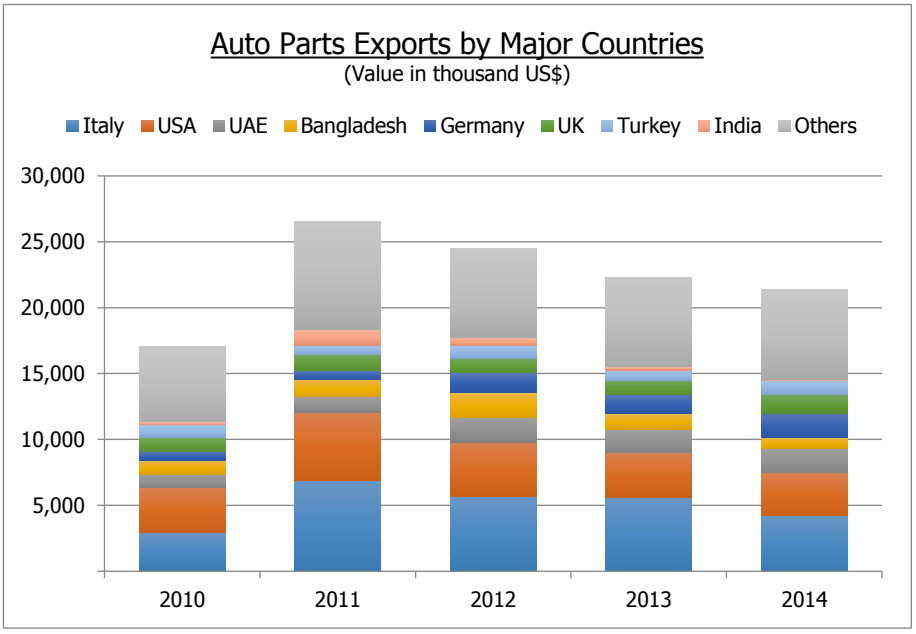
Country :	Pakistan

Figure A.VII-3: Pakistan's Auto Parts Imports



Source: UN Comtrade Database.

Figure A.VII-4: Pakistan's Auto Parts Exports



UAE = United Arab Emirates, UK = United Kingdom, USA = United States of America.

Source: UN Comtrade Database.

Country：	Pakistan

Reference

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(3) Plans and regulations relating to import regulations

Trade Control

Customs Duties:

- According to Business Monitor International, 'the general tariff regime [for commercial vehicles] in Pakistan is 20 percent on CKD buses and trucks; 60 percent on compressed natural gas (CNG) trucks; and 20 percent on CBUs for buses.' In addition, CKD bus imports have been exempted from Customs duty.

Taxes:

- A 15 percent General Sales Tax (VAT tax) is assessed on all motor vehicles (personal, commercial, CKDs, and CBUs.

Other Measures:

- Pakistan permits the importation of motor vehicles as a personal gift, or as personal baggage accompanying a returning Pakistani after residing abroad. Siblings are also now covered under the gifting scheme. The schedule of duties is listed in Appendix G of the Import Trade and Procedure Order, 2002-2003.
- The Government of Pakistan exempts diplomats, tour operators/travel agents, and privileged organisations/offices/agencies from Customs duties on the importation of certain categories of motor vehicles as defined under Customs Rules and Procedures 2002-2003.

Country：	Pakistan

Duties and Taxes

Table A.VII-1: Import Duties and Taxes for Automobile

Passenger vehicles	HS code	Unit	Import Rate
Motor cars and other motor vehicles principally designed for the transport of persons (other than those of heading 87.02), including station wagons and racing cars.			
- Other vehicles, with spark-ignition internal combustion reciprocating piston engine:	8703.20		
- - - Of a cylinder capacity not exceeding 800cc:		Kg	50%
- - - Of a cylinder capacity exceeding 800cc but not exceeding 1000cc:		Kg	55%
- - Of a cylinder capacity exceeding 1,000cc but not exceeding 1,500 cc:		Kg	60%
- - - Of a capacity exceeding 1,500cc but not exceeding 1,800cc:		Kg	75%
- - - Other, of a capacity exceeding 1,800cc but not exceeding 3,000cc:		Kg	100%
- Other vehicles, with compression- ignition internal combustion piston engine (diesel or semi- diesel):	8703.30		
- - - Of a cylinder capacity not exceeding 800cc:		Kg	50%
- - - - Of a cylinder capacity exceeding 800cc but not exceeding 1,000cc:		Kg	55%
- - - Of a cylinder capacity exceeding 1,000cc but not exceeding 1,500cc:		Kg	60%
- - - Of a capacity exceeding 1,500 cc but not exceeding 1,800 cc:		Kg	75%

- - - Other, of a capacity exceeding 1,800 cc but not exceeding 2,500 cc:		Kg	100%

cc = cubic centimetre, HS = harmonised system, kg = kilogram.

Source: Federal Board of Revenue, Government of Pakistan.

Table A.VII-2: Duties and Taxes for Automobile Parts

Bodies, parts and accessories of the motor vehicles	HS code	Unit	Import Rate
Bodies (including cabs), for the motor vehicles of headings 87.01 to 87.05.	8707	Kg	50%
Parts and accessories of the motor vehicles of headings 87.01 to 87.05.	8708	Kg	35%

HS = Harmonised system, Kg = kilogram.

Source: Federal Board of Revenue, Government of Pakistan.

References

Federal Board of Revenue, Government of Pakistan. http://www.fbr.gov.pk/ShowDocument.aspx?view=Document&ActionID=998&ArticleID= (accessed September 2015).

Federal Board of Revenue, Government of Pakistan. http://www.fbr.gov.pk/OfficeHomePage.aspx?view=OfficeHomePage&ActionID=38&ArticleID=547 (accessed September 2015).

ITA website. http://trade.gov/static/autos_report_tradebarriers2011.pdf (accessed September 2015).

Country：	Pakistan

(4) Plans and regulations relating to vehicle registration

New Car Registration

Registration of motor vehicles in Pakistan is done through the Excise, Taxation and Narcotics Department (ETND). In addition, vehicle registration is managed through the Motor Transport Management Information System. Vehicle Registration engages the soundtrack of a motor vehicle in the official records subsequent to outstanding corroboration. Vehicle registration is obligatory and required for vehicle ownership. Registration is also required during the garage sale of a vehicle and transport of its ownership.

Taxes are incurred for registering new, imported, and transferred vehicles, based on specified rates by the ETND.

Transfer Registration

In 2015, the government cut the advance income tax on the transfer of ownership by 75 percent for those who file income tax returns and 33 percent to 50 percent for non-filers. However, out of a population of 180 million, only 880,000 persons have filed income tax returns.

The federal government took this action after phenomenally increasing it in the last fiscal year. In 2014, the government decided to impose heavy taxes ranging between Rs10,000 and Rs450,000 on the transfer of ownership of vehicles. These rates were equal to those imposed on the registration of a new vehicle, which discouraged car owners from getting their vehicles transferred, raising security concerns.

According to Shahid Hussain Assad, Member of the Inland Revenue Policy of the Federal Board of Revenue (FBR), the taxes on transfer of ownership of vehicles were reduced on the demand of the provincial governments.

The new rates are expected to cause a revenue loss of Rs500 million for the next fiscal year. However, while continuing its policy of increasing cost of doing business for non-compliant persons, the FBR increased taxes on contractors, suppliers, brokerage commissions, and on

accounts of annual token fees, which will yield additional Rs23 billion revenue. This amount is in addition to the Rs35 billion that the government has estimated from the withholding tax on banking transactions by non-filers.

Inspection

The legal basis for motor vehicle inspection can be found in Motor Vehicles Ordinance 1965, under Rule-35 of the M.V. Rules 1969.

Currently, periodic inspection and certification of vehicles only applies to commercial vehicles. However, the Motor Vehicle Examiner (MVE) is neither trained nor equipped for testing and certification. The systems, tools, and knowledge required for inspecting simply does not exist.

The structure of the MVE organization varies from province to province. For example, in Punjab, the MVE operates under the Provincial Transport Authority. In Sindh, the MVEs are being run by the police department and are referred to as Motor Vehicle Inspectors (MVI). In the North-West Frontier Province and Baluchistan, MVEs are under the Provincial Police Department. In the northern areas and federally administered tribal areas, MVEs are under the administrative control of the Deputy Inspector General of Police who acts as the motor vehicle registering authority.

Other

Each province has a different system of car registration in Pakistan. Typically, car registration requires a registration fee of some sort. Punjab is trying to adapt a web-based registration system.

References

Engineering Development Board, Government of Pakistan. http://www.engineeringpakistan.com/EngPak1/trucking/MVE.pdf (accessed September 2015).

Country：	Pakistan

Excise, Taxation and Narcotics Department, Government of Sindh. http://www.excise.gos.pk/index.php?option=com_content&view=article&id=70&Itemid=94 (accessed September 2015).

The Express Tribune with the International New York Times. *Widening tax base: Heavy taxes imposed on transfer of vehicle ownership.* http://tribune.com.pk/story/718181/widening-tax-base-heavy-taxes-imposed-on-transfer-of-vehicle-ownership/ (accessed September 2015).

The Punjab Information Technology Board website. http://pitb.gov.pk/mtmis_I (accessed September 2015).

(5) Handling of imported used cars and/or accident status quo cars

Imported Used Cars

Pakistanis who have lived for six months abroad can import used cars up to three years old as personal baggage. Pakistanis overseas who have stayed abroad for 700 days are allowed to send a used car as a gift or if they are returning back to Pakistan, they can import it under transfer of residence category.

The duty on new cars in Pakistan ranges from 50 percent to 60 percent, plus 17 percent general sales tax (GST) and 1 percent excise duty for 800 cubic centimeters to 1,500 cubic centimeters cars. This 48 percent reduction in duty is a significant incentive to import used cars.

There is a duty concession of one percent per month up to a maximum of 50 percent for used cars in Pakistan for three-year-old models. There are no other restrictions. Even the environmental standards are not checked for the used cars.

Other

The so-called scrap-dealers in markets manually dismantle cars, and there is a reasonable chance that the car being dismantled is a stolen car in car-theft-ridden Punjab.

Country :	Pakistan

References

Maverick Pakistanis.com. *Import Of Used Vehicles Into Pakistan Most Liberal In Region: Study.* http://www.maverickpakistanis.com/2010/07/import-of-used-vehicles-into-pakistan-most-liberal-in-region-study/ (accessed September 2015).

The Nation. *15,500 vehicles vanished from Punjab.* http://nation.com.pk/lahore/13-Sep-2014/15-500-vehicles-vanished-from-punjab. (accessed September 2015).

Annex II

Country Reports

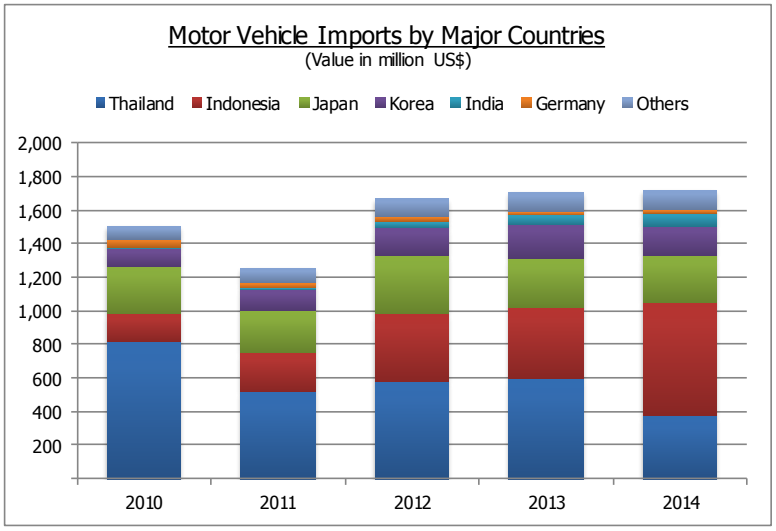
8. Philippines

Country :	Philippines
1. Current status of automobile recycling in the targeted country	
(1) Imports and exports from Japan and other countries: used cars	

Import

The following graph shows Philippines' automobile imports, including used cars, for 2010-2014. The big suppliers during this period were Indonesia, Thailand, and Japan. The total import in value was over US$1,700 million in 2014.

Figure A-VIII.1: Philippines' Automobile Imports



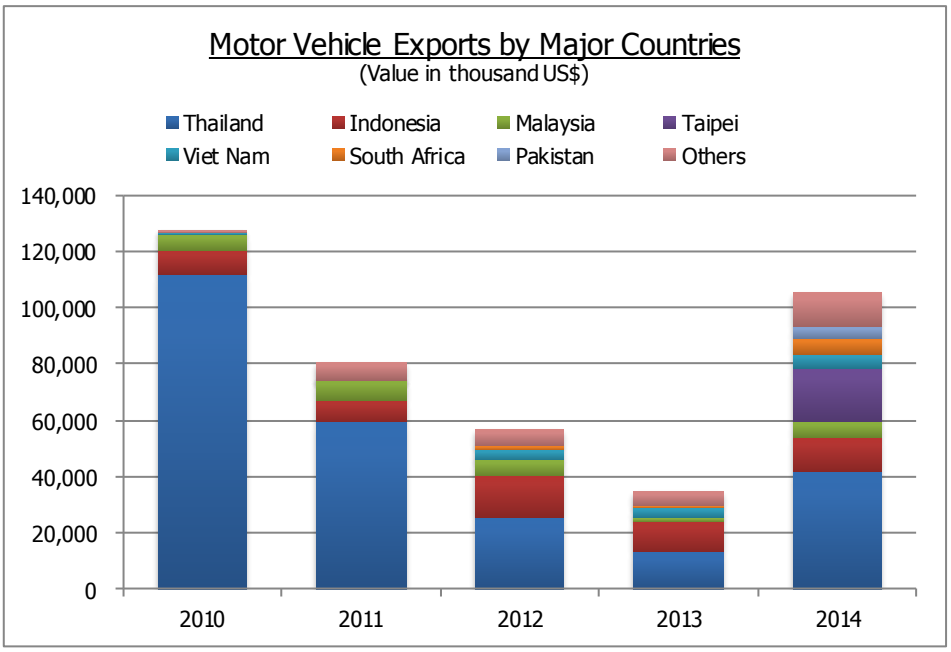
Source: UN Comtrade Database.

Country :	Philippines

Export

The volume of export of motor vehicles from the Philippines was smaller than that of its import volume. Destinations of the vehicles were Thailand and Indonesia. However, from 2014, exports became diversified, including countries such as South Africa, Taipei, and so on.

Figure A-VIII.2: Philippines' Automobile Exports



Source: UN Comtrade Database.

Reference

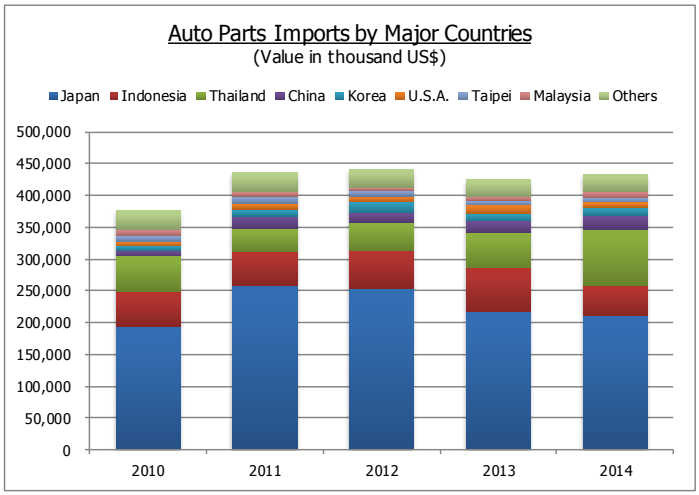
United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

Country :	Philippines

2) Imports and exports from Japan and other countries: used parts

The two graphs below show major importers and exporters of auto parts, including used parts, for 2010-2014.

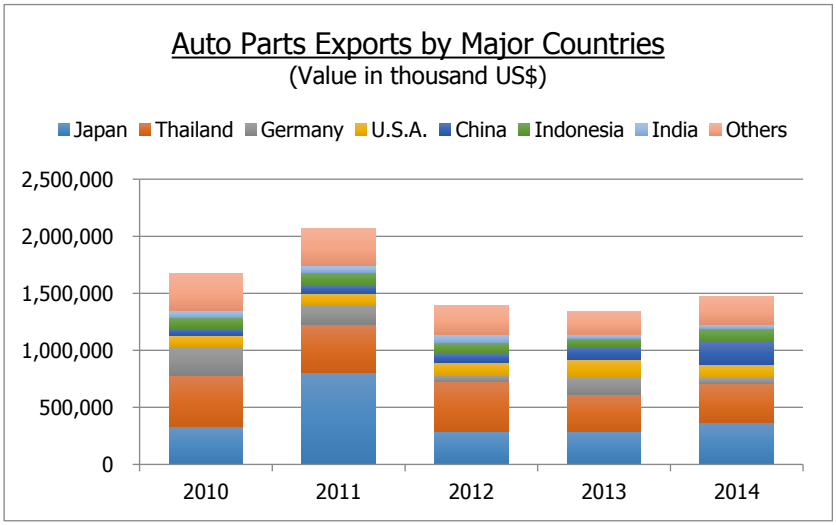
Figure A-VIII.3: Philippines' Auto Parts Imports



USA = United States of America.

Source: UN Comtrade Database.

Figure A-VIII.4: Philippines' Auto Parts Imports



USA = United States of America.

Source: UN Comtrade Database.

Country：	Philippines

Reference

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

3) Plans and regulations relating to import regulations

The Philippine regulation relating to import and export is the Tariff and Customs Code of the Philippines 1991, amended in 2001. The Code regulates the practice of evaluation and collection of import and export duties, as well as Customs supervision. The Philippine Tariff Commission makes tariff policies, including tariff concessions, modifications, and rebates. The Commission also holds public hearings on anti-dumping and countervailing cases, and conducts investigations on safeguard measures. The Bureau of Customs, under the Philippine Department of Finance, is the sole agency that administers tariff laws, and collects VAT and other additional taxes.

Table A-VIII.1: Duties and Taxes for Automobile Parts

Bodies, parts and accessories of the motor vehicles	HS code	Unit	Import Rate
Bodies (including cabs), for the motor vehicles of headings 87.01 to 87.05.			
- For the vehicles of heading 87.03:	87.07.10	Kg	10%
- Other:	87.07.90	Kg	15%
Parts and accessories of the motor vehicles of headings 87.01 to 87.05.			
- Bumpers and parts thereof:	8708.10	Kg	10%
- Other parts and accessories of bodies:	8708.20	Kg	3 - 20%
- Brakes and servo-brakes; parts thereof:	8708.30	Kg	10 - 20%

Country：	Philippines		
- Gear boxes and parts thereof:	8708.40	Kg	3 - 10%
- Drive-axles with differential, whether or not provided with other transmission components, and non-driving axles; parts thereof:	8708.50	Kg	3 - 10%
- Road wheels and parts and accessories thereof:	8708.70	Kg	3 -15%
- Suspension systems and parts thereof (including shock-absorbers):	8708.80	Kg	1 - 10%
- Other parts and accessories:	8708.90	Kg	1 - 30%

HS = Harmonised System, kg = kilogram.

Source: Philippine Tariff Commission.

References

Louis Adviento, Chief Export Division. POM, Bureau of Customs. Its Role in Export Control. http://www.meti.go.jp/policy/anpo/outreach/Industry_PH/pdf/ph04.pdf (accessed September 2015).

Philippine Tariff Commission. http://tariffcommission.gov.ph/ (accessed September 2015).

(4) Plans and regulations relating to vehicle registration

Republic Act (RA) 4136, the national Law on Traffic, is the main act that controls vehicle operations in the Philippines such as the registration and inspection of vehicles. Also, the Department of Transportation and Communication (DOTC) is in charge of the use of vehicles and the operation of traffic rules.

New Car Registration

Starting April 2015, DOTC and the Land Transportation Office (LTO) will strictly enforce the 'No Registration-No Travel Policy"' for motor vehicles (MVs). This means that all vehicles must be

registered to be on the road.

The prescribed procedure of registration is conducted at the LTO. Vehicle registration is required to be renewed every year. On renewing the registration, users need to pay the Motor Vehicle Usage Charge (MVUC).

The MVUC rates have been set by RA8794, An act imposing MVUC on owners, depending on Gross Vehicle Weight (GVW) and vehicle classification. The rate is different for specific vehicles such as taxis and cars registered before RA8794 was enforced.

Table A-VIII.2: The MVUC for Passenger and Company Cars (ageless)

Categories	Rates (₱)
1. Passenger cars	
up to 1,600kg	1,600
1600 to 2,300kg	3,600
2,301kg and above	8,000
2. UV (Utility Vehicles)	
up to 2,700kg	2,000
2,701 to 4,500kg	2000 plus 0.40 x GVW in excess of 2700kg
3. SUV (Sports Utility Vehicles)	
up to 2,700kg	2,000
2710 to 4,500kg	2000 plus 0.46 x GVW in excess of 2,700
4. Motorcycles	
Without Sidecars / With Sidecars	240 / 300
5. Truck and Truck buses (over 4,501kg)	1800 plus 0.24 x GVW in excess of 2,700
6. Trailers (over 4,501kg)	0.24 x GVW

GWV = Gross Vehicle Weight, kg = kilogram, MVUC = Motor Vehicle Usage Charge, ₱ = Philippine peso.

Source: Land Transportation Office (LTO).

Transfer or Selling of Licence

The ownership of a car can be changed through the submission of required documents such as original copy of the Deed of Sale at the LTO district office. According to the provisions of Batas

Country：	Philippines

Pambansa Blg. 43, an Act providing number plates to owners of motor vehicles and trailers, the licence plate is not allowed to be changed.

Re-registration

Owners can re-register their vehicles at any LTO district office. The schedule of re-registration will depend on the vehicle's plate number. The last digit of the plate number will depend on the month of the registration while the middle digit indicates the weekly deadline.

Table A-VIII.3: Schedule of Re-registration Month

Plate number's last digit	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
0	October

Source: Land Transportation Office (LTO).

Table A-VIII.4: Schedule of Re-registration Week

Plate number's middle digit	Weekly deadline (on working days of the month)
1, 2, 3	1st to 7th day
4, 5, 6	8th to 12th day
7, 8	13th to 21st day
9, 0	22nd until last day

Source: Land Transportation Office (LTO).

Country：	Philippines

The LTO issued new standard licence plates in January 2015. Car owners who will renew their registrations will have to prepare an additional ₱450 for the licence plate fee. These new plates will be claimed 45 days after the LTO registration renewal.

Deregistration

There is a deregistration system but few people use it. Registered vehicles are required to be renewed every year, however, it will not apply for inactive cars. If owners want such cars to be active again, they need to renew the registration and pay accumulated renewal fees.

Inspection

All motor vehicles, including passenger and commercial cars, shall be subjected to mandatory inspection prior to registration as per MO No. 86-003 dated 3 June 1986. No motor vehicle of any classification shall be accepted for registration unless it has been fully inspected in accordance with the standards and procedures of motor vehicle inspection. The three venues of inspection are LTO district offices, Motor Vehicle Inspection Stations (MVIS), and Private Emission Testing Centres (PETCs).

The annual inspection is mandatory and the report of inspection is required to be submitted at the renewal of registration. Owners of brand-new cars can skip the safety inspection for the first three years, but they need to take the emission inspection from the first year.

Tax

There are three main types of taxes that owners need to pay.

Country：	Philippines

Table A-VIII.5: Taxes Related to Owning Vehicles

Fee		Details
1	MVUC	Rates fixed by each GVW and vehicle classification should be paid at the annual renewal registration
2	Compulsory Insurance	Compulsory Third Party Liability which costs around ₱1,200 is required to be purchased at the renewal registration
3	Inspection	Inspection report is required to be submitted at the renewal registration

GWV = Gross Weight Vehicle, MVUC = Motor Vehicle Usage Charge.

Source: Yano Research Institute.

Insurance

Philippine law requires all vehicle owners to purchase a Compulsory Third Party Liability (CTPL) insurance policy before they register or renew their vehicles. CTPL provides compensation to the third party in case of an accident. Comprehensive car insurance can also be purchased for extra protection, but it is not required by law.

Penalty

Registration:

All vehicles must be registered with the LTO, except for the first seven days. Under a joint administrative order, violators will be slapped with a ₱10,000 fine for driving an unregistered vehicle, which is assessed against the vehicle owner, and a ₱1,000 fine on the driver. If the driver is able to present a certificate of registration and an official receipt of the vehicle to prove that it has been registered, the driver will be fined only ₱5, 000 for failure to attach plates.

For MVs that are within the seven-day registration process, the driver must present the Certificate of Stock Reported, sales invoice dated within seven days prior to the apprehension, and a Certificate of Insurance Cover dated on or after the date of the sales invoice. If such

documents are presented, no penalties will be meted out.

As an additional penalty, should the date of the sales invoice exceed 37 days on the date of apprehension, the motor vehicle will be impounded by the LTO.

Re-registration:

Renewal later than the last working day of the indicated week from the middle digit is not allowed. The fine is computed weekly for late registration. There is a weekly fine of ₱200 for late registration. But, when the payment is delayed for a month, the fine shall become 50 percent of the user charge.

Environmental Control

RA No. 8749, known as the 'Philippine Clean Air Act of 1999', is the main act for environmental control in the Philippines. It provides for air quality management through the setting of ambient air quality guidelines and standards for monitoring, emission limits for motor vehicles (effective by 2003) which is linked to registration, and regulation of importation of motor vehicles and engines to comply with emission limits.

References

Crispin Emmanuel D. Diaz. National Center for Transportation Studies, University of the Philippines. *Environmental Policy in the Philippines Related to Road Transportation.* http://www.un.org/esa/gite/iandm/diazpresentation.pdf (accessed September 2015).

Land Transportation Office. http://www.ltoregionvi.net/motor-vehicle-users-charge/, http://www.dotc.gov.ph/index.php/2014-09-02-05-01-41/2014-09-03-06-43-32/86-dotc-lto-time-to-change-old-licence-plates (accessed September 2015).

RA 8749. An Act Providing for a Comprehensive Air Pollution Control Policy and for Other Purposes. http://emb.gov.ph/ECA%20Center/RA8749.pdf (accessed September 2015).

The provisions of the Batas Pambansa Blg. 43. http://www.chanrobles.com/bataspambansa/bataspambansablg43.html (accessed

Country：	Philippines

September 2015).

(5) Handling of imported used cars and/or accident status quo cars

End-of-life cars in the Philippines would first flow to repair shops where usable parts are taken out. Then they, along with accident cars, would be sent to junk shops. There, valuable metals recovered from scrapped cars are separated by hand and open incineration. Retrieved metals are sold to metal factories.

Reference

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(6) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: end-of-life vehicle

Volume

According to Yano Research Institute, the number of ELVs was 17,866 in 2013. This was estimated based on the number of registered and re-registered vehicles.

Table A-VIII.6: Forecast of the Number of ELVs in the Philippines

Year	2013	2014	2015	2016	2017	2018	2019	2020
No. of ELVs	17,866	28,985	36,273	39,852	48,025	61,141	78,077	97,332

ELV = end-of-life vehicle.

Source: Yano Research Institute.

Country：	Philippines

Model Years

In the Philippines, cars are utilised for at least over 25 years with repairs. The locals are still not familiar with the concept of ELVs.

Sales Prices

The price of used cars in the Philippines is ₱378,000 for a 2010-year model (Nissan Sentra), ₱200,000 for a 2000-year model (Toyota Corolla) and ₱108,000 for a 1990-year model (Toyota Crown).

Distribution

Old models of cars are continuously sold as used cars by being repaired and changing parts. These old cars are seldom dismantled as ELVs. Owners bring in their cars to repair shops or junkyards. The scale of these shops is small so that the amount of ELV is few. Recently, there are several automobile insurance companies that launched the ELV project. For example, Standard Insurance, which is the biggest motor car insurance company in Philippines, has constructed the new automobile repair and maintenance factory and launched the repair business for damaged cars. For cars which cannot be repaired anymore, they pick out the usable parts and dispose the ELVs.

Processing Situation

Vehicle dismantling is mainly conducted by repair shops and junkshops and there are a few specialized operators in the vehicle dismantling business. Dismantling is conducted mainly by hand and this threatens labour safety.

The study team could not acquire information on shredding facilities for automobiles.

Country：	Philippines

References

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

Yano Research Institute. *Current situation of automobile recycling in ASEAN.* http://www.econ.kyoto-u.ac.jp/~shioji/resource/20150711%20QGAWA.pdf (accessed September 2015).

(7) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: recycled parts

Volume

Used parts are in huge demand in the Philippines. In 2012, according to Philippine Statistics Authority National Statistics Office, $859,285,000 used parts were imported. This is almost twice the number that was imported in 2008 and 2009. The importation of used parts is not totally prohibited, however, some parts are not allowed or are regulated.

Table A-VIII.7: Regulated Parts for Vehicles

Philippine Standard Commodity Code (PSCC)	Customs code	Commodity description	
784.32-09	8708.2910	Other parts and accessories of body in PSCC group 781	
	8708.2990	Dashboard	Clasp fixed to plate
		Door	Running Board
		Fender	Radiator cowling

Country :	Philippines		
		Floor board	Trunk/Trunk cover
		Grill	Sun visor
		Hood	Wing
		Cabin	Dasher
		Luggage rack (exterior)	Floor mat
784.24.21-0	8707.1000	Vehicle body only in group 781 including driver seat and fuselage (prohibited)	
		Chassis with engine only in group 781 (prohibited)	

PSCC = Philippine Standard Commodity Code.

Source: Yano Research Institute.

Distribution and Used Parts Market and Player

There is an area called, Evangelista where used parts sellers are gathered. Used parts are mainly procured by Japan, China, and Thailand. Imitation parts occupy a large portion of parts imported from China. Parts dealers buy the used parts by way of auction in the form of parts package in the container or buy directly from buyers which procure used parts in auction.

Repair shops collect some parts which can be recycled and sell them as used parts. Non-usable parts are sent to junkshop, which sort them and collect valuable resource like steel scrap.

Also, used car shops dismantle ELVs and sell used parts. Insurance companies, repair shops, and vehicle makers also deal with used parts in the Philippines.

Reference

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Country：	**Philippines**

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(8) Volume, distribution, flow, model years, sales prices, processing situation, items on trading and resources: steel and non-ferrous metals

All iron-making factories operating in Philippines produce crude steels scrapped by electric furnace. Almost all of factory equipment and technologies remain outdated so that the capacity of production is not much changed in the past 10 years. As the exceptional company, Steel Asia manufacturing, the biggest company producing reinforced bar steel is expanding its capacity of production.

As the receiver of the steel scrap, in Philippines, there are several electric furnace companies in the following table.

Table A-VIII.8: Electric Furnace Companies in the Philippines (1,000 tons per year)

Company	**Crude steel**	**Slab**	**Billet**	**Bloom**
TKC: Treasure Steel Works	400		400	
Cathay Metal	300		300	
Steel Asia Manufacturing	300		300	
Metro Concast Steel	n.a			
Apollo Steel Mill	n.a			
Midland Steel	n.a			
SKK Steel	n.a			
Elegant Chemical Alloy	n.a			

Source: JFE Techno Research.

Country：	Philippines

While Philippines exports aluminium scraps to mainly Malaysia, Korea, China, and Japan, the size of aluminium recycling industry is not large due to the weakness the aluminium smelting industry.

Reference

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

(9) Distribution volume, flow, model years, sale prices, and processing methods during dismantling (batteries, tires, and waste fluids, among others)

Almost all of auto weight including wasted oil, battery and tire are recycled.

-Batteries

The Philippine battery recycling industry is characterised by one dominant recycler, Philippines Recycler Inc., a few small licensed and therefore legitimate recyclers, and thousands of unregulated recyclers spread out all over the country. Only the legitimate recyclers have the smelting technology to properly process the scrap batteries to recover metal from battery active materials. The unregulated recyclers merely melt the metal from batteries and indiscriminately discard their non-metallic material wastes and acid wastes.

However, there is information that Philippine Recycler Inc., the company recycling the battery, is no longer operating.

Country：	Philippines

Table A-VIII.9: The Recycle of Lead-Battery

	Philippine Recycler Inc.	**Informal small refining factory**	**Informal re-conditioner / home refining**
Raw materials	From home and abroad	From Electrode plate and home	From Home and dismantled battery
Product	Refined load	Unrefined load	Unrefined load
The rate of lead recovery	98%	About 90%	About 40%

Source: EX Research Institute.

-Tires

Tires are recycled into sandals, slippers, and fuel for cement manufacturing. Danglos Eco Systems invested in a modern tire recycling plant to help rid the Philippines of the waste tires and convert them into useful bi-products known as Rubber Crumb. According to the company, this recycled material is used for sports stadium surfaces, children's playgrounds, rubber moldings and automotive parts.

-Waste Oils

It is recycled through draining and distilling process. In Philippines, there are more than dozens of waste oil treatment companies and they are listed in the List of Registered Treatment/Storage/Disposal Facilities for Hazardous Wastes of the Department of Environment and Natural Resources.

References

Danglos Eco System webpage. http://www.danglosecosystems.com/rubber-plastics-recycling. (accessed September 2015).

Department of Environment and Natural Resources. Environmental Management Bureau. ENVIRONMENTAL MANAGEMENT BUREAU, *LIST OF Registered Treatment/Storage/Disposal (tsd) Facilities for Hazardous Wastes.* http://www.emb.gov.ph/hazardous/treater.pdf

(accessed September 2015).

Kojima, Michikazu. Institute of Developing Economies, JETRO. *Re-use and Recycling in Asia.* http://www.meti.go.jp/committee/downloadfiles/g40713a40j.pdf (accessed September 2015).

(10) Factual survey of end-of-life two-wheeled vehicles

The registered number of two-wheeled and three-wheeled vehicles in 2013 was approximately 4,250,000. The newly registered number is approximately 1,140,000. In Philippines, the number of two/three-wheeled vehicles is increasing more than that of automobiles. The transition from two/three-wheeled vehicles to automobiles has not been seen so far.

Table A-VIII.10: The Transition of Registered and Newly Registered Number of Two-/Three-Wheeled Vehicles in the Philippines

	2008	2009	2010	2011	2012	2013
The registered number (year-over - year)	2,982,511 112.65%	3,200,968 107.32%	3,482,149 108.78%	3,881,460 111.47%	4,116,690 106.06%	4,250,667 103.25%
The newly registered number (year-over-year)	734,666 109.39%	756,228 102.93%	903,663 119.50%	1,052,863 116.51%	1,046,228 99.37%	1,140,329 108.99%

Source: Land Transportation Office (LTO).

The study team could not acquire the information on end of life motor cycle in this study.

Country：	Philippines

(11) Type of operation and number of recycling-related companies

Dismantlers

There is no specific registration scheme for vehicle dismantling and it is difficult to effectively regulate the industry. Dismantlers do not exist and dismantling is mainly conducted by repair and junk shops. Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity.

Other Related Companies

Lead batteries:

Philippines Recyclers Inc. is the largest and most advanced battery recycling facility in the Philippines. It supplies all the lead requirements of the Ramcar Battery group, the largest battery manufacturer in the Philippines. The company is certified to ISO 14001 and ISO9002 and has received numerous local awards and recognition for its environmental management efforts. However, there is information that Philippine Recycler Inc. is no longer operating.

Tires:

Danglos Eco Systems invested in a modern tire recycling plant to help rid the Philippines of waste tires and convert it into a useful bi-product known as Rubber Crumb.

Waste oils:

There are more than dozens of waste oil treatment companies in the Philippines and they are listed in the List of Registered Treatment/Storage/Disposal Facilities for Hazardous Waste of the Department of Environment and Natural Resources.

References

Danglos Eco System. http://www.danglosecosystems.com/rubber-plastics-recycling (accessed September 2015).

Country：	**Philippines**
Department of Environment and Natural Resources. Environmental Management Bureau. *List of Registered Treatment/Storage/Disposal (tsd) Facilities for Hazardous Wastes.* http://www.emb.gov.ph/hazardous/treater.pdf (accessed September 2015).	
(12) Management of recycling-related companies The study team could not acquire the information on management situation of recycling related companies in this study. **Reference** N/A	
2. Current challenges and considerations in automobile recycling laws and institutional systems in vehicle recycling	
(1) Challenges in the vehicle recycling system (illegal dumping, inappropriate processing of waste, stringent situations at final disposal site, dismantling technology, safety, efficiency, and recycling rates) There is no specific act for vehicle recycling and dumping in Philippines. There is no registration and permit system for dismantling vendors, since dismantling companies specialized in dismantling vehicles do not exist. There are other challenges as listed below: • Waste oils are not mostly retrieved or resold, and are mostly dumped. • Due to the lack of processing facilities, CFCs are released into the atmosphere without being properly recovered. • Metallic component recycling is done manually. This causes labour safety issues.	
(2) Trend in vehicle recycling policies and related automobile recycling laws, and the enforcement, presence, and details of related institutions. RA 6969 and RA9003 are Acts related to scrapped automobiles.	

Country：	Philippines

RA 6969 is known as the Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990. It provides the list of registered treatment, storage and disposal (TSD) of hazardous wastes, including lead compounds (D406) and waste oils (I101).

RA9003 is known as the Ecological Solid Waste Management Act of 2000. It defines tire, battery and oil, parts related to vehicles, as special wastes that need to be disposed differently from other wastes.

Article 4, Section 28 of RA 9003 on reclamation programs and buy-back centres for recyclables and toxic wastes stipulates that the National Ecology Center needs to assist in establishing and implementing deposit or reclamation programs in coordination with manufacturers, recyclers, and generators to provide separate collection systems or convenient drop-off locations for recyclable materials, particularly for separated toxic components of the waste stream like dry cell batteries and tires to ensure that they are not incinerated or disposed in a landfill.

a) Status of institutional system collateral for improper processing of three Designated Recovery items (fluorocarbons, airbags, and ASRs)

Fluorocarbons

Around 70 percent of the recycled CFCs for refrigerators are from those collected from vehicles. However, CFCs are not retrieved during the dismantling process and are released in the air as there is no CFC collecting facility.

Airbags

The study team could not acquire detailed information on airbags.

Automobile Shredder Residues

The study team could not acquire detailed information on ASRs.

b) Demarcation of roles (obligation and economic burden) among production officers (manufacturers and importers), related operators, vehicle users and government agencies (including local governments)

Country：	**Philippines**

The current roles and responsibilities among stakeholders related to regulations on the automotive industry are as follows:

- Importers/Manufacturers
    - Subject to tariffs and taxes, vehicle type approval, and registration
- Users
    - Compliance to road transport regulations, including licences and periodic inspection
- Government Agencies
    - Department of Transportation and Communications - in charge of new car registration, licensing, car inspection, and exhaust gas inspection
    - Department of Environment and Natural Resources – in charge of protecting the environment by ensuring compliance with the environmental law, and of environmental issues related to hazardous waste management CFCs, lead batteries, waste oils and waste tires.

References

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(3) Presence or absence of environmental regulations (such as landfill and incineration ban, and heavy metals use ban)

The Philippines is in its early stages of starting the ELV recycling system and considering ELV recycling regulations. The following regulations stipulate general waste management in the Philippines.

-Hazardous Substances and Wastes Management

RA 6969: Philippine Toxic Substances and Hazardous and Nuclear Waste Act.

This Act mandates the regulation, restriction, or prohibition of the importation, manufacture, processing, sale, distribution, use, and disposal of chemical substances and mixtures that present unreasonable risks and/or injuries to health and the environment.

DAO 92-29: Implementing Rules and Regulations

DAO 2004-36: Further implementation Rules.

Section 24 of DAO 92-29 stipulates the responsibility of hazardous waste generators in the following manner:

- The waste generator shall be responsible for the proper management and disposal of the hazardous waste.
- The waste generator shall bear the costs for the proper storage, treatment and disposal of their hazardous waste.

It provides the list of hazardous wastes among which lead compounds (D406), waste oils (I101), sulfur acid (B201) as they relate to ELV recycling.

In DAO 92-29, waste treatment and disposal premises, and waste transporters are required to secure permits or authorizations from the Department of Environment and Natural Resources prior to the transport, storage, or disposal of hazardous wastes. The Secretary of the Department of Environment and Natural Resources has the authority to inspect any premises in which hazardous wastes are being generated, stored, processed, recycled, treated, and/or disposed, and to make recommendations to the proper authorities.

Penalties for failure or refusal to notify the department of the type and quantity of hazardous wastes generated and to provide quarterly report of waste generation and failure or refusal to

secure a permit or authorization from the Department prior to transport, storage, or disposal of hazardous wastes shall apply. The Secretary of the Department is authorized to impose a fine of not less than ₱10,000 but not more than ₱50,000 on any person or entity found guilty thereof.

-Solid Waste Management

RA 9003: Philippine Ecological Solid Waste Management Act (PESWMA) of 2000

The law was passed by Congress in December 2000 and signed by the President of the Philippines on 26 January 2001 with the aim of adopting a systematic, comprehensive, and ecological solid waste management program.

DAO 2000 - Implementing Rules and Regulations.

References

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Implementing Rules and Regulations of Republic Act No. 6969. http://emb.gov.ph/ECA%20Center/IRR%20of%20Republic%20Act%206969.pdf (accessed September 2015).

Republic Act No. 6969. An Act to Control Toxic Substances and Hazardous and Nuclear Wastes, Providing Penalties for Violations Thereof, and for Other Purposes. http://www.denr.gov.ph/policy/basicpol/envcode/ra6969.pdf (accessed September 2015).

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

Annex II

Country Reports

9. Republic of Korea

Country：	Republic of Korea

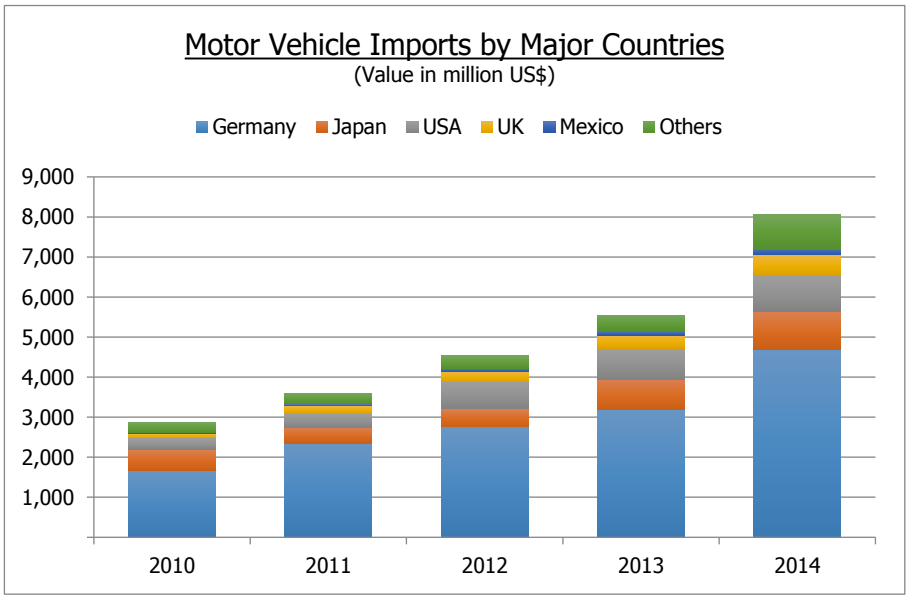
1. Current status of automobile recycling in the targeted countries

(1) Imports and exports from Japan and other countries: used cars

Import

The following graph shows Korea's automobile imports, including used cars, for 2010-2014. The big suppliers during this period were Germany, Japan, and USA. The total value of import was over US$8,000 million in 2014.

Figure A-IX.1: Korea's Automobile Imports



UK = United Kingdom, USA = United States of America.

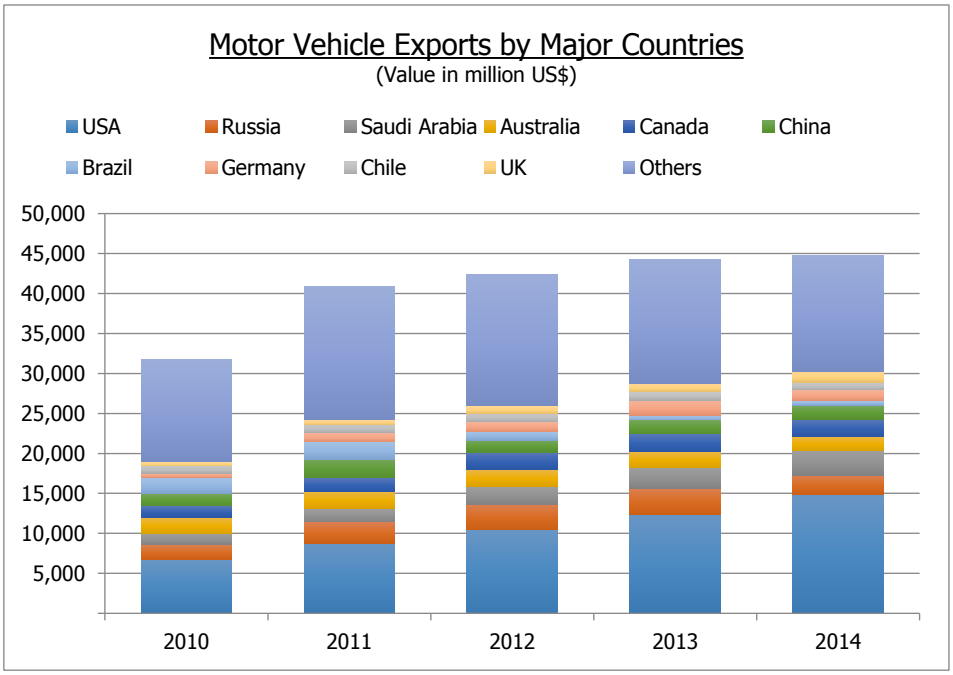
Source: UN Comtrade Database.

Country :	Republic of Korea

Export

The volume of motor vehicle exports from Korea was larger than that of its import volume due to the presence of globally competitive automobile makers in the country. The main destination of the vehicles was USA. In addition to the USA, there were other countries importing Korean vehicles.

Figure A-IX.2: Korea's Automobile Exports



UK = United Kingdom, USA = United States of America.

Source: UN Comtrade Database.

Reference

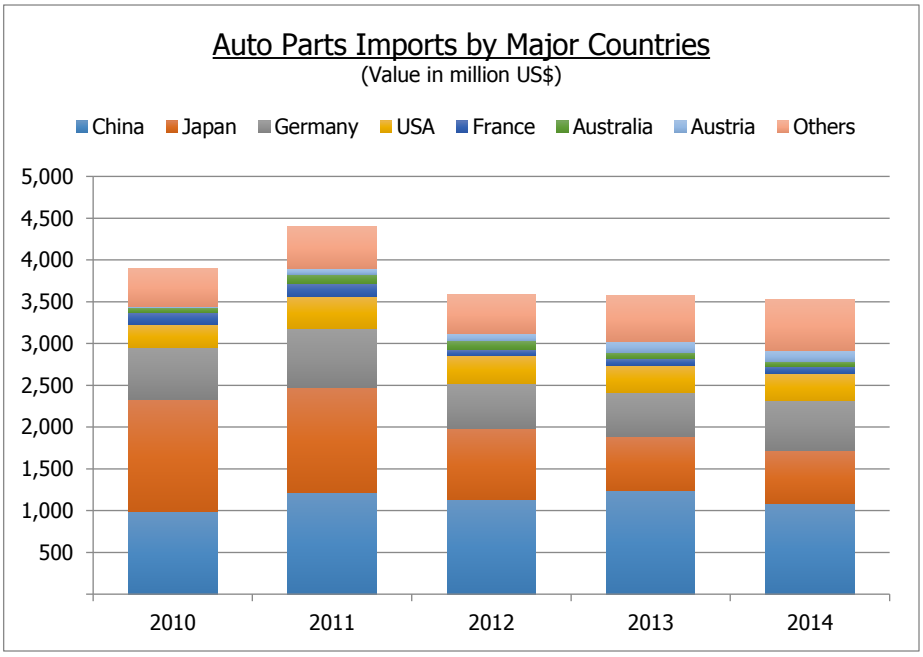
United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(2) Imports and exports from Japan and other countries: used parts

The two graphs below show major importers and exporters of auto parts, including used parts, for 2010-2014.

Country :	Republic of Korea

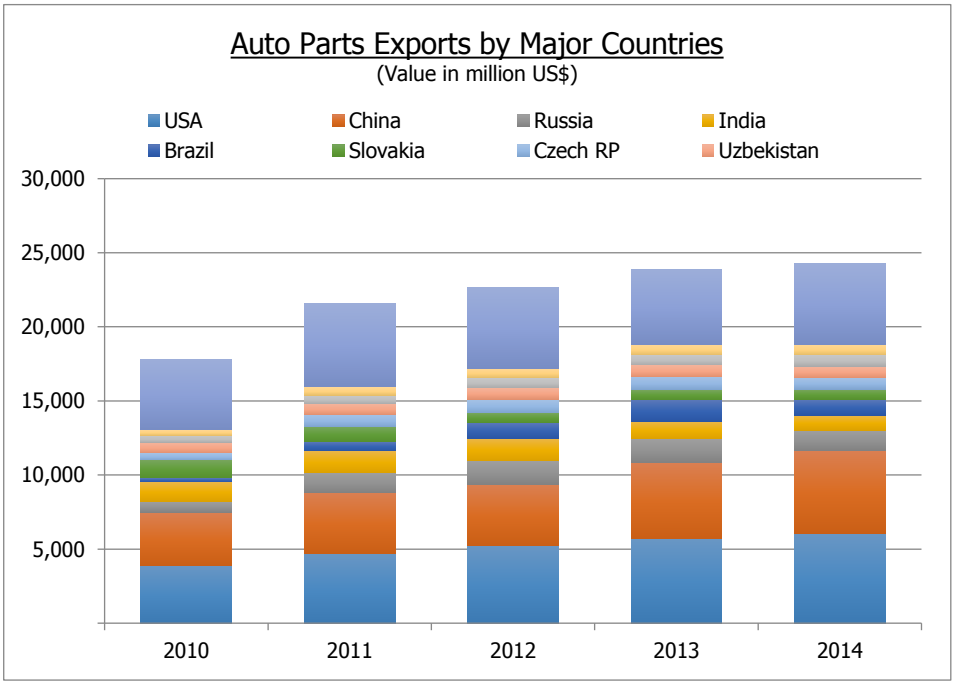
Figure A-IX.3: Korea's Auto Parts Imports



Source: UN Comtrade Database.

Country :	Republic of Korea

Figure A-IX.4: Korea's Auto Parts Exports



USA = United States of America.
Source: UN Comtrade Database.

Reference

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(3) Plans and regulations relating to import regulations

Tariffs:

- Passenger vehicles are assessed and applied a tariff rate of eight percent. The applied tariff rate for commercial vehicles is 10 percent.
- Per the 1998 Memorandum of Understanding (MOU), the Korean Government agreed to notify the World Trade Organization (WTO), within 30 days of entry into force of the MOU, that it would lower its bound tariff rate on passenger vehicles from 80 percent

to its current applied rate of eight percent, constraining the Korean Government's ability to raise this tariff rate in the future.

- The applied tariff rate for most automotive parts and components is eight percent or lower.

Taxes:

The government imposes eight different taxes on passenger cars, which are assessed on the cost, insurance, and freight (CIF) value of the vehicle plus the eight percent tariff. Three of the taxes are based on engine displacement. The Korean engine displacement taxes are currently applied such that a disproportionate financial burden falls on vehicles with larger engines (over 2,000 cubic centimetres).

- Taxes Levied at the Purchase Stage:
    1. Special consumption tax (a percentage of the CIF value of the vehicle plus duty, based on engine displacement)
    2. Education tax (30 percent of the special excise tax)
    3. A 10 percent VAT
- Taxes Levied at the Registration Stage:
    4. Registration tax (five percent of the retail price before VAT)
    5. Acquisition tax (two percent of the retail price before VAT)
    6. Subway bond (based on engine displacement)
- Taxes Levied at the Ownership Stage:
    7. Annual vehicle tax (based on engine size)
    8. Annual vehicle education tax (30 percent of the annual vehicle tax)

Bias Against Imported Products:

- In the past, pervasive anti-import sentiments limited marketing opportunities and intimidated potential customers of foreign vehicles in Korea.
- Also in the past, the Korean government practised measures that discouraged the purchase of imported products. For example, in December 1996 and early 1997, the National Tax Office (NTO) engaged in broad action directed at lessees of imported autos. Though withdrawn after complaints by foreign governments, the threat of tax audits for lessees of imported cars had a chilling effect on sales of imported vehicles.

Country： **Republic of Korea**

- In recent years, these problems have been dramatically reduced and Korean consumers' acceptance of imported vehicles is on the rise. Nevertheless, fear of the resurgence of economic recession in the future remains a concern.
- Since 1998, however, the government has been trying to relax its anti-importation policy and discrimination against foreign motor vehicles. The Korean Government has also engaged in public activities to promote the equal treatment of foreign and domestic motor vehicles, through such means as direct outreach to civic groups, in an attempt to improve the environment for sales of foreign motor vehicles.

Table A-IX.1: Duties and Taxes for Automobile Parts

Bodies, parts, and accessories of the motor vehicles	HS code	Unit	Import Rate
Bodies (including cabs), for the motor vehicles of headings 87.01 to 87.05.			
- For the vehicles of heading 87.03:	8707.10	Kg	16%
- Other:	8707.90	Kg	13 - 16%
Parts and accessories of the motor vehicles of headings 87.01 to 87.05.	8708	Kg	13%

HS = Harmonised system, kg = kilogram.

Source: Korea Customs Service.

References

Korea Customs Service. http://english.customs.go.kr/kcshome/site/index.do?layoutSiteId=english (accessed September 2015).

United States Department of Commerce International Trade Administration Office of Transportation and Machinery. *Compilation of Foreign Motor Vehicle Import Requirements.* http://trade.gov/static/autos_report_tradebarriers2011.pdf (accessed September 2015).

(4) Plans and regulations relating to vehicle registration

The Automobile Management Act of Korea specifies the registration of new, change, transfer, and attachment of registration of vehicles, the assignment of registration numbers and licence plates, the markings of vehicle identification numbers, the safety standards and self-

certification, the correction of manufacturing deficits, the operation restriction and enforcement, the vehicle inspection and automobile management business for the purpose of improving public welfare through the security of performance; and the safety of vehicles as well as the efficient management of vehicles.

Chapter II of the Act provides for the registration of automobiles. An automobile shall not be operated unless it is registered. This is managed by the Mayor/District Office Governor. Registration applies to new vehicle registration (owned, assembled, manufactured and imported); modification; transfer of ownership; cancellation, and seizure.

Reference

Motor Vehicle Management Act.

http://elaw.klri.re.kr/eng_service/lawView.do?lang=ENG&hseq=8827 (accessed September 2015).

(5) Handling of imported used cars and/or accident status quo cars

Importers of used automobiles are required to self-certify that the car has met the safety criteria under the Automobile Management Act. This procedure is called the Self-Certification System. Used cars also need to satisfy environmental tests under the Clean Air Conservation Act. Tariff on both new and used imported passenger cars (HS8703) is 8 percent. In Seoul, registration is conducted by the district office, whereas in other parts of Korea, it is conducted by automobile registration offices. The Korea Insurance Development Institute runs a website called CarHistory (www.carhistory.com) that can trace a used car's history for a fee of W5,000 (US$4.80).

Janganpyeong is the centre of Korea's biggest used car market.

Country：	Republic of Korea

Abandoned cars, including accident status quo cars, are dismantled at the dismantler's' expense in case the owner is unknown or he is unable to dispose the car. When abandoned cars are dealt for free, automakers collect and pass them to dismantlers without abandoners' cost.

References

IDE-JETRO. *Kensyu Sosho No.570 Recycling in Asia.*

JETRO, Japan. https://www.jetro.go.jp/world/qa/04A-001226.html (accessed September 2015).

Korea Joongang Daily. *Used car dealers say not to worry.* http://koreajoongangdaily.joins.com/news/article/Article.aspx?aid=2891150 (accessed September 2015).

(6) Volume, distribution, flow, model years, sale prices, processing situation, check items on trading and resources: end-of-life vehicle

Volume

In 2011, 2.32 million second-hand cars were sold.

In 2012, 660,000 cars (4.5 percent of all passenger cars in Korea) were imported. Of those, 400,000 were estimated to be second-hand.

Model years

The average vehicle lifespan on the road is 11.3 years.

Country：	Republic of Korea

Price

The average price of used cars is W7 million.

Distribution

The most common way of buying second-hand imported cars is from used-car websites (19 percent), followed by individual trade websites (12 percent).

Processing situation

Abandoned cars are dismantled at the dismantler's expense in case the owner is unknown or he is unable to dispose the car. The Motor Vehicle Management Act defines 'scrapping car' as dismantling an automobile and then compressing, crushing or cutting the devices of the automobile so that they cannot maintain their performance set forth in the Ordinance of the Ministry of Construction and Transportation; or compressing or smelting an automobile without dismantling. Manufacturers are responsible for collecting and dismantling tires and lubricant oils. ASRs will be sent to the disposal plants and buried. The Enforcement Decree of the Wastes Control Act sets the regulations on ASRs.

Other

The most popular second-hand car market at SK Encar, the biggest used car dealer in Korea, is the Grandeur TG. Here, a 2.7-liter model made in 2009 sells for around W17 million, roughly 40 percent cheaper than its original asking price three years ago.

References

IDE-JETRO. *Kensyu Sosho No.570 Recycling in Asia.*

Country：	Republic of Korea

Motor Vehicle Management Act.
elaw.klri.re.kr/kor_service/converter.do?hseq=8825&type=PDF (accessed September 2015).

The Chounilbo. *Car Dealers to Offer Price Comparison for Used Imports.*
http://english.chosun.com/site/data/html_dir/2012/07/11/2012071101301.html (accessed September 2015).

The Chounilbo. *Used Cars More Popular Than New Models.*
http://english.chosun.com/site/data/html_dir/2012/03/23/2012032300970.html (accessed September 2015).

The Korea Bizwire. *10+ Year Vehicle Lifespan is the 'New Normal'.*
http://koreabizwire.com/10-year-vehicle-lifespan-is-the-new-normal/6007 (accessed September 2015).

(7) Volume, distribution, flow, model years, sale prices, processing situation, check items on trading and resources: recycled parts

In Korea, the Ministry of Land, Infrastructure and Transport, formerly called the Ministry of Construction and Transportation, has been in charge of handling disused vehicles. One of the issues the government has been concerned about is the increasing number of vehicles being abandoned without being sent to dismantlers by the owners themselves. In 1989, only 3.3 percent of ELVs (around 3,300 vehicles) were abandoned. In 1999, the number increased to 69,000.

In case an abandoned vehicle gets found, the government, with the help of the police, orders its owner to have it dismantled. However, if the owner is missing or it is difficult to order him/her to take care of the abandoned car, the vehicle is sold to dismantlers as potential commodities.

The government now treats ELVs or abandoned vehicles as a source of recycled parts, but the county used to have negative policies on recycling and reusing auto parts. Since 1990, the Ministry of Commerce, Industry and Energy has started promoting recycle and reuse of used auto parts, which has resulted in the reuse of all auto parts except the hydrobak, the master cylinder, and some gears possible.

Country :	Republic of Korea

Reference

IDE-JETRO. *Kensyu Sosho No.570 Recycling in Asia.*

(8) Volume, distribution, flow, model years, sale prices, processing situation, check items on trading and resources : steel and non-ferrous metals

Korea has been relying on land filling of wastes for a long time. In 1995, 72.3 percent of municipal solid wastes were land filled and 23.7 per cent were recycled. However, with the help of the government's promotion of recycling in 2007, 57.8 percent were recycled and 23.6 percent were land filled. Furthermore, in 2007, 81.1 percent of the total waste was recycled.

Under the Waste Control Act, the Korean Government promotes the 'Extended Producer Responsibility' (EPR) system in which certain manufacturers are required to reduce the amount of waste. As of 2006, 1,275 companies were subjected to this system.

The results in 2004 showed 7.7 kilograms of waste reduction per 1 ton, which was caused by the major waste reduction in the metal and electronic industry.

References

JETRO. *Industrial Wastes and Recycling Policies in Korea.* (accessed September 2015).

United Nations Environment Programme.

http://www.unep.org/greeneconomy/AboutGEI/SuccessStories/WasteManagementinRepublicofKorea/tabid/29892/Default.aspx (accessed September 2015).

Annex II

Country Reports

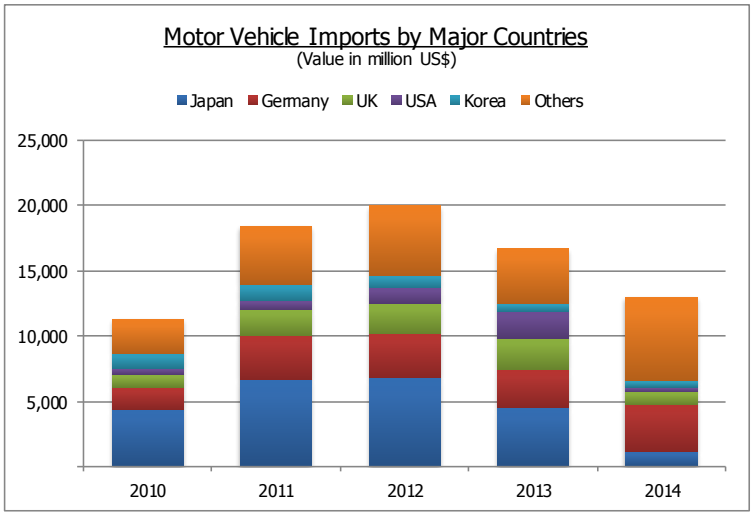
10. Russia

Country :	Russia
1. Current status of automobile recycling in the targeted country	
(1) Imports and exports from Japan and other countries: used cars	

Import

The following graph shows Russia's automobile imports, including used cars, for 2010-2014. The big suppliers during this period were Japan and Germany. However, the share of Japan in 2014 decreased remarkably by about 75 percent. The total import in value was over US$1,300 million in 2014.

Figure A-X.1: Russia's Automobile Imports



UK = United Kingdom, USA = United States of America.

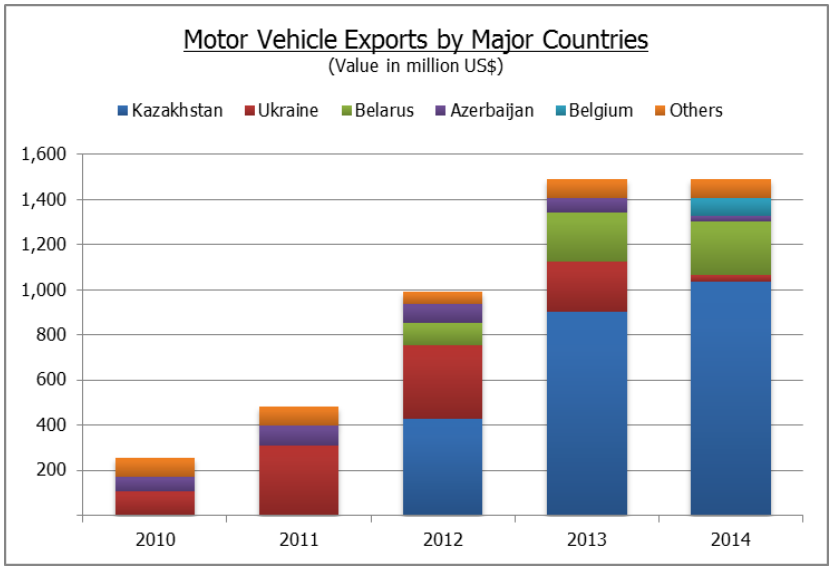
Source: UN Comtrade Database.

Country :	Russia

Export

The volume of export of motor vehicles from Russia was smaller than that of its import volume. Destinations of the vehicles were mainly Kazakhstan, Ukraine, and Belarus.

Figure A-X.2: Russia's Automobile Exports



Source: UN Comtrade Database.

Reference

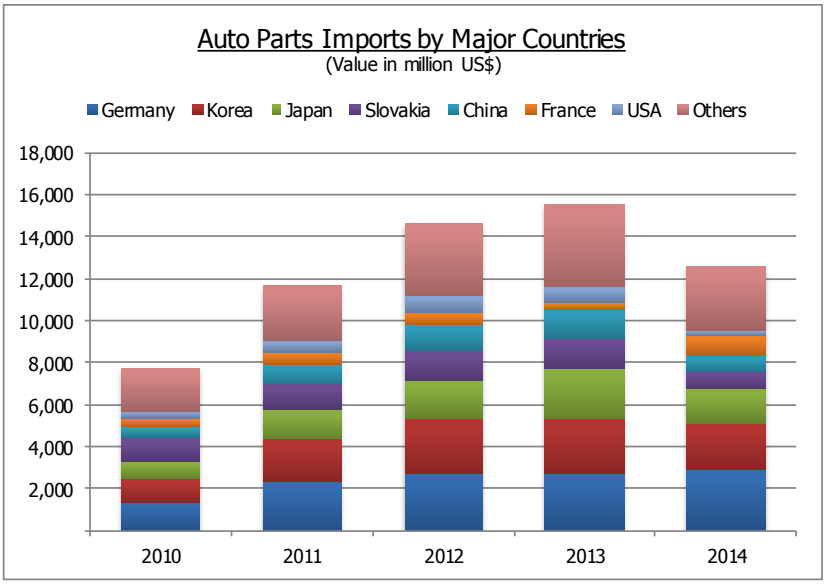
United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(2) Imports and exports from Japan and other countries: used parts

The two graphs below show major importers and exporters of auto parts, including used parts, for 2010-2014.

Country :	Russia

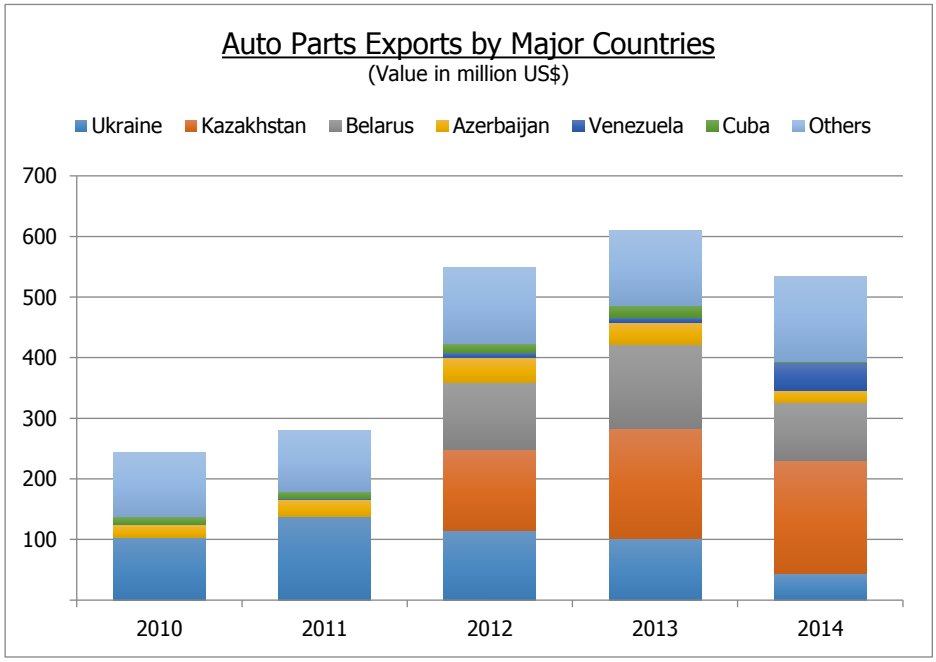
Figure A-X.3: Russia's Auto Parts Imports



USA = United States of America.

Source: UN Comtrade Database.

Figure A-X.4: Russia's Auto Parts Exports



Source: UN Comtrade Database.

Country：	Russia

Reference

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(3) Plans and regulations relating to import

Trade Control

Tariffs:

- The customs duty on new cars is currently 30 percent.

Taxes:

- Imported vehicles must also pay an 18 percent VAT which is calculated on the sum of the CIF value plus the tariff.
- In 2009, the Russian Government introduced new prohibitive import taxes on used cars and trucks. As a result, the sales of used vehicles in Russia drastically reduced and currently constitute a little fraction of what it used to be before 2009.

Other:

- Russia has maintained for several years an auto-industry investment incentive program (Decree 166), which grants Customs preferences on imported auto components in exchange for investors' commitment to meet certain local content and vehicle output targets. As a result of these incentives, many foreign original equipment manufacturers (OEMs), including Ford, General Motors, Hyundai, Nissan, Peugeot-Citroen, Renault, Suzuki, Toyota, and Volkswagen, have established manufacture or assembly operations in Russia. However, in December 2011, Russia introduced a revised incentive program that exceeds Decree 166 in scope. It significantly increased the number of automobiles that each manufacturer must produce annually in Russia (from 25,000 to 350,000), raising the local content requirement from 30 percent to 60

percent. It also cited an array of specific value-added assemblies (e.g. power trains) that must be included in the local content in order to benefit from the tariff privileges.

- The Ministry of Industry and Trade is responsible for negotiations with potential investors in component projects.

Duties and Taxes

Russia implements a rather odd system of tariff for vehicles, which are determined not solely by the Customs price but also by the engine displacement. The smaller of the two regulations are applied. Temporary import for private use is exempt.

Table A-X.1: Import Duties and Taxes for Automobiles

Passenger vehicles	Unit	Import Rate
Motor cars and other motor vehicles principally designed for the transport of persons (other than those of heading 87.02), including station wagons and racing cars.		
automobiles, specially meant for medical purposes	Kg	5%
vehicles operating more than 7 years after release from manufacturing plant	cc	1.4 - 3.2 EURO / cc *According to cylinder capacity
Other		25%

Cc = cubic centimetre, Kg = kilogram.

Source: Federal Customs Service.

Table A-X.2: Duties and Taxes for Automobile Parts

Bodies, parts and accessories of the motor vehicles	HS code	Unit	Import Rate
Bodies (including cabs), for the motor vehicles of headings 87.01 to 87.05.			
- car bodies for transportation vehicles of commodity item 8703:	8707.10		
- - for industrial assembly	8707.10.100	Kg	0%

Country :	Russia		
- - Other:	8707.10.900	Kg	15%
- Other:	8707.90		
- - for industrial assembly	8707.90.100	Kg	15%
- - Other:	8707.90.900	Kg	15%
Parts and accessories of the motor vehicles of headings 87.01 to 87.05.			
for industrial assembly:		Kg	0%
Other:		Kg	5%

HS = Harmonised system, kg = kilogram.

Source: Federal Customs Service.

References

Federal Customs Service. http://eng.customs.ru/index.php?option=com_content&view=article&id=1690&Itemid=1913 (accessed September 2015).

Federal Customs Service. http://eng.customs.ru/index.php?option=com_content&view=article&id=1727:the-procedure-of-temporary-importation-of-vehicles-by-foreign-persons&catid=34 (accessed September 2015).

Federal Customs Service. http://www.russian-customs.org/ (accessed September 2015).

United States Department of Commerce International Trade Administration Office of Transportation and Machinery. *Compilation of Foreign Motor Vehicle Import Requirements*. http://trade.gov/static/autos_report_tradebarriers2011.pdf (accessed September 2015).

Country：	Russia

(4) Plans and regulations relating to vehicle registration

New Car Registration

MOTOTRER (МОТОТРЭР), the State Road Traffic Safety Inspectorate, is responsible for car registration in Russia as determined by Regulation No.938 on 'State Registration of Motor Transportation Means and Other Means of Automotive Vehicles in the Territory of the Russian Federation' in 1994. According to a news report, the annual expense for car registration in Moscow is around RUB80,000. Cars which are brought in temporally are exempt from customs duty, but they must be registered to customs. The Certificate of Transport Means Import (UVTS), issued by the Customs Service, is required to drive foreign registered cars.

Transfer of Registration

Both the previous owner and the new owner have to be present during deregistration as the mechanics compare the numbers of the engine and the chassis with those written in the car's record card or passport, the Pasport Transportnogo Sredstva (PTS) / Паспорт Транспортного Средства (ПТС), which holds all the information about a car and its owner.

After deregistration, a 'For Sale' (Dlya Prodazhi / Для продажи) notice is put on the PTS card. The car receives transit licence plates valid for a certain period and this fact is also incorporated in the PTS, together with the number of the transit plates, the date of receiving them and the term of validity. All these must be signed and stamped by the traffic police officer.

It is possible that this procedure may be carried out by the previous owner in advance and the car already has transit plates. In this case, the new owner should request from the previous owner the completed PTS card. The new owner will need to carefully check the numbers on the plates and in the paper.

In case the transfer of a car takes place between individuals, it is usual for the new owner to ask for the proof of identity and check the person's name against the name in the PTS. If the person is not the owner of the car, then the person has to have an authorised General Power of Attorney to certify his or her right to sell the car.

Country：	Russia

The next step is to make an agreement for selling and buying the car, the Dogovor kupli-prodazhi (DKP)/договор купли-продажи (ДКП). For this, the completed PTS is needed as well as identification of both the seller and the buyer. For foreign nationals, a notarised translated copy of the passport is also required, along with a visa and/or residence permit (and the Power of Attorney, if applicable).

The agreement can be made by the buyer and seller themselves or by a commission autoshop or desk, a service offered by most car dealers (komissionnyi avtomagazin/комиссионный автомагазин) where the agreement will be drawn and certified against a commission. Both the seller and the buyer should be present. After this, the PTS card is updated with the information of the new owner, the date of sale, and the DKP. Then, the PTS is signed by both seller and buyer.

After all these procedures, money can be now exchanged and the ownership of the car is transferred to the new owner. The car has transit numbers with a certain period of validity. Even for the transit period, immediate civil liability insurance (polis OSAGO/полис ОСАГО) with a term of validity of one year is necessary in order to drive the car. This can be obtained in the registration office of MOTOTRER. Before the transit term expires, the car has to be registered by the new owner and permanent Russian registration plates need to be obtained so that the car can be driven legally.

Deregistration

The owner, whether an individual or a dealer, needs to deregister the car in local offices of the State Road Traffic Safety Inspectorate called MOTOTRER.

Inspection

In January 2012, a new federal law No.170 was brought into force, regulating technical inspections for the roadworthiness of a vehicle. For cars older than three years, the technical card issued after this test is required for the compulsory OSAGO insurance policy. Cars under three years old are not required to have this test or card to arrange insurance.

Technical inspections are carried out by commercial companies, known by the law as an ‘operator of technical inspection.’

Country：	Russia

Components tested in these inspections include:

•Emission measurements;

•Steering wheel regulations;

•Head lights and fog lights;

•Windshield wipers;

•Brake systems, including the parking brake; and

•Availability of compulsory equipment: first aid kit, fire extinguisher, emergency triangle sign and a neon reflective vest.

There is no law making snow tires mandatory in Russia in winter.

If something is found that is not within the norm, the driver has 20 days to fix the problem and submit the car for another inspection, which is limited to checking only the requested issues. The price of this inspection differs depending on the individual administrative areas of Russia.

Documents required for the inspection are:

•Proof of identity of the vehicle owner; and

•Vehicle registration document, or the technical passport of the car (PTS).

After the inspection, the operator issues the technical card for the vehicle. For passenger cars older than three years but not over seven years old (including the year of manufacture), inspection is required every 24 months. For cars older than seven years (including the year of manufacture), the inspection must be carried out every 12 months. When buying a new or used car, the new owner is obliged to carry out the first technical inspection within 30 days after registration.

References

Angloinfo. *Registering a New or Used Car in Russia.* http://russia.angloinfo.com/transport/vehicle-ownership/registering-a-car/ (accessed September 2015).

Country：	Russia

Angloinfo. *Vehicle Safety Inspections in Russia.* http://russia.angloinfo.com/transport/vehicle-ownership/vehicle-inspections/ (accessed September 2015).

Federal Customs Service. http://russian-customs.org/ftravelers/ietv/index.html (accessed September 2015).

The Moscow Times. *Car Ownership Easier, More Expensive.* http://www.themoscowtimes.com/business/article/car-ownership-easier-more-expensive/487930.html (accessed September 2015).

(5) Handling of imported used cars and/or accident status quo cars

Imported Used Cars

When importing a motor vehicle across the Russian border, the importer must pay a deposit to Moscow's Customs in advance. The amount of the deposit depends on year of manufacturing and the engine volume in cubic centimetre.

- Cars over three years old with an engine volume of lower than 2,500 cubic centimetres - €1,500
- Cars over three years old with an engine volume of over 2,500 cubic centimetres - €3,500
- Cars under three years old with an engine volume of lower than 2,500 cubic centimeters - €7,000
- Cars under three years old with an engine volume of over 2,500 cubic centimetres - €15,000.

Used cars that are two or more years old and are imported by companies are assessed a 40 percent tariff instead of 46 percent tariff, plus excise tax, plus VAT. Individuals importing used cars pay the same tariff of about $4 per cubic centimetre of engine displacement.

Country：	Russia

Other

In the past, old cars more than 10 years old were typically left on the ground after taking out the spare parts. The periodic implementation of the 'cash for clunkers' program, is expected to help collect ELVs. The latest one started in September 2014, with more than RUB10 billion budget. In the latest round, at least RUB40,000 of subsidy was given by bringing used cars aged more than six years.

References

The Truth About Cars. *Russian Government Moves Ahead With Revived Cash For Clunkers Program.* http://www.thetruthaboutcars.com/2014/08/russian-government-moves-ahead-revived-cash-clunkers-program/ (accessed September 2015).

US News Cars. *Cash for Clunkers Catching On Globally -- Russia Joins Up.* http://usnews.rankingsandreviews.com/cars-trucks/daily-news/090817-Cash-for-Clunkers-Catching-On-Globally-Russia-Joins-Up/ (accessed September 2015).

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Annex II

Country Reports

11. Taipei

Country :	Taipei

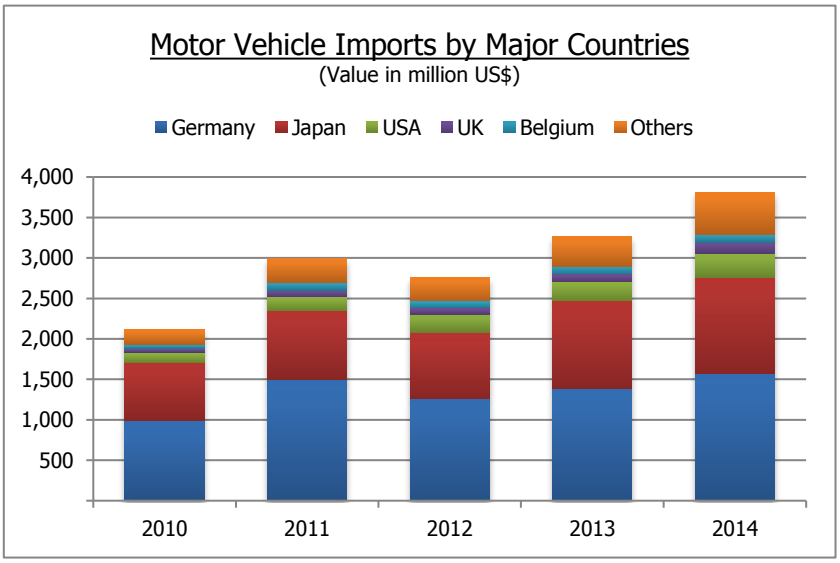
1. Current status of automobile recycling in the targeted country

(1) Imports and exports from Japan and other countries: used cars

Import

The following graph shows Taipei's automobile imports, including used cars, for 2010-2014. The big suppliers during this period were Germany and Japan. The total import in value was over US$3,800 million in 2014.

Figure A-XI.1: Taipei's Motor Vehicle Imports



UK = United Kingdom, USA = United States of America.

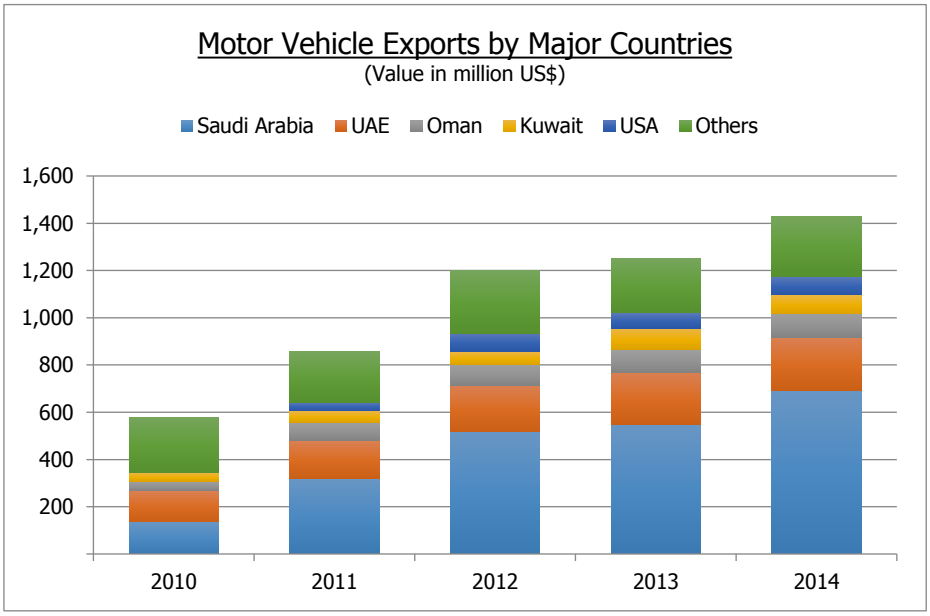
Source: Customs Administration, Ministry of Finance, Taiwan.

Export

The volume of export of motor vehicles from Taipei was smaller than that of its import volume. Destinations of the vehicles were mainly Saudi Arabia and UAE.

Country :	Taipei

Figure A-XI.2: Taipei's Motor Vehicle Exports



UAE = United Arab Emirates, USA = United States of America.
Source: Customs Administration, Ministry of Finance, Taiwan.

Reference

Ministry of Finance, Customs Administration, Taiwan.
https://portal.sw.nat.gov.tw/APGA/GA03E;APGAJSESSIONID=TRCMWKyphYm4FVpNtmpdTx8Pnwjn2SbRL13nJbQRb30fQ1w4q3x1!-1802831680 (accessed September 2015).

(3) Plans and regulations relating to import regulations

Trade Control

Even after the World Trade Organization (WTO) somewhat loosened accession, Taiwan still implements tough import barriers on cars.

Duties and Taxes

Cars costing more than $20,000 must obtain permission from the Board of Foreign Trade. Taxes charged are: import duty of 17.5 percent; commodity tax of 25 percent for ~2,000 cubic

centimetre and 30 percent for 2,001~ cubic centimetre; business tax of 5 percent; and trade promotion service fee of 0.04 percent. Cars exceeding in value above TWD 1,945,000 (2,000 cubic centimetre and under) or TWD 1,870,000 (2,001 cubic centimetre and above) would be charged specially selected goods and services tax of 10 percent. For used cars, Customs values are calculated using the method specified by Customs Administration.

Table A-XI.1: Duties and Taxes for Automobile Parts

Parts and accessories of the motor vehicles of headings 87.01 to 87.05.	HS code	Unit	Import Rate
Bodies (including cabs), for the motor vehicles of headings 87.01 to 87.05.			
- For the vehicles of heading 87.03:	87.07.10	Kg	15%
- Other:	87.07.90	Kg	2.5 - 15%
Parts and accessories of the motor vehicles of headings 87.01 to 87.05.			
- Bumpers and parts thereof:	8708.10	Kg	12.5%
- Other parts and accessories of bodies:	8708.20	Kg	2.5 - 15%
- Brakes and servo-brakes; parts thereof:	8708.30	Kg	5 - 15%
- Gear boxes and parts thereof:	8708.40	Kg	0%
- Drive-axles with differential, whether or not provided with other transmission components, and non-driving axles; parts thereof:	8708.50	Kg	2.5 - 15%
- Road wheels and parts and accessories thereof:	8708.70	Kg	5 - 15%
- Suspension systems and parts thereof (including shock- absorbers):	8708.80	Kg	15%
- Other parts and accessories:	8708.90	Kg	2.5 - 25%

HS = Harmonised system, Kg = kilogram
Source: Customs-Port-Trade Single Window, Customs Administration.

References

CPT Webpage. http://portal.sw.nat.gov.tw/PPL/ (accessed September 2015).

The Customs Administration, Ministry of Finance. http://eweb.customs.gov.tw/ct.asp?xItem=44745&ctNode=6493 (accessed September 2015).

Country：	Taipei

(4) Plans and regulations relating to vehicle registration

New Car Registration

Obtaining a Taiwan licence plate requires registration at the Motor Vehicle Office where a car inspection fee is charged.

Transfer Registration

The transfer of ownership must be completed at a local Motor Vehicle Office in the presence of both the previous owner and the new owner of a vehicle. Documents needed in the procedure are as follows:

•Proof of identity of both the previous and the new owner

•Driving licence

•Proof of insurance

•Copy of the licence plate registration certificate.

There is also a fee to be paid for the procedure.

Most sellers expect a deposit to be paid before transferring ownership.

Cars over ten years old and motorcycles over five years old must undergo a Provisional Inspection for Transfer of Vehicle Ownership at any Motor Vehicle Office.

Inspection

Vehicle inspection is placed under the control of the Ministry of Transport and Communications (MOTC).

Vehicles aged between five and ten years must be inspected annually. Private vehicles under five years are not subject to inspection unless they are going through a change of ownership, or have been recovered after being stolen. Private cars that are more than 10 years old must be inspected twice a year.

Commercial vehicles or those using liquid petroleum gas (LPG) or compressed natural gas (CNG)

Country：	Taipei

must also undergo an annual inspection if less than five years old and twice a year if over five years old.

The inspection must be arranged within one month before or after the due date. One can be fined if the inspection occurs after the due date and the number plates will be suspended if the time exceeds one month. The licence plates are cancelled if the inspection has not been carried out after six months from the due date.

Checks include:

•Brakes

•Lights

•Wheel alignment

•Emissions

•Specification.

Documents required:

•Vehicle Registration Licence

•Motor insurance certificate (valid for at least 30 days)

•Fee.

References

Angloinfo Webpage. http://taipei.angloinfo.com/information/transport/vehicle-ownership/importing-a-vehicle/ (accessed September 2015).

Angloinfo Webpage. http://taiwan.angloinfo.com/transport/vehicle-ownership/buying-a-new-car/ (accessed September 2015).

Angloinfo Webpage. http://taiwan.angloinfo.com/transport/vehicle-ownership/vehicle-inspection/ (accessed September 2015).

Country：	Taipei

(5) Handling of imported used cars and/or accident status quo cars

Imported Used Cars

Since 2002, used vehicles manufactured in WTO countries can be imported into Taiwan. However, the car should have been manufactured in accordance with Taiwanese regulations.

Requirements are not limited to, but include:

•The vehicle meeting EUR 4 emissions standards

•The car being left-hand drive

•The car having a metric speedometre.

Imported used vehicles are subject to import duty and other levies, including commodity tax, business tax, and trade promotion service fee, as explained below.

- Customs value = FOB + F (freight) + I (insurance)
- Import Duty = Customs value × 17.5 percent
- Commodity Tax = (Customs value + Import Duty) × Commodity Tax Rate (25 percent for cars of 2,000 cubic centimetre and below; 30 percent for cars of 2,001 cubic centimetre and above)
- Business Tax = (Customs value + Import Duty + Commodity Tax) × 5 percent (Business Tax Rate)
- Trade Promotion Service Fee = Customs value x 0.04 percent (Trade Promotion Service Fee Rate).

References

Angloinfo Webpage. http://taiwan.angloinfo.com/transport/vehicle-ownership/importing-a-vehicle/ (accessed September 2015).

Country：	**Taipei**

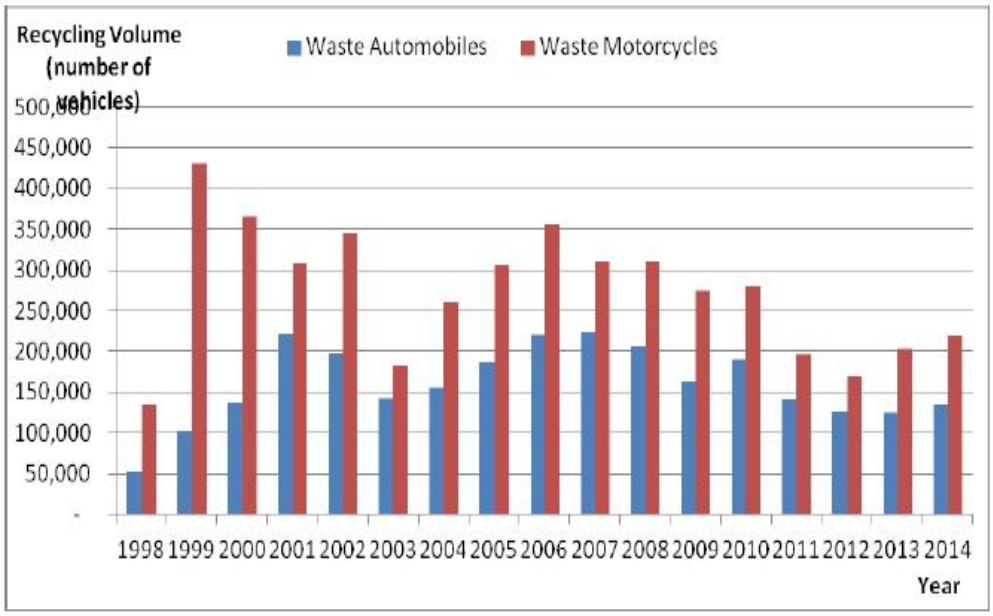
Customs Administration, Ministry of Finance. http://eweb.customs.gov.tw/ct.asp?xItem=44745&ctNode=6493 (accessed September 2015).

(6) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: end-of-life vehicle

Volume

According to the Environmental Protection Administration, about 125,000 cars were recycled in 2013. The resource collection rate of waste motor vehicles in 2013 was about 65.39 percent.

Figure A-XI.3: Number of Inspected and Certified Waste Motor Vehicles Recycled



Source: Environmental Protection Administration.

The above figure describes the number of inspected and certified waste motor vehicles recycled over the past 17 Years.

Country：	Taipei

Distribution

Yulon, the largest automaker in Taiwan, plans to set up at least 30 such sales points throughout Taiwan, making MyCar the largest used car distribution mechanism on the island within the coming two years. It has an estimate annual transaction volume of over 20,000 second-hand automobiles.

Flow

Taiwan has more than 200 scrap car dismantling yards and five crushing plants. ELVs are collected through public, police, and car repair shops. In the yards, batteries, oils, and tires are taken out to avoid pollution. These materials are separately treated. The remaining body would be pressed to take out valuable metals. ASR generated is then sent to a separation factory in which iron and non-ferrous metals are recovered.

Sales Prices

Toyotas are able to command relatively high prices in the used-car market, amounting to about 70 percent of the original price for a three-year-old car. (The level is similar for another Japanese brand, Honda).

Used cars with less than one year of usage are priced at 80 percent of the new car equivalent, and an extra five percent discount is given for every additional year of usage.

Processing Situation

The 4-in-1 recycling program promoted by the EPA since January 1997 is a system that uses recycling, clearance, and disposal fees collected from manufacturers and importers to establish a recycling fund, which is then used to subsidise the recycling disposal system and extend the responsibility of these enterprises. This system provides adequate economic incentives to encourage the development of recycling and reuse industries, and to create output value and employment opportunities.

Other

Taiwan has a ‘car recycling incentive’ scheme that is similar to the ‘cash for clunkers’ programs practiced in other countries. The collection of ELVs is conducted in an organised way, equipped

with web-based reporting system for recycle businesses.

According to the statistics provided by the Recycling Fund Management Board of Taiwan, there are 303 ELV recycling operators in Taiwan and five shredding and sorting plants throughout the country.

Most of automotive companies in the Taiwan market have had similar certified-quality used-car programs known as certified pre-owned (CPO) systems.

References

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Recycling Found Management Board. http://recycle.epa.gov.tw/Recycle/index2.aspx (accessed September 2015).

Taiwan Sourcing Service Provider. *Yulon launches used car flagship store in central Taiwan.* http://www.cens.com/cens/html/en/news/news_inner_15149.html (accessed September 2015).

(7) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: recycled parts

Volume

Around 100,000 tons of tires have been recycled each year from 1999 to 2013. In 2013, the collection rate of waste tires was 62.26 percent.

Country：	Taipei

Figure A-XI.4: Volume of Inspected and Certified Waste Tires Recycled

Source: Environmental Protection Administration.

The above figure describes the volume of inspected and certified waste tires recycled over the past 17 years.

Flow

Lead-acid battery wastes are initially divided into those for machine crushing or for manual cutting. Machine crushing refers to the dismantling process where the entire lead-acid battery wastes are inserted into an equipment for crushing. The pieces will then be processed by a sorting machine to recycle the lead and plastic parts. Manual cutting involves placing the entire lead-acid battery waste on a mechanical cutting machine, then the battery's upper cover will be cut manually and the lead plate will be taken out. The plastic shell will be crushed into plastic pieces by a crushing equipment, whereas the recycled lead-containing materials will be sent to separators or refining furnaces and made into lead ingots. The lead ingots can be sold to lead-acid battery manufacturers or other metal enterprises as a raw material; and the plastic pieces can be sold to plastic manufacturers, who will reprocess them into plastic pellets as a raw material for making plastic products. The waste battery acid collected in the dismantling process will be processed by sewage treatment facilities.

The principal handling method for waste tires is to crush them into pieces or powders, which will then be reused in cogeneration plants, cement plants, paper mills as auxiliary fuels, or pyrolysis materials in some cases. By heating them and adding cement agents, rubber powders

Country：	Taipei

can also be pressed into grass planting tiles, wood protecting tiles, rubber mats, rubber trail tiles, heat (sound) insulating mats, parking bumpers, corner protector strips, hanging seats, and other crush-proof facilities. Apart from renewable products, waste tires can also be used as additives for making synthetic rubber or other rubber products.

Processing Situation

The recycling of lead-acid batteries have increased in Taiwan, reaching more than 50,000 tons in 2011-2013. The resource collection rate for lead-acid battery wastes in 2013 was 81.72 percent.

Reference

Recycling Found Management Board. http://recycle.epa.gov.tw/Recycle/en/index.html (accessed September 2015).

(8) Volume, distribution, flow, model years, sales prices, processing situation, items on trading and resources: steel and non-ferrous metals

1) Steel

Volume

From 2010 to 2014, the average annual recycling volume of iron reached 55,783 tons.

Flow

After removing the paint, waste iron containers are sent to steel smelting plants as a mixed material for the smelting process, to be reused in different types of steel products.

Other

In April 2005, the motor vehicle industry took over the responsibility for crushing, sorting, and disposing waste iron containers.

Country：	Taipei

2) Non-ferrous Metals

Volume

The recycling volume of aluminum containers decreased from 4,404 tons in 2009 to 4,627 tons in 2014. The average annual certified recycling volume was 6,248 tons over the last five years.

Table A-XI.2: Recycling Volume of Waste Metal Containers over the Years

Year	Waste Iron Containers Unit: Tons	Waste Aluminum Containers Unit: Tons
2000	53,557	9,393
2001	61,489	11,295
2002	55,514	15,090
2003	43,381	12,892
2004	19,500	12,271
2005	8,589	10,669
2006	43,642	7,914
2007	41,913	6,112
2008	46,313	6,073
2009	59,454	4,404
2010	48,149	6,116
2011	64,094	5,892
2012	61,488	7,182
2013	52,497	7,422
2014	52,686	4,627

Source: Environmental Protection Administration.

Flow

The reuse method for waste aluminum containers is to smelt them first and transform them into aluminum ingots or aluminum-magnesium composite ingots, which will then be processed to make products like auto rims, and aluminum doors and windows for households.

Country：	Taipei

Other

Though quantities are unknown, the recovery of steel and non-ferrous metals in Taiwan is advanced, using metal separation equipment. Pressed car scraps are crushed by crushers. The metal dust would be separated by wind and later by magnetic separation processes. Recovered metals would be sent to respective metal plants.

References

Recycling Found Management Board. http://recycle.epa.gov.tw/Recycle/en/index.html (accessed September 2015).

Recycling Found Management Board. http://recycle.epa.gov.tw/Recycle/index2.aspx (accessed September 2015).

Annex II

Country Reports

12. Thailand

Country :	Thailand

1.The current status of automobile recycling in the targeted countries

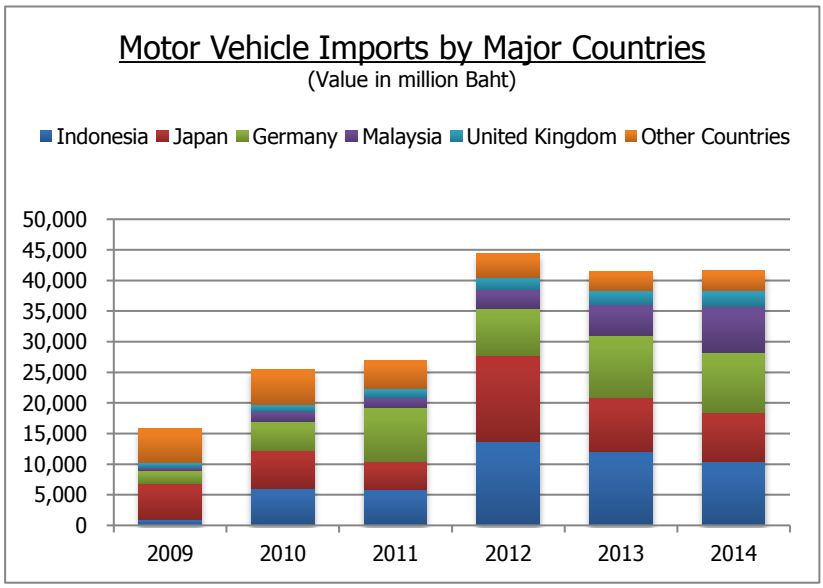
(1) Imports and exports from Japan and other countries: used cars

Import

The importation of used cars in Thailand is strictly regulated. Used/second-hand vehicles need to obtain an import permit from the Foreign Trade Department of the Ministry of Commerce. For vehicles that weigh less than 3,500 kilograms, the importer needs to obtain an import permit from the Industrial Standard Institute as well.

The cumulative bar graph shows automobile (HS code: 870321 - 870390) imports, including used cars, for 2009 - 2014. The total volume of imports in 2012 grew by 16 percent from the previous year due to the Thai Government's incentive program for first-time car buyers.

Figure A-XII.1: Thailand's Automobile Imports



Source: Thailand Ministry of Commerce.

Country :	Thailand

Table A-XII.1: Number of Used Passenger Motor Cars Exported from Japan

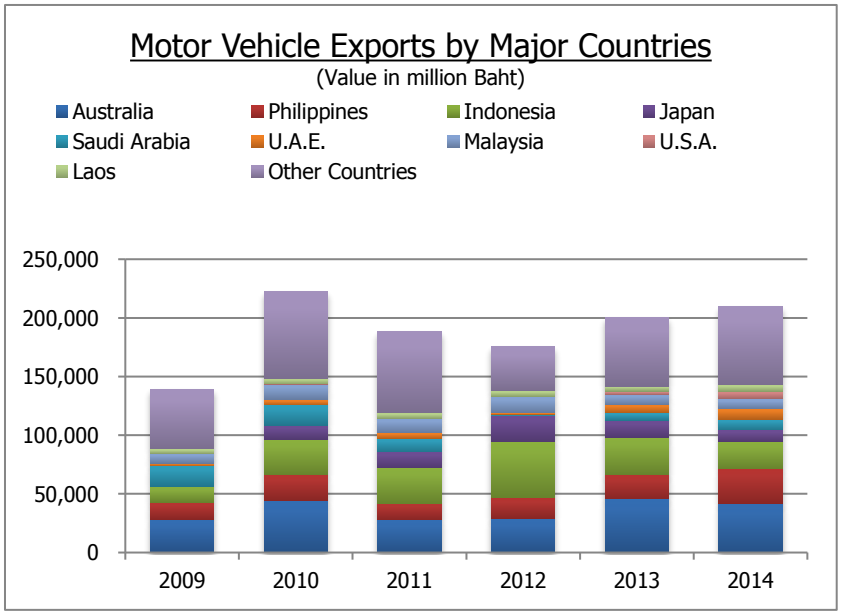
Year	2010	2011	2012	2013	2014
Thailand	11,656	9,016	5,787	5,775	7,222
World	672,627	699,881	830,703	947,990	1,059,617
Share of Thailand	1.7%	1.3%	0.7%	0.6%	0.7%

Source: Trade Statistics of Japan, Ministry of Finance.

Export

The major destinations of Thailand's automotive exports were Australia, Philippines, and Indonesia, which has accounted for about 50 percent of exports worldwide during 2012 to 2014.

Figure A-XII.2: Thailand's Automobile Exports



UAE = United Arab Emirates, USA = United States of America.

Source: Thailand Ministry of Commerce.

Country :	Thailand

References

Ministry of Commerce, Thailand. http://www2.moc.go.th/main.php?filename=index_design4_en (accessed September 2015).

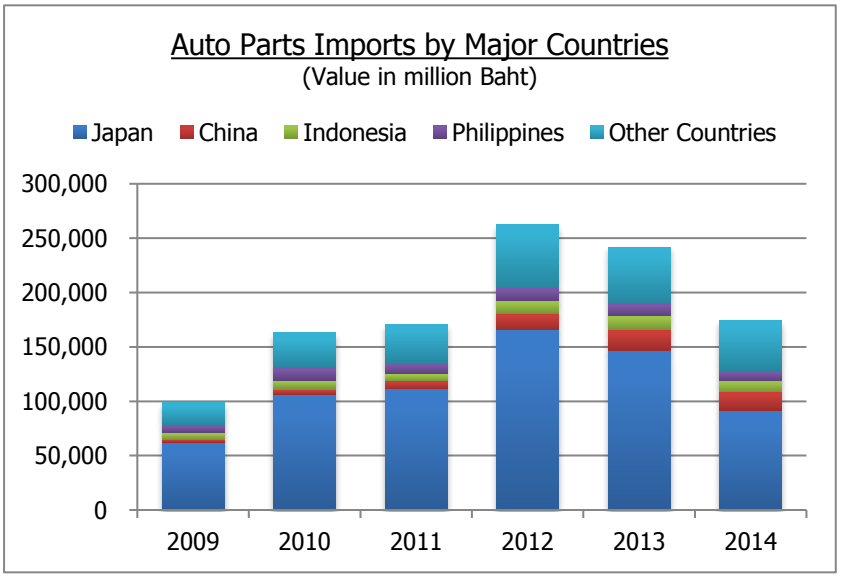
Trade Statistics of Japan Ministry of Finance. http://www.customs.go.jp/english/index.htm (accessed September 2015).

(2) Imports and exports from Japan and other countries: used parts

Import

Thailand prohibits the importation of used tires, used engines, and used parts for motorcycles. The importation of used diesel engines requires an import permit. Thailand imports many half-cuts and used parts from other countries, mainly from Japan. Many used parts recyclers/traders dismantle half-cuts. Some used parts are domestically used and others are exported. For example, some diesel engines are exported to Dubai.

Figure A-XII.3: Thailand's Auto Parts Imports



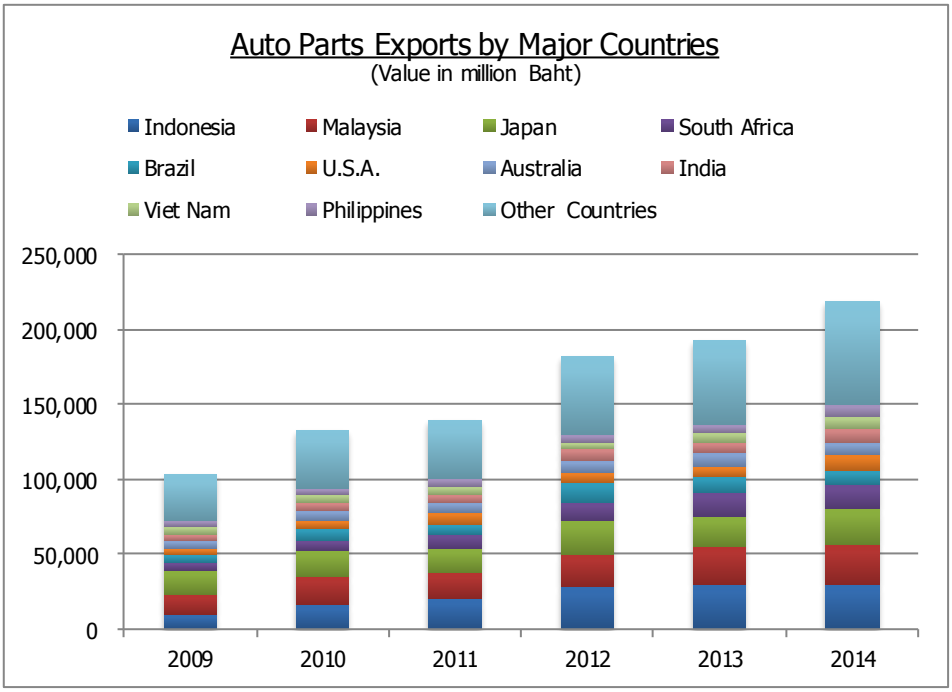
Source: Thailand Ministry of Commerce.

Country :	Thailand

Majority of Thailand's automotive parts exports are original equipment manufacturer (OEM) parts, comprising almost 75 percent of all exports. During the period, Japan was the biggest supplier, which accounted for a little over 60 percent of its global vehicle imports on average. In 2012, the Japanese trade value increased 150 percent from the previous year, largely due to the abolition of import duty on 80 auto parts under the Japan-Thailand Economic Partnership Agreement.

Export

Figure A-XII.4: Thailand's Auto Parts Exports



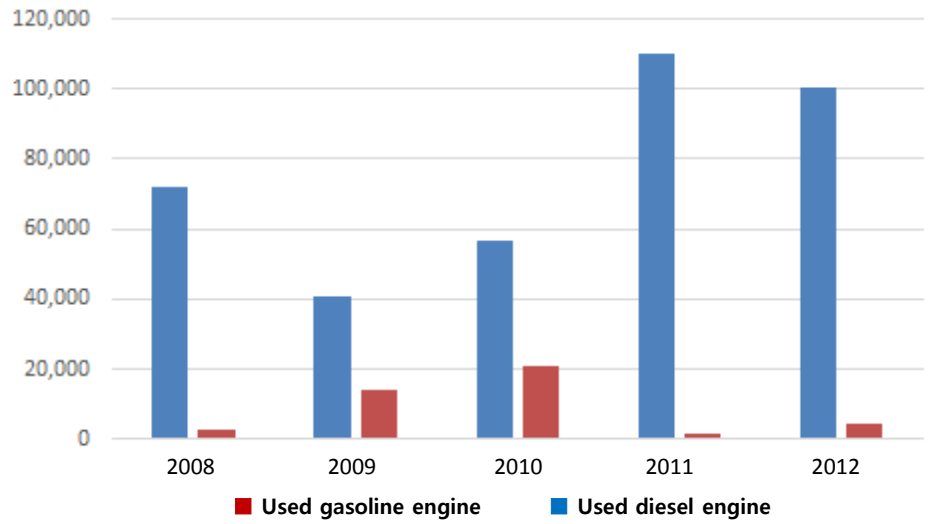
USA = United States of America.

Source: Thailand Ministry of Commerce.

The two graphs below show the import and export of used engines in Thailand for 2008-2012.

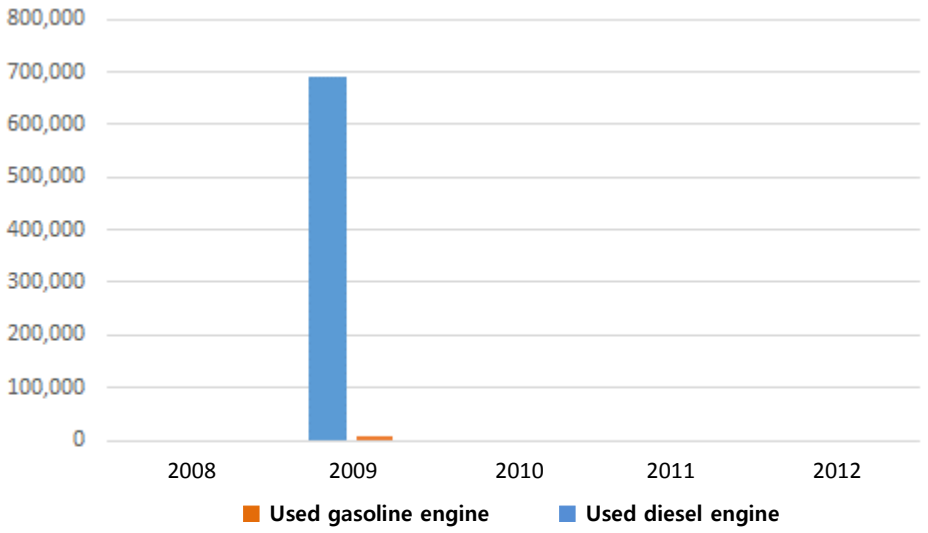
Country :	Thailand

Figure A-XII.5: Import of Used Engines



Source: United Nations Commodity Trade Statistics Database.

Figure A-XII.6: Export of Used Engines



Source: United Nations Commodity Trade Statistics Database.

Country：	Thailand

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United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

Yano Research Institute. *ASEAN Automobile Recycling 2014.* Field Survey of the Study Team.

(3) Plans and regulations relating to import regulations

Trade Control

Permanent Import of Personal Vehicles

New vehicles of all types that have not yet been registered abroad are allowed to be imported without applying for an import permit from the Ministry of Commerce. However, for vehicles that weigh less than 3,500 kilograms, the importer has to obtain an import permit from the Industrial Standard Institute.

Importers of used/second-hand vehicles need to obtain an import permit from the Foreign Trade Department of the Ministry of Commerce before the arrival of the vehicles, otherwise he/she shall be liable to a fine equal to 10 percent of the price of the vehicle but not less than B1,000 or more than B20,000. For vehicles that weigh less than 3,500 kilograms, the importer needs to obtain an import permit from the Industrial Standard Institute as well.

Criteria for Permanent Import of Used/Second-hand Vehicles

- An importer is eligible to import only one used/second-hand vehicle for personal use.
- If the importer is a non-resident, he/she is required to stay in Thailand for at least one year and to present a non-immigrant visa issued by the Immigration Bureau and the National Police Office, together with a work permit issued by the Ministry of Labor and Social Welfare at the time of importation.

- If the importer is a Thai resident marrying a foreigner, he/she is required to present documentary evidence of marriage and proof of change of residence to Thailand. The importer has to own and possess the imported vehicle for at least one-and-a-half-years while staying abroad, from the date of transferring the ownership to the date of arrival in Thailand.
- If the importer is a Thai resident, he/she is allowed to import a vehicle only when such vehicle is accompanied by the owner on the change of residence and he/she has owned and possessed the imported vehicle, together with the valid driving licence for at least one-and-a-half years while staying abroad.

Duties and Taxes

According to the Customs Department of Thailand, import duties and taxes are due when importing auto vehicles to Thailand, whether by a private individual or a commercial entity. The valuation method used is the Cost, Insurance and Freight (CIF) method, which means that the import duties and taxes payable are calculated on the complete shipping value, which includes the cost of the imported vehicles, the cost of freight, and the cost of insurance. In addition to duty, imports are subject to sales tax (VAT), and in some cases, to excise tax, interior tax, and surcharge. Goods imported to Thailand are subject to a 7 percent VAT, calculated over the CIF value plus any applicable duty.

Table A-XII.2: Import Duties and Taxes for Automobiles

Vehicle Type		Import Duty	Excise Tax	Interior Tax	VAT
Passenger vehicles	Below 2,400cc	80%	35%	10%	7%
	2,400cc - 3,000cc	80%	41%	10%	7%
	3,000cc and above Or 220+ horsepower	80%	48%	10%	7%
Off-road vehicles		80%	33%	10%	7%
Pick-up trucks		60%	33%	10%	7%

Cc = cubic centimeter, VAT = Value Added Tax.

Source: The Customs Department.

Country :	Thailand

As shown in the table on Import Duties and Taxes for Automobiles, the high duty imposed on auto vehicles remains an impediment to access the Thai auto market. Ad valorem tariffs can be as high as 80 percent for imports that compete with domestically produced automobiles and parts. In addition, excise taxes on automobiles in Thailand are based on various vehicle characteristics such as engine size, weight, and wheelbase. The tax calculation remains complex and heavily favors domestically manufactured vehicles. Regarding excise taxes on automobiles, the Thai Government started taxing vehicles based on carbon dioxide (CO_2) emission rather than engine size from 1 January 2016.

Import duties and taxes on used parts and accessories are as high as used vehicles. The ad valorem rate varies from 60 percent to 80 percent. However, the following rates are variable or reduced to 0 percent, depending on economic agreements between Thailand and foreign countries

Table A-XII.3: Duties and Taxes for Automobile Parts

Bodies, parts, and accessories of the motor vehicles	HS code	Unit	Import Rate
Bodies (including cabs), for the motor vehicles of headings 87.01 to 87.05.	8707	Kg	80%
Parts and accessories of the motor vehicles of headings 87.01 to 87.05.	8708	Kg	60%

HS = Harmonised system, kg = kilogram.

Source: The Customs Department, Thailand.

Other

Thailand has prohibited the importation of used vehicles and parts to protect and promote its own motor industries, as have other developing countries.

References

Hello Bangkok Thailand. http://hellobangkokthai.com/ (accessed September 2015).

Pitney Bows Global Trade Solutions. http://www.dutycalculator.com/country-guides/Import-

Country：	Thailand

duty-taxes-when-importing-into-Thailand/ (accessed September 2015).

The Customs Department. http://igtf.customs.go.th/igtf/en/main_frame.jsp (accessed September 2015).

The Customs Department. http://www.customs.go.th/wps/wcm/connect/custen/individuals/importing+personal+vehicle/importingpersonalvehicle (accessed September 2015).

(4) Plans and regulations relating to vehicle registration

The Department of Land Transport under the umbrella of the Ministry of Transport is in charge of new car registration, transfer or selling of licences, re-registration, suspension, and deregistration.

New Car Registration

In Thailand, all types of vehicles must be registered. The Department of Land Transport (f) is in charge of car registration and inspects vehicles in the following manner:

- Private inspection stations authorised by the Department of Land Transport (DLT) carry out inspections of vehicles registered under the Motor Vehicle Act (MVA), i.e. motorcycles and taxis.
- Car owners have to pay Road Tax.
- Compulsory insurance is also required.

DLT administers two relevant pieces of legislation:

- The Motor Vehicle Act (MVA): smaller vehicles, including cars, pick-ups, and motorcycles, taxis, and so on.
- The Land Transport Act (LTA): heavy-duty diesel vehicles, including buses and trucks.

A motor vehicle shall be registered at a Land Traffic Office that has jurisdiction over the car owner's registered address. If the owner mostly wants to use the vehicle at some other area, he/she may have it registered at the Land Traffic Office with such jurisdiction.

Country：	Thailand

The tax fee for the registration depends on the type and age of the vehicle. Typically for a motorbike, it is around B300 - B400. For a car, it starts at around B1,000 (for engines up to 2,000 cubic centimetres). The average price is about B2,000 but it can go up to B6,000 to B7,000 for a 4-door pick-up and similar vehicles. The fee is the same each year for the first five years, then it is reduced by 10 percent every year up to a maximum of 50 percent.

At present, motorcycles and cars aged more than five and seven years respectively must be inspected before their motorcycle registration can be renewed. The registration system relies on a log book which is tied to the vehicle or motorcycle.

Transfer or Selling of Licence

Car owners are required to transfer of registration in case of change of ownership, colour and engine.

Re-registration

Registration of cars are required every year and the car owner has to propose certifications of automobile tax, inspection, and compulsory insurance at the time of registration.

Suspension

In case of suspension of use of a registered car over 15 days, the car owner is required to submit an application.

Deregistration

Deregistration is obliged within 15 days after the owner has stopped using the vehicle. If a car owner does not pay the registration fee for more than three years, the car will be automatically deregistered.

Inspection

Responsibilities for periodic inspection of in-use vehicles are divided as follows:

- DLT inspects vehicles regulated under the LTA;
- Private inspection stations authorised by DLT carry out inspection of vehicles registered under the MVA, i.e. motorcycles and taxis.
- The Ministry of Industry supported the improvement of automotive testing centres,

Country :	Thailand

enabling the testing centres to conduct testing according to international standards as well as testing related to non-tariff measures to trade e.g. ELV management and Volatile Organic Compounds.

- DLT established the privately operated system of inspection stations in 1994. There are 225 centres in the Bangkok Metropolitan Region (BMR) — 169 centres in Bangkok, with a further 56 in the surrounding provinces that make up the balance of the BMR. About 70 percent of the centres also repair vehicles.

Personal vehicles are required to undergo inspection every year after seven years from new registration. Commercial vehicles have to take an inspection every year after registration.

DLT has 13 staff in Bangkok who are responsible for monitoring the quality of inspections but each station is only monitored, on average, three times per year. There is no centralised reporting.

Penalties

Based on the Protection for Motor Vehicle Accident Victims Act B.E. 2535, any person who fails to subscribe to compulsory insurance or to renew the insurance in case of expiration shall be liable to a fine of B10,000 to B50,000.

Any person who drives a motor vehicle without a proper driver's licence is subject to imprisonment not exceeding one month or a fine not exceeding B1,000.

Other

Three organisations have responsibility for on-road enforcement of vehicle emissions standards. These are: The Police, under the Ministry of Interior; DLT under the MOTC; and the Pollution Control Department (PCD).

References

Motor Vehicle Act, Thailand. http://driving-in-thailand.com/motor-vehicle-act/ (accessed September 2015).

Country：	Thailand

Vehicle Registration and Inspection in Thailand.

http://infofile.pcd.go.th/air/DIESEL2_Vehicle%20Registration%20and%20Inspection.pdf?CFID=804176&CFTOKEN=86882656 (accessed September 2015).

(5)Handling of imported used cars and/or accident status quo cars

The transactions on used cars are conducted in so called 'Tents' or small retail used car dealers. Person-to-person dealing is common.

Dismantlers and used car parts dealers buy damaged cars, putting an advertisement on the web.

Accident cars and used cars are sold by auction. There are three major auction areas in Bangkok: Manheim, Apple, and Union. Some of the used cars are actually moved and shown in auction areas. For ELVs that cannot be moved, photos are shown to buyers.

Some auctions for used cars have bid prices of B294,000 and B510,000.

Reference

Yano Research Institute. *ASEAN Automobile Recycling 2014.* Field Survey of the Study Team.

(6) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: end-of-life vehicle

Volume

The number of ELVs in 2014 was 163,577.

The number of used car distribution in 2013 was about 2 million.

Yano Research Institute forecast the estimate of the number of ELVs below:

Country：	Thailand

Table A-XII.4: Forecast of the Number of ELV in Thailand

Year	2013	2014	2015	2016	2017	2018	2019	2020
# of ELVs	164,934	163,577	195,214	233,902	272,002	326,282	378,430	411,596

ELV = end-of-life vehicle.
Source: Yano Research Institute.

Model years

One sample of the model year of the ELV brought to a dismantler is 1990.

Price

The price range of used cars is from B300,000 to B800,000.

Used cars ranging from B350,000 to B400,000 are popular.

According to the field survey conducted by EX Research Institute, the purchase price of ELVs range from B3,000 to B8,000.

Distribution

In Thailand, drivers continue to use old types of used cars. When used cars become older and older, they are likely to be resold from urban to rural areas or from Thailand to neighbouring countries such as Myanmar, Lao PDR, and Cambodia. Therefore, ELVs are seen in rural areas.

In most cases, used parts recycler/traders run the dismantling business. Although there are few dismantlers in the urban area, they buy old cars through the WEB advertisement or on a person-to-person basis. The old cars are dismantled and the dismantled parts are sold to end users or repair shops. Steel scraps are also sold to the scrap trading companies in the neighbouring areas.

Some of the industrial scrap trading companies are considering introducing shredders, however the amount of generation is not enough to introduce shredders for ELVs.

Processing situation

Country :	Thailand

Domestic and imported ELVs are dismantled in dismantling companies. Dismantling is conducted mainly by hand and waste oils and CFCs are not properly treated, which threatens labour safety.

Steel scraps generated in the process of dismantling are sent to recyclers and mufflers, including rare metals, which are sold to recyclers.

References

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Field Survey of the Study Team.

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(7) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: recycled parts

Volume

Used parts are imported as half-cuts or parts. According to a company interviewed by the study team, they import around 10 to 15 40-feet containers annually. EX Research Institute estimates the import of used engines to be over 100,000 units annually in 2011 and 2012.

Flow

There are huge hubs of used parts trade in Thailand. Thailand imports many half-cuts and used parts from other countries, mainly from Japan. Many used parts recyclers/traders dismantle half-cuts. Some of the used parts are used domestically and the others are exported.

Areas where used parts dealers gather are dotted in Thailand. Small-scale dealers conduct their business in those areas. There are dealers that specialise in an item and they deal with used parts coming from both inside and outside the country. These dealers send their dismantling skilled staff to dismantling workplaces in Japan and then import used parts from Japanese dismantling sites where their staff work.

Country：	Thailand

In addition, automotive repairers, parts brokers, and end users purchase parts from these used parts recyclers/traders.

As previously mentioned, the used parts could be re-exported. Thailand allows dealers to import only those which can be sold as parts if they are valuable as resources.

Sale Prices

According to the interview conducted by the field study team, some used parts are sold as follows:

- Half-cuts: Procured at B35,000 and sold at about B80,000;
- Engines: Sold at about B20,000 if the brand new part is B100,000; and
- Handles: Price with airbag is B1,200 and without airbag is B4,500 to B5,000.

Used Parts Market

Taxi companies maintain their taxis by themselves. For repair, they select new genuine parts, imitation parts, and used parts in consideration of quality and price. Used parts are used for expensive parts such as gear boxes, compressors, and the like. Imitation parts are made in China and Taiwan. An example of the price range is as follows: new genuine parts B100, imitation B30, used parts B30. For engines, people use used parts. For new model cars, there are not so many used parts available. Therefore, people use new genuine parts first and then use imitation parts after one year, and then use used parts after two or three years. Used parts shops provide two-year warranty. Recently, most used parts imported from Japan cannot be used. There is minor difference of specification between the same model sold in Thailand and Japan.

Taxi cars are allowed to be used for a maximum of nine years. After nine years, two of ten cars are stored as sources of parts for repair and the others are sold to used car dealers. Sometimes, taxi drivers buy them at low prices. Taxi drivers use them by themselves or sell them to other owners. Many of these cars are automatic and therefore the parts are not easy to utilise as second-hand.

Country：	Thailand

Used tires are sold to used tire dealers. Airbags started to be installed from 2014.

Industry Association

Thailand's Used Car Association promotes the cooperation among used car dealers by improving their marketing potential and standard of products and services to be recognised internationally.

References

EX Research Institute. *Survey on recycling law and business in Asia 2014.*
http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Field Survey of the Study Team.

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(8) Volume, distribution, flow, model years, sale prices, processing situation, items on trading and resources: steel and non-ferrous metals

1) Steel

Steel scraps are recycled in steel manufacturing companies. Steel scraps are sent to scrap trading companies and then sold to steel manufacturing companies.

A certain level of quality must be maintained during the sorting process as the mixture of the steel and other materials causes quality deterioration. Steel scrap is subject to component analysis.

Table A-XII.5: Volume of Steel Scrap Generation in Thailand

Year	2008	2009	2010	2011	2012
Steel Scrap (ton)	2,583	2,617	3,321	2,996	2,283

Source: Nikkan Shikyo Tsushin sya.

Country：	Thailand

There are about 20 scrap recycling mills such as TATA, G Steel, GJ Steel, Siam Yamato Steel, and Triumph Steel in the country according to the Iron and Steel Institute of Thailand. The sector has a healthy appetite for steel scrap. However, the field study found that domestically generated scrap can only meet half of its overall demand of six million tons. Therefore, the sector needs to depend on foreign imports. The domestic generation comes from two sources — mill and industrial scrap generated from the manufacturing process; and post-consumer scrap including steel cans or old steel products including construction and demolition materials. The ratio seems to be 3:7 according to an industry source.

Table A-XII.6: Electric Furnace Companies in Thailand (1,000 tons per year)

Company	Crude steel: converter	Crude steel: electric furnace	Slab	Billet	Bloom
Tata Steel	500	1,480		1,480	
G steel (include GJ steel)		3,300	3,300		
Siam Yamato Steel		1,330		1,350	
others		2,380		2,380	
Total	500	8,490	3,300	5,210	0

Source: JFE Techno Research.

2) Non-ferrous Metals

Non-ferrous metals such as rare metals and copper are recycled in manufacturing companies. Non-ferrous metals are also sent to scrap trading companies and sold to manufacturing companies.

The volume of automobile catalyst generated, including that of commercial vehicle, was estimated to be about 600 tons in 2011.

For aluminum scrap, Daiki Aluminium Industry is one of the major aluminum recycling

companies and is located in Amata Nakorn Industrial Estate, Chonburi. Its production is over 5,000 tons per month. In addition to the company, there are about 100 local small companies in Thailand.

References

EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015).

Field Survey of the Study Team.

Iron and Steel Institute of Thailand. *Thailand economic and steel industry development.* http://www.oecd.org/industry/ind/50494696.pdf (accessed September 2015).

Walter J. Foley, General Manager, Federal Relations Steel Recycling Institute. *Recycling Steel Automatically-Through Resource Recovery.* http://www.seas.columbia.edu/earth/wtert/sofos/nawtec/nawtec05/nawtec05-06.pdf (accessed September 2015).

Wikrom Vajragupta, President, Iron and Steel Institute of Thailand (ISIT). *Investment Opportunity in Iron and Steel, Petrochemical and Food Processing Industry.* https://www.giz.de/fachexpertise/downloads/2012-en-wikrom-pep-informationsworkshop-thailand-eneff.pdf (accessed September 2015).

Yano Research Institute, *ASEAN Automobile Recycling 2014.*

(9) Distribution volume, flow, model years, sale prices, and processing methods during dismantling (batteries, tires, and waste fluids, among others)

Processing Situation

Dismantlers break used cars into parts. Waste oils and CFCs are not recycled.

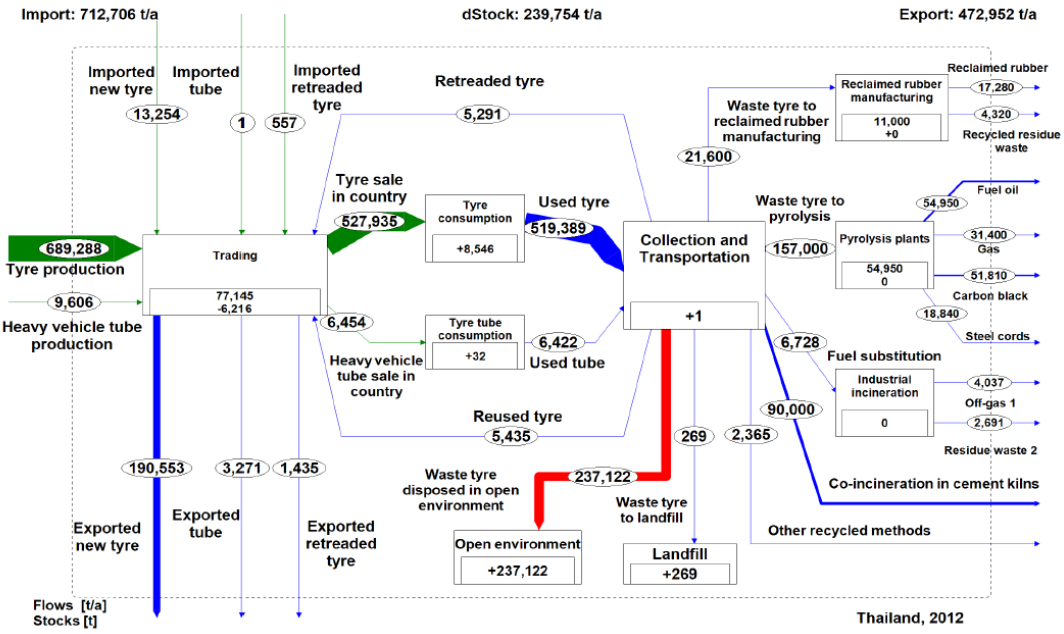
Plastics from ELVs are collected and pelletised. Plastic scraps are sold to plastic manufacturing companies or traders.

Batteries are collected by the informal sector, recycling companies (e.g. T.K. Metal Trading

Limited Partnership), and trading companies, among others. Some of the collected batteries are recycled domestically and the others are exported, mainly to China.

Approximately 529,000 tons of used tires are collected annually. Nearly 50 percent of waste tires generated go into the open environment without proper collection and treatment, while very less is recycled as reclaimed rubber. Energy contained in the tire is recovered by co-incineration and pyrolysis processes. Cement kilns are identified as one of the potential industries to utilise waste tires as fuel substitutes in their energy-intensive cement production processes.

Figure A-XII.5: Tire Recycling in Thailand



Source: Tasawan Suparat. Waste Tire Management in Thailand: A Material Flow Analysis Approach, 2013.

Waste oils and CFCs are not recycled. Waste oils and CFCs that are not properly treated may cause soil and air pollution. However, the polluter handling over 20 litres of the waste oil recycle or burn it. In some cases, waste oils are sold to collectors as valuable material.

Country :	Thailand

References

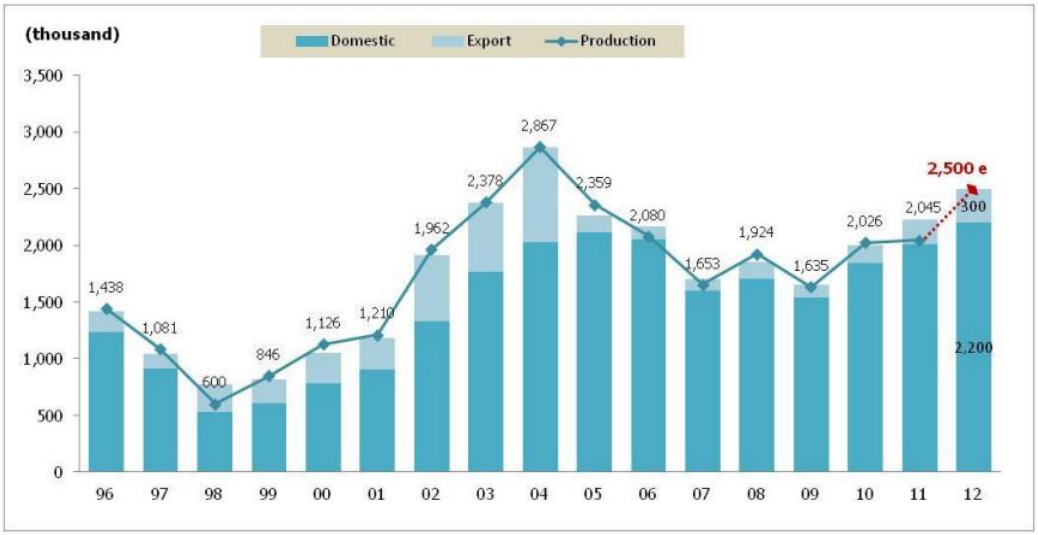
Tasawan Suparat. *Waste Tire Management in Thailand: A Material Flow Analysis Approach, 2013.* http://faculty.ait.ac.th/visu/public/uploads/images/pdf/2013/tasawan.pdf (accessed September 2015).

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(10) Factual survey of end-of-life two-wheeled vehicles

Motorcycle production in Thailand is in line with automobile production. Production was on the rise after the economic crisis. In 2004, production peaked at 2.9 million units. Nonetheless, the production significantly decreased in 2005. Importers such as Viet Nam, which previously imported motorcycles from Thailand, started their own motorcycle assembly factories. They reduced their import of complete build-up units from Thailand and switched to complete knock-down units. Since 2005, motorcycle production has been stable at 2.0 million units, primarily for domestic sales. Demand is mainly for replacement of ELVs as shown in the figure below.

Figure A-XII.6: Motorcycle Production, Domestic Sales, and Exports of Thailand



Source: TAI (Thailand Automotive Institute), 2012.

Country：	Thailand

There is no reliable estimate of generation of end-of-life motorcycles. End-of-life motorcycles are sent to junk shops and parts are taken out and recycled as steel.

Reference

TAI, 2012. http://www.thaiauto.or.th/2012/ (accessed September 2015).

(11) Type of operation and number of recycling-related companies

Dismantlers

It is common for dismantlers to offer to buy damaged automobiles and ELVs at the same time they sell imported used parts and brand new parts. Dismantling seems to be conducted mainly by hand. Waste oils and CFCs are not properly treated, so these may cause soil and air pollution.

In Thailand, recyclers collect wastes from people bringing ELVs to recyclers nearby or brokers bringing them to recyclers.

Dismantlers and used parts traders who import half-cuts and used parts are located in specific areas such as Bang Na, Ptathumwang, Phaholyothin and Frontage Road. Originally, these dismantlers and used parts traders were mainly located in Ptathumwang, which is a real estate owned by Churalongkorn University. Churalongkorn University rent apartments at very cheap prices so these people come to gather in this area. In 1990, the contract between the dismantlers and used parts traders and Churalongkorn University expired. The dismantlers left Ptathumwang and moved to Bang Na and Phaholyothin Frontage Road and other areas.

Shredders

There are about 10 shredders in Thailand. Some of the industrial scrap trading companies are considering introducing shredder and guillotine shears, but the amount of ELVs generated is not enough to make the introduction of shredders and guillotine shears viable.

Country：	Thailand

Downstream Recycling Companies

After separating recyclable wastes and processing them, recyclers sell processed waste to steel plants and plastic recyclers. The precise number of dealers is unknown because special registration or permission is not required when running an automotive business. However, permission for antiquary is required when selling used parts.

Regarding battery, AP Honda is now collecting batteries from used motorcycles and sending them to T.K. Metal Trading Limited Partnership.

As for lead battery recycling, the following companies are listed on the webpage of 'Lead Battery Recycling World':

- Batterybocter, Year Established: 2000
- BNR Co., Ltd, Year Established: 2003. This company is an importer of lead batter scrap and buys 500 by 500 tons on a monthly basis.
- Thai Non-ferrous Metal Co., Ltd., Year Established: N.A
- Full Success Energy Inter-Trade Co. Ltd., Year Established: N.A.
- Krun Thai Scrap Limited, Year Established: N.A.
- Dream Town General Trading LLC Dubai UAE, Year Established: N.A.

Other Related Companies

Examples of tire recycling companies in Thailand are in the following table:

Country：	Thailand

Table A-XII.7: Types of Recycling Companies

Type of recycling	Companies
Waste tire disposal in co-incineration in cement kiln	The Pollution Control Department (PCD) reported that there are three cement plants that have the potential to use waste tires for co-processing — Asia Cement, SCG cement, and TPI Polene.
Reclaimed rubber manufacturing	According to PCD records, there are six rubber manufacturing industries, e.g. the Union Commercial Development Co., Ltd.
Tire pyrolysis plant	According to PCD and the field visit, there were 30 tire pyrolysis plants being operated in Thailand.
Used/waste-based invention factory	No official statistics.

Source: Tasawan Suparat. *Waste Tire Management in Thailand: A Material Flow Analysis Approach 2013*.

Waste tire disposal — co-incineration in cement kiln:

- Company: Siam City Cement Public Company Limited (SCCC)
- Location: 99 Moo 9 Mitrapab Rd., Tabkwang, Kaengkoi, Saraburi 18260, Thailand.

SCCC is Thailand's second largest cement producer. It is located at 99 Moo 9 Mitrapab Road, Tambon Tabkwang, Amphor Kaengkoi, Saraburi Province, Thailand. The main process used is clinker production, which requires a high temperature of up to 1,450 degrees centigrade to produce clinker from mineral ores.

The plant contains six rotary kilns of various kiln capacity. Kiln Numbers 1 and 2 can produce clinkers at 4,000 tons per day and 3,500 tons per day respectively. Kiln Numbers 3 and 4 are 5 metres in diametre by 85 metres in length, with clinker capacity of 5,500 tons per day each, and the other two biggest kilns, Numbers 5 and 6, are 6 metres in diametre by 96 metres in length, can produce 10,000 tons per day of clinker each.

Waste tires were also utilised in kiln Number 5 at the time of the first field visit, which accounted for around 0.6 percent of the total energy used in that kiln. They consumed around 150 tons per month.

Country：	Thailand

SCCC stopped using tires as alternative fuel as it caused several problems. Initially, the company used to burn whole tires of all kinds (car, truck, heavy vehicle tires) in the kiln. Though the smaller tires have no issues when they are burned, the larger tires have steel cords/metallic threads, which could not be burned completely and require high amount of oxygen for complete burning. Thus, the burning process was inefficient and the cement quality was affected. With this problem, the cement company manually removed the steel cords before burning. In addition, the tires contained high sulphur which caused high alkali-chlorine/sulphur ratio and blocked was the kiln system. Therefore, there is a need to further search for appropriate technology for waste tire disposal.

Reclaimed rubber manufacturing:

- Company: The Union Commercial Development Co., Ltd. (UCD)
- Location: Samut Prakan Province, Thailand
- Duration: 1969-present
- Funding: Bank of Thailand.

Objective of the plant:

To recycle used tires in order to reduce waste tires and protect the environment, while contributing to natural resources conservation and cost reduction in related industries.

To manufacture and supply products that meet ASTM International standards.

The main resources for reclaim rubber production are scrap trucks and bus tires. There are many suppliers that collect the waste tires for the company. The suppliers are the locals and the people from other provinces. They buy the waste tires from garage, car care shops, and tire shops. Some suppliers collect the waste tires from road sides.

Some are big suppliers that can collect big amounts of waste tires that they can separately sell to recycle companies. The suppliers cut the steel chords from the sidewalls of the tires and chop the tires into two to four pieces before delivering them to the recycled plant. The one-

half to one-quarter forms increase the transportation capacity and storage capacity.

The other resources for the reclaim rubber production include various chemicals for the de-vulcanizing process and calcium carbonate to prevent the pieces of reclaim rubber products from sticking to each other. It has no negative effect on the quality or selling price of the product. In the later processing of the reclaim rubber resource into final products such as tires, tubes, hoses, and coating, among others, calcium carbonate is generally added in a greater or lesser amount as a filler to reduce resource costs and to control moisture content.

The main resources for the production of rubber goods in the affiliated manufacture are the self-made reclaim rubbers as well as the various raw synthetic rubbers and natural rubbers. Further resources depend on the final product but might contain chemicals for vulcanizing the product as well as other materials such as fine metals, plastics, and fabrics.

The rubber recycling process produces reclaimed rubber in the form of sheets that are approximately 80 centimetres long, 40 centimetres wide and 4 to 6 centimetres thick. As mentioned above, the sheets are covered with calcium carbonate to counter the distinctive stickiness of the product. Furthermore, rubber powder and rubber granulates are produced and sold for further workmanship. The intra-corporate plant to manufacture rubber goods produces rubber-based products such as fenders, flooring tiles, rubber sheets for various applications, speed bumpers, and hoses, among others.

Tire pyrolysis plant:

- Address: Plaengyao District, Chachoengsao, Thailand 2419
- Duration: 2010 – present
- Funding: Bank of Thailand.

This pyrolysis plant was established in 2008 and is located in Plaengyao District, Chachoengsao Province. Initially, the owner sold pyrolysis reactors. However, the suppliers did not know the efficiency of the machines and they did not know the market for selling pyrolysis products. As a result, they did not want to invest in this business. So, the owner started to produce and sell pyrolysis products on his own.

The pyrolysis process produces fuel oil, carbon black, and steel wires from used tires. This

Country：	Thailand

company is registered with the Department of Industrial Works (DIW) and is certified to ISO 9001:2008. The company started operating and selling products in April 2010.

Used/waste based invention factory:

- Company: Somnuek Kanyang
- Address: Thachang, Chaleumprakiet, Nakhonratchasrima, Thailand
- Duration: 1991-present
- Total labor: 2 people.

Somnuek Kanyang, a tire recap shop, was established in 1970. The owner indicated that his father is the first person who created and invented the creative products from the waste tire, and sold the product in 1981. He also taught people who wanted to learn and be in this business. They produce waste bins, basins, flower pots, furniture, and swings.

From 1981 to 2002, the waste bin was the most famous product. The main customer was a municipality that distributes the waste bins to households to increase the amount of waste collection. This factory also sold waste bins and other products to many other provinces in the country such as Chiang Mai, Ubonratchathani, Kalasin, Bangkok, Surat Thani, Loei, and others. Moreover, the owner also exported the product to other countries.

From 2002 up to the present, the demand for waste bins decreased because the municipality preferred to use the plastic waste bins than the waste tire bins which are heavier. Moreover, the waste tire has a high price because the demand for waste tires has increased.

Shredded rubber manufacturing:

- Address: Plaengyao District, Chachoengsao, Thailand 2419
- Duration: Rayong, Thailand 21180
- Period: 2010-present
- Description: This plant buys all types rubber wastes, performs a size reduction process, and sells shredded rubber and rubber powder.

Country :	Thailand

The plant has been producing plastic pellets from plastic wastes such as PP, PE, and PVC. The company started this business in 2009. The company is interested in the rubber waste business because there are few people that know and do this business. The company also wants to learn more about the rubber recycling business. Moreover, the company changed from plastic pelletising business to rubber recycling business because that business is widely known and highly competitive.

This plant buys all types of rubber from various industries. This plant also buys damaged tires or residue rubber from tire manufacturing. Rubber processing is easier than tire processing because rubber is homogeneous. This factory produces shredded rubber in many sizes depending on consumers' requirements.

References

Lead Battery Recycling World. http://www.lead-battery-recycling.com/lead-recycler/thailand.html (accessed September 2015).

Tasawan Suparat. *Waste Tire Management in Thailand: A Material Flow Analysis Approach 2013*. http://faculty.ait.ac.th/visu/public/uploads/images/pdf/2013/tasawan.pdf (accessed September 2015).

Yano Research Institute. ASEAN Automobile Recycling 2014.

(12) Management situation of recycling-related companies

Most scraps, including valuable ELV metals, are being utilised as raw materials for recycling by billet companies through their electric-arc furnace. However, most of the scraps in Thailand are imported from neighbouring countries since the volume of scrap in Thailand is not sufficient for recycling. Currently, there are 20 steel companies with induction furnace utilising scrap as raw materials for recycling. Each company has a capacity from 100,000 tons to 1 million tons per year of scrap materials.

The recycling-related companies interviewed by the study team have about 800 employees. However, companies of this scale are exceptional. The majority of local companies have only

Country：	Thailand

several people.

The revenue of the companies interviewed by the study team varied from B30 million to B8,200 million, depending on the size and domain of the business.

Reference

Field Survey of the Study Team.

2. Current challenges and consideration in automobile recycling laws and institutional systems in vehicle recycling

(1) Challenges in the vehicle recycling system (illegal dumping, inappropriate processing of waste, stringent situations at final disposal sites, dismantling technology, safety, efficiency, and recycling rates).

There is no general regulation on ELVs in Thailand. Although there is an inspection system, the rigorous implementation of the system is not assured and this leads to the circulation of old used cars. Using old cars threatens people's safety and the environment.

Dismantling operators have to acquire a licence (DIW Code 105 and 106) under the Notification of MOI No. 15 B.E. 2544 (2001). Under the regulation, they are required to introduce appropriate pollution prevention measures. The municipalities regularly monitor the status of their implementation of the above-mentioned measures.

The dismantling business in urban areas is not expected to expand because the center of generation of ELVs is in the rural areas. Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity. Environmental measures such as the prohibition on illegal dumping of wastes and collection of CFCs and the like are insufficient. The occupational health of ELV recyclers involved in the dismantling process and downstream recycling is also a challenge. Some ELV recyclers work in bad conditions.

For the recycling technology and dismantling infrastructure, there are some local companies that have the facility to shred automobile scraps and there are rooms for improvement or sophistication of recycling technology.

Country：	Thailand

References

Field Survey of the Study Team.

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(2) Trend in vehicle recycling policies and related automobile recycling laws, and the enforcement, presence, and details of related institutions.

There is no specific legislation on ELVs. Various environmental regulations are imposed for controlling ELV recycling. These include:

- Enhancement and Conservation of National Environmental Quality Act, B.E. 2535 (1992)
- Pollution Prevention and Mitigation Policy (1997-2016) – includes management, investment, legal, and supporting guidelines to address:
  - Water Pollution
  - Air Pollution
  - Noise and Vibration Pollution
  - Pollution from Solid Waste and Night Soil
  - Pollution from Hazardous Materials
  - Pollution from Hazardous Wastes
- Environmental Standards:
  - Water Quality (2009)
  - Air Quality and Noise (2007)
  - Soil Quality (2004).

a)The status of institutional system collateral for improper processing of three designated recovery items (fluorocarbons, airbags, and ASRs)

Fluorocarbons

Country：	Thailand

Due to the lack of processing facilities, CFCs are released into the atmosphere without being properly recovered.

Airbags

Currently, the proper treatment of airbags is not regulated. Cars from Japan are imported without airbags. The prices of cars with airbags are higher than those without airbags as people prefer to deal with cars with airbags.

For repair shops, cars with airbags do not lead to serious safety problems.

Automobile Shredder Residues

Advanced technologies like guillotine shears and shredders are installed in scrap trading companies in Thailand. However, there are only 10 shredders in Thailand. During shredding, the steel scraps are generated and sent to Japanese or Thailand electric furnaces. The disposal situation of ASRs generated during the shredding process is uncertain.

b) Demarcation of roles (obligation and economic burden) among production officers (manufacturers and importers), related operators, vehicle users, and government agencies (including local governments).

Most ELVs generated in Thailand are exported to neighbouring countries such as Myanmar, Lao PDR, and Cambodia. The current roles of the stakeholders under the current ELV recycling regulations are as follows.

- Importers – subject to Customs formalities (e.g. required documents, fees, re-export, and registration), depending on the type of vehicle importation (temporary or permanent)
- Manufacturers – subject to design/technical standards and regulations, vehicle registration, and taxes
- Users – compliance with transport regulations and standards (e.g. emission standards and periodic inspection, among others)
- Government agencies
    - Ministry of Commerce – issuance of permit for vehicle importation

Country：	Thailand
	○ Department of Land Transport – registration and inspection of vehicles ○ Pollution Control Department – emission testing and waste management ○ Department of Industrial Works – licensing and standard setting for wastes emanating from factories ○ Department of Energy – guidelines on fuels for vehicles ○ Police – inspection of in-use vehicles. **References** EX Research Institute. *Survey on recycling law and business in Asia 2014.* http://www.meti.go.jp/meti_lib/report/2015fy/000344.pdf (accessed September 2015). Field Survey of the Study Team. Yano Research Institute. *ASEAN Automobile Recycling 2014.*
(3) Presence or absence of environmental regulations (such as landfill and incineration ban, and heavy metals use ban) Thailand is in its early stages of starting the ELV recycling system and considering ELV recycling regulations. The following regulations stipulate general waste management in Thailand: Enhancement and Conservation of National Environmental Quality Act, B.E.2535: The Act regulates the environmental protection plan, standards, and monitoring of industrial wastes and infectious wastes. The Act also regulates the Environmental Impact Assessment (EIA) to be applied for the industrial waste treatment facility. • The owner of the facility for treatment of polluted air, equipment or instrument for the control of the discharge of polluted air or other pollutants, or the wastewater treatment or waste disposal facility shall have the duty to collect statistics and data, and to make detailed notes thereof to be kept as recorded evidence; and shall submit a report summarising the functioning results of the facility, equipment or	

instrument to the local official of the locality at least once a month.

- The local official gathers the reports received and sends them to the pollution control official, who has jurisdiction over that locality, on a regular basis at least once a month. In doing so, the local official may make comments for consideration of the pollution control official.
- Any person who renders services for wastewater treatment or waste disposal without licence shall be punished by imprisonment not exceeding one year or fine not exceeding B100,000 or both.

Factory Act B.E. 2535:

The relevant rules of the Factory Act stipulate safe transportation, container, storage site, and so on, of the hazardous materials. The Authority, the person appointed by the Minister for the execution of this Act, has the following powers:

- To enter a factory or building, place or vehicle suspected to engage in a factory business, to inspect the condition of the factory, building, place or vehicle, the condition of the machines or any act that may violate the provisions of this Act.
- To take the specimens of products suspected of their quality in a reasonable quantity for inspection of their quality together with relevant documents.
- To inspect, search, detain, seize or attach the products, containers, books of accounts, documents or any relevant articles where there is reasonable ground to suspect that the business engagements of the factory may cause harm to the people or property in the factory or its vicinity, or an offence under this Act has been committed.
- To summon in writing any person to testify or to submit any document or object for consideration.

Any person obstructing or failing to facilitate the Authority who performs the duties mentioned above shall be subject to an imprisonment not exceeding one month or a fine not exceeding B20,000 or both.

Country :	Thailand

Hazardous Substances Act B.E. 2535:

The Act stipulates the rules and standards on importation/exportation, production, transportation, use, and disposal of the hazardous substances. The competent official, the person appointed by the responsible Minister for the execution of this Act, shall have the following powers:

- To enter into the place of business that is relevant to the hazardous substance, the place of production or storage of hazardous substance, or any other place suspected to be used as that place; or to enter into the vehicle carrying or suspected of carrying hazardous substance in order to inspect hazardous substance, container of hazardous substance, books of accounts, documents or other things relating to hazardous substances.
- To take hazardous substances or substances suspected to be hazardous in a reasonable amount as specimen for inspection.
- To search for, detain, seize or attach hazardous substances, containers of hazardous substances, books of accounts, documents or relevant things if there is a reasonable ground to suspect that an offence under this Act has been committed.
- To summon any person in writing to give a statement or to submit any document or thing for consideration.

A person who fails to render the appropriate facility to the competent official in the performance of his/her duty shall be liable to imprisonment for a term of not exceeding one month or to a fine not exceeding B10,000.

Industrial Estate Authority of Thailand Act B.E. 2522:

The Act regulates the authority of industrial estates on the treatment method of industrial wastes and hazardous wastes.

The competent official, the person appointed by the Minister for the execution of this Act, shall have the power to enter any place of an industrial entrepreneur, trader or business entrepreneur which is beneficial to, or connected with, an industrial undertaking or commerce located in an industrial estate; or to examine any document or object which relates to a

Country :	Thailand

business undertaking by any person presenting at that place as necessary. In this case, such entrepreneur shall render appropriate facilities. If the competent official is going to enter the place, the Governor or the person entrusted by the Governor shall have a written notification to the industrial entrepreneur, trader or business entrepreneur not less than 24 hours in advance, provided that the Governor or the person entrusted by the Governor is of opinion that it is urgent.

Whoever fails to render facilities to the competent official or obstructs or fails to render facilities to the competent official shall be liable to a fine not exceeding B5,000.

The Notification on treatment of industrial waste (2005):

This Notification is published based on the Factory Act. The Notification classifies the hazardous waste and lists the hazardous waste relating to ELV in the classification.

The following table lists the wastes defined by the Notification relating to the ELV. Any waste whose six-digit code is marked with 'HA' (Hazardous waste – Absolute entry) or 'HM' (Hazardous waste – Mirror entry) is a hazardous waste according to characteristics. However, the 'mirror entries' cover wastes that have the potential to be either hazardous or non-hazardous, depending on their actual composition and the concentrations of 'dangerous substances' within the waste. Therefore, for waste that is marked 'HM', analysis should be performed according to the criteria prescribed to demonstrate whether or not waste is hazardous according to this Ministerial Notification.

Country :	Thailand

Table A-XII.8: Hazardous waste list of The Notification on treatment of industrial waste

Code	Type	Hazardous Wastes
1301	HA	Waste hydraulic oils
1302	HA	Waste engine, gear and lubricating oils
1307	HA	Wastes of liquid fuels
1406	HA	Waste organic solvents, refrigerants and foam/aerosol propellants
1601		End-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance (except 13, 14, 1606 and 1608)
160103		End-of-life tires
160104	HM	End-of-life vehicles
160106		End-of-life vehicles, containing neither liquids nor other hazardous components
160107	HA	Oil filters
160108	HM	Components containing mercury
160109	HA	Components containing PCBs
160110	HA	Explosive components (for example air bags)
160111	HM	Brake pads containing asbestos
160112		Brake pads other than those mentioned in 160111
160113	HA	Brake fluids
160114	HM	Antifreeze fluids containing dangerous substances
160115		Antifreeze fluids other than those mentioned in 160114
160116		Tanks for liquefied gas
160117		Ferrous metal
160118		Non-ferrous metal
160119		Plastic
160120		Glass
160121	HM	Hazardous components other than those mentioned in 160107 to 160111 and 160113 and 160114
160122		Components not otherwise specified
160180	HA	Radiator coolant fluids containing dangerous substances such as glycol
160181		Radiator coolant fluids other than those mentioned in 160180
160199		Wastes not otherwise specified
1606		Batteries and accumulators
160601	HA	Lead batteries
160602	HA	Ni-Cd batteries
160603	HA	Mercury-containing batteries
160604		Alkaline batteries (except 160603)
160605		Other batteries and accumulators
160606	HA	Separately collected electrolyte from batteries and accumulators
1608		Spent catalysts
160801		Spent catalysts containing gold, silver, rhenium, rhodium, palladium, iridium or platinum (except 160807)
160802	HM	Spent catalysts containing dangerous transition metals (transition metals are scandium, vanadium, manganese, cobalt, copper, yttrium, niobium, hafnium, tungsten, titanium, chromium, iron nickel, zinc, zirconium, molybdenum and tantalum) or dangerous transition metal

Country :	Thailand	
		compounds
160803		Spent catalysts containing transition metals or transition metal compounds not otherwise specified
160804		Spent fluid catalytic cracking catalysts (except 160807)
160805	HM	Spent catalysts containing phosphoric acid
160806	HA	Spent liquids used as catalysts
160807	HM	Spent catalysts contaminated with dangerous substances

HA = Hazardous waste – Absolute entry, HM = Hazardous waste – Mirror entry, HS = Harmonised System, PCB = Poly Chlorinated Biphenyl.
Source: The Notification on treatment of industrial waste (2005).

The Notification also covers the following management method of waste:

- Landfill: There shall be a lining system, a leakage detection system, a gas ventilation system, and a leachate treatment system appropriate for type and characteristic of wastes without adverse effects on the environment. It must also be approved by the Department of Industrial Works.
- Incineration of non-hazardous wastes shall be done so that stack emission is in compliance with the Notification of Ministry of Science Technology and Environment regarding the emission standard for solid waste incinerators dated 17 June 1997 (B.E. 2540). Incineration of hazardous wastes is not allowed unless it is approved by Department of Industrial Works.

Reference

Yano Research Institute, *ASEAN Automobile Recycling 2014.*

Annex II

Country Reports

13. United Arab Emirates

Country :	United Arab Emirates

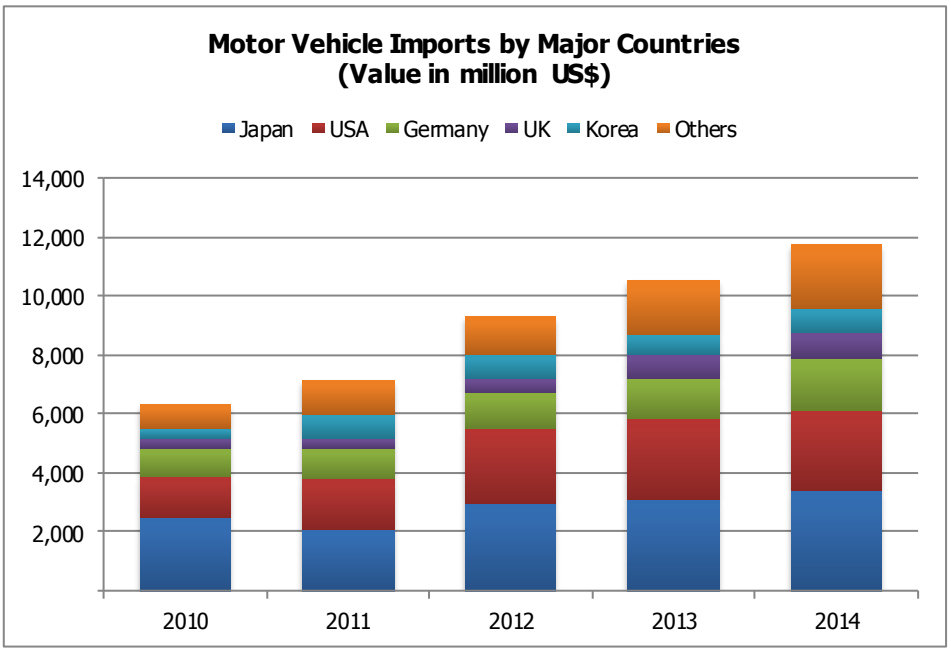
1. Current status of automobile recycling in the targeted country

(1) Imports and exports from Japan and other countries: used cars

Import

The following graph shows United Arab Emirates (UAE) automobile imports, including used cars, for 2010-2014. The big suppliers during this period were Japan, USA, and Germany. The total import in value was over US$11,700 million in 2014.

Figure A-XIII.1: UAE's Automobile Imports



UAE = United Arab Emirates, UK = United Kingdom, USA = United States of America.

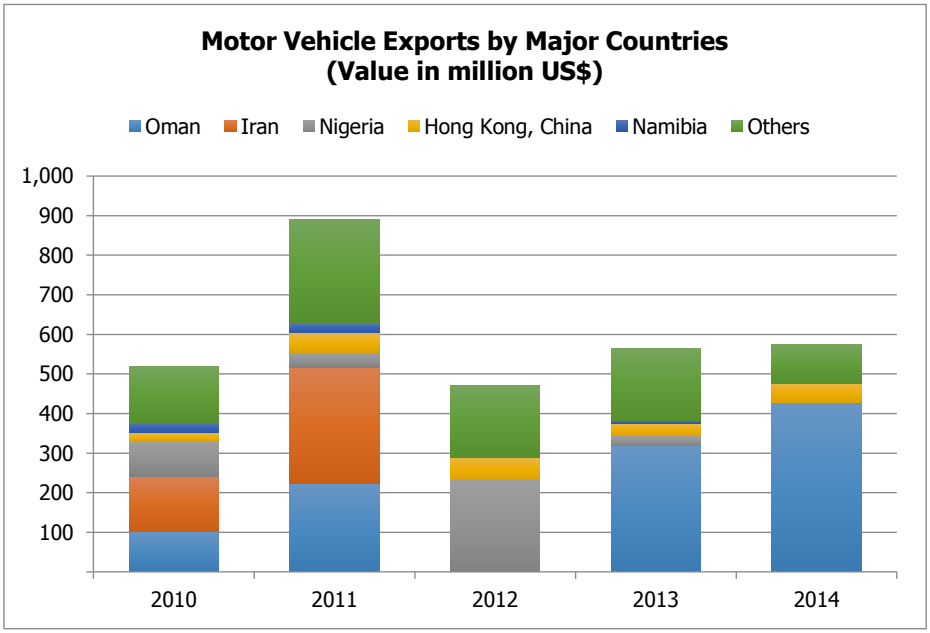
Source: UN Comtrade Database.

Country：	United Arab Emirates

Export

The volume of export of motor vehicles from UAE is basically smaller than that of its import volume. The destination countries varied, depending on the year. For 2014, Oman was the top importer, reaching about US$430 million.

Figure A-XIII.2: UAE's Automobile Exports



UAE = United Arab Emirates.
Source: UN Comtrade Database.

Reference

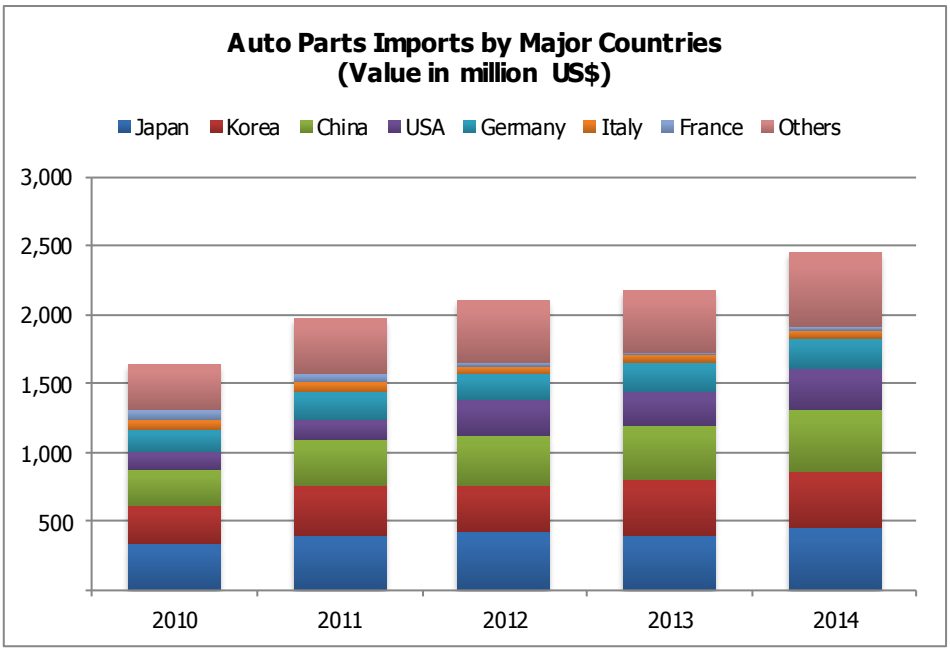
United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(2) Imports and exports from Japan and other countries: used parts

The two graphs below show major UAE's importers and exporters of auto parts, including used parts, for 2010-2014.

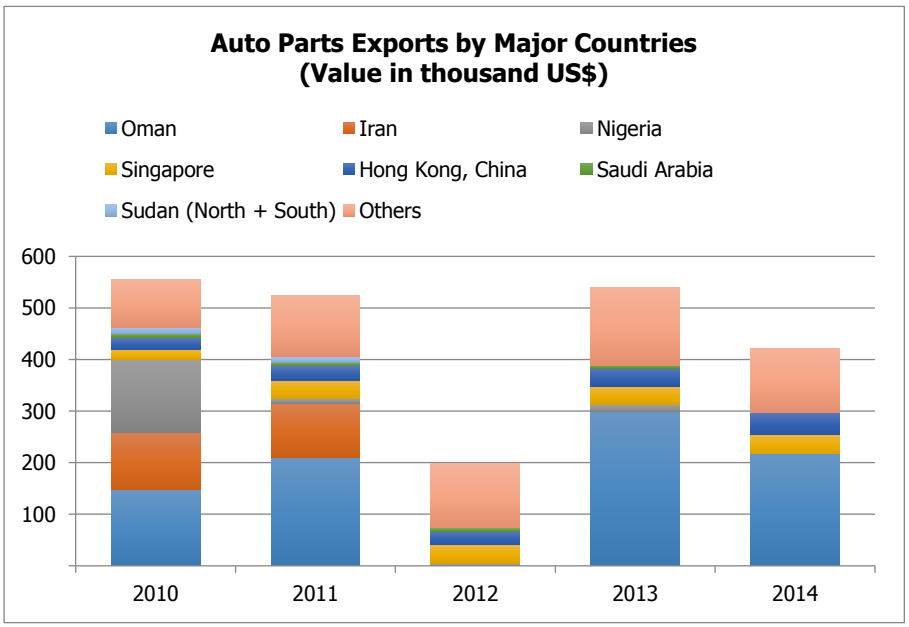
Country :	United Arab Emirates

Figure A-XIII.3: UAE's Auto Parts Imports



UAE = United Arab Emirates, USA = United States of America.
Source: UN Comtrade Database.

Figure A-XIII.4: UAE's Auto Parts Exports



UAE = United Arab Emirates.
Source: UN Comtrade Database.

Country：	United Arab Emirates

Reference

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(3) Plans and regulations relating to import regulations

Trade Control

Tariffs:

- The tariff applied to cars is five percent (five percent Customs duty on the value of the vehicle + one percent insurance + cost of the shipment).
- The tariff applied to trucks is 12 percent.
- The tariff for auto parts (HTS 8407-08 and 8708) is four percent (Customs duty at four percent on total CIF value. However, Customs may charge different increased percentages according to commodities).

Taxes:

- No VAT
- Special tax depending on fuel type – N.A.
- Luxury tax – N.A.
- Special Consumption tax – N.A.

Import Restrictions:

- The vehicle must conform to the State standards and the steering wheel must not be modified.
- There must be no damages on the vehicle's outer body. If damage occurs at the arrival port, a certificate from the competent authorities is required to be submitted accordingly.

Country：	United Arab Emirates

- Vehicles that have been subject to accidents such as drowning, fire, collision, rollover, and the like are not allowed to be imported.
- Vehicles used as taxicabs or by the police force are not allowed to be imported.
- The importer's residence authorisation (residency) must be valid if the importer is not a citizen of any of the GCC States.
- It is permissible to import more than one vehicle per year if the importer does not have a commercial registration legalising business activity in vehicle sale and import.

Procedure:

- Submit the required documents including the certificates issued by the traffic department from the country of export and shipping documents to Customs.
- Pay Customs duties.
- Customs will view the vehicle to ascertain that the value given in the export declaration is correct. If the value is inconsistent with that of the invoice, the importer will have to pay the duties based on the Customs estimation.
- After paying the Customs duty, the importer will be given a certificate of registration addressed to the Traffic and Licensing Department.
- Approach the Traffic and Licensing Department to register the car locally.

References

Abudhabi e-government.
https://www.abudhabi.ae/portal/public/en/business/international_trade/import_and_export/gen_info92?docName=ADEGP_DF_175900_EN&_adf.ctrl-state=16qc3fxq36_4&_afrLoop=14109981087310913#%40%3FdocName%3DADEGP_DF_175900_EN%26_afrLoop%3D14109981087310913%26_adf.ctrl-state%3D106sxihbpq_9
(accessed September 2015).

Dubai Customs.

Country：	United Arab Emirates

http://www.dubaicustoms.gov.ae/en/eServices/ServicesForIndividuals/Pages/ClearanceOfPersonalEffects.aspx (accessed September 2015).

United States Department of Commerce, International Trade Administration Office of Transportation and Machinery. *Compilation of Foreign Motor Vehicle Import Requirements.* http://trade.gov/static/autos_report_tradebarriers2011.pdf (accessed September 2015).

(4) Plans and regulations relating to vehicle registration

The Traffic Law in UAE stipulates the need to inspect and register vehicles before these vehicles are allowed to be used on the road, in accordance with the approved technical standards and specifications.

There are general requirements for vehicle registration and licensing set by the Licensing Agency of RTA. There are special conditions that vary depending on specific requirements of each vehicle type.

General Requirements:

1. A traffic file must be created under the name of the person or entity.
2. Vehicle registration is available for UAE citizens, GCC citizens, and residents if they meet all requirements for opening a traffic file. For registering company vehicles, the company trade licence must be issued from the Emirate of Dubai.
3. The vehicles must pass technical inspection, which includes light vehicle inspections from other Emirates.
4. Vehicle Insurance.
5. Colour and engine changes or any additions to the vehicle are to be approved by the technical inspection department at the service centres.

New Car Registration

In Abu Dhabi, an imported car must be registered at the Traffic and Licensing Department. The certificate of registration issued by Customs is required.

Country：	United Arab Emirates

The Customs certificate and other documents are required for car registration at the RTA.

Re-registration

Motor vehicle licences in Dubai need to be renewed annually. When buying a new car or motorcycle, the formalities of initial registration are generally dealt with by the dealership. Thereafter, the car can be re-registered through selected insurance companies or by visiting an RTA Customer Centre or approved testing facility.

There are eight insurance companies approved to offer registration renewal services to their insurance policy holders: AXA Insurance, Fujairah Insurance, National General Insurance, Noor Takaful, Oman Insurance, Orient Insurance, RSA Insurance, and Salama Insurance.

Owners of new vehicles that do not need testing and vehicles that have already been tested can renew their registration through the RTA website and over the phone.

Transfer Registration

The service is provided to nationals of Gulf Cooperation Council (GCC) nationals or residents of UAE.

In Abu Dhabi, the process will cost Dh200 for light vehicles and Dh300 for vehicles heavier than 3 tons but less than 12. In Dubai, it will cost Dh430 for new number plates.

Unlike other emirates, Dubai will not provide export number plates to transport the vehicle from Dubai. The new owner must arrange for lorry transport to the new location, which costs Dh400 to Dh600.

Deregistration

Owners can take a step of de-registration with their Export Insurance Certificate along with your vehicle registration card, driving licence, and your number plates (that you should be carrying with you). Owners might also need additional documents such as a mortgage release letter if that is applied.

Inspection

New cars and motorcycles are exempt from the yearly vehicle inspection for the first three years. All vehicles over three years old must undergo an annual roadworthiness test. Vehicle

inspections and licence renewals can usually be done at the same time. A list of test centre locations can be found on the websites above and on the RTA website.

In Dubai, vehicle testing can be completed at RTA Customer Centres or at an Eppco, Shamil, or Wasel testing facility.

Many drivers bring their vehicles to the inspection facilities themselves. Additional options include hiring a company to collect and return the car or arranging for a call out inspection with Wasel Vehicle Testing. For those attending in person, a time of approximately 30-45 minutes is quoted for the testing process, subject to a testing bay being available on arrival.

The annual vehicle inspection includes checks on brakes, wheel alignment, emissions, electrics, lights and general bodywork. If vehicle registration has lapsed for two years or more, the RTA may decide to write off the car.

Environmental Control

Vehicle inspection system is in place, however, there is no indication that emissions testing is included. Around 50 parts per million (ppm) in Dubai city commenced with the introduction of Euro IV buses in 2009.

References

Abudhabi e-government. https://www.abudhabi.ae/portal/public/en/business/international_trade/import_and_export/gen_info92?docName=ADEGP_DF_175900_EN&_adf.ctrl-state=16qc3fxq36_4&_afrLoop=14109981087310913#%40%3FdocName%3DADEGP_DF_175900_EN%26_afrLoop%3D14109981087310913%26_adf.ctrl-state%3D106sxihbpq_9 (accessed September 2015).

Angloinfo. http://dubai.angloinfo.com/information/transport/vehicle-ownership/vehicle-registration/ (accessed September 2015).

Country：	United Arab Emirates

(5) Handling of imported used cars and/or accident status quo cars

As import restrictions for vehicle emission standards, the vehicle must conform to State standards and the steering wheel must not be modified. There must be no damages on the vehicle's outer body. Vehicles used as taxi cabs or used by the police are not allowed to be imported. It is permissible to import more than one vehicle per year if the importer does not have a commercial registration legalising business activity in vehicle sale and import.

Reference

UNEP. *Status of Fuel Quality and Vehicle Emission Standards: Middle East West Asia (MEWA).* http://www.unep.org/transport/PCFV/PDF/Maps_Matrices/MENAWA/matrix/Vehicles/MEWA_VehicleMatrix_Jan2012.pdf (accessed September 2015).

Annex II

Country Reports

14. Viet Nam

Country：	Viet Nam

1. Current status of automobile recycling in the targeted country

(1) Imports and exports from Japan and other countries: used cars

Import

The total number of imported cars was 17,692 in 2013.

The total number of cars imported from Japan was 115 in 2012 according to the Japanese Ministry of Finance. However, Viet Nam statistics show 1,353 cars.

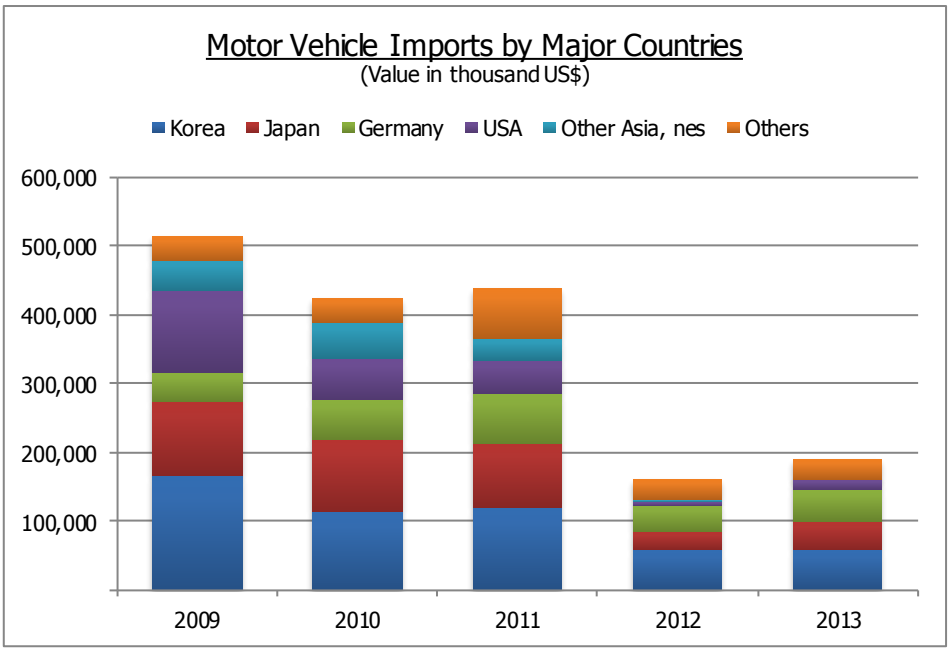
Because the trading data in Viet Nam does not separate categories into used cars and new cars, the accurate number of total used cars imported could not be confirmed. However, we were able to estimate the rough number by adding the number of used cars exported to Viet Nam from over 32 countries, including Japan, which was about 8,725 cars. The ratio of Japanese cars was 1.3 percent.

Thus, it could be concluded that the number of imported used cars is scarce because it is technically impossible to import used cars for business. On the other hand, considering the data that there are certainly a few used cars exported from Japan to Viet Nam and from other countries, we cannot deny the possibility that there might be some illegal used car imported.

The following graph shows Viet Nam's automobile (HS code: 870321 - 870390) imports, including used cars, for 2009-2013.

Country :	Viet Nam

Figure A-XIV.1: Viet Nam's Automobile Imports



USA = United States of America.
Source: UN Comtrade Database.

Table A-XIV.1: Number of Used Passenger Motor Cars Exported from Japan

Year	2010	2011	2012	2013	2014
Viet Nam	5	1	1	10	2
World	672,627	699,881	830,703	947,990	1,059,617

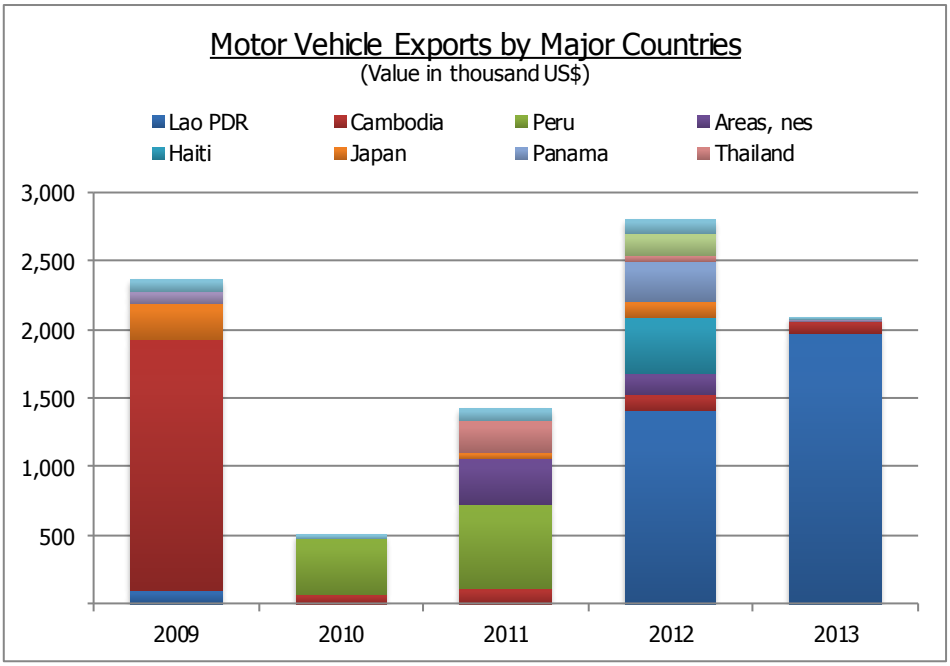
Source: Trade Statistics of Japan Ministry of Finance.

Export

According to the Vietnamese trading statistics, the number of new and used cars exported in 2012 was 110. The limited number of distribution in its own country might be the explanation for this number.

Country :	Viet Nam

Figure A-XIV.2: Viet Nam's Automobile Exports



Source: UN Comtrade Database.

References

Trade Statistics of Japan Ministry of Finance. http://www.customs.go.jp/english/index.htm (accessed September 2015).

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(2) Imports and exports from Japan and other countries: used parts

Import

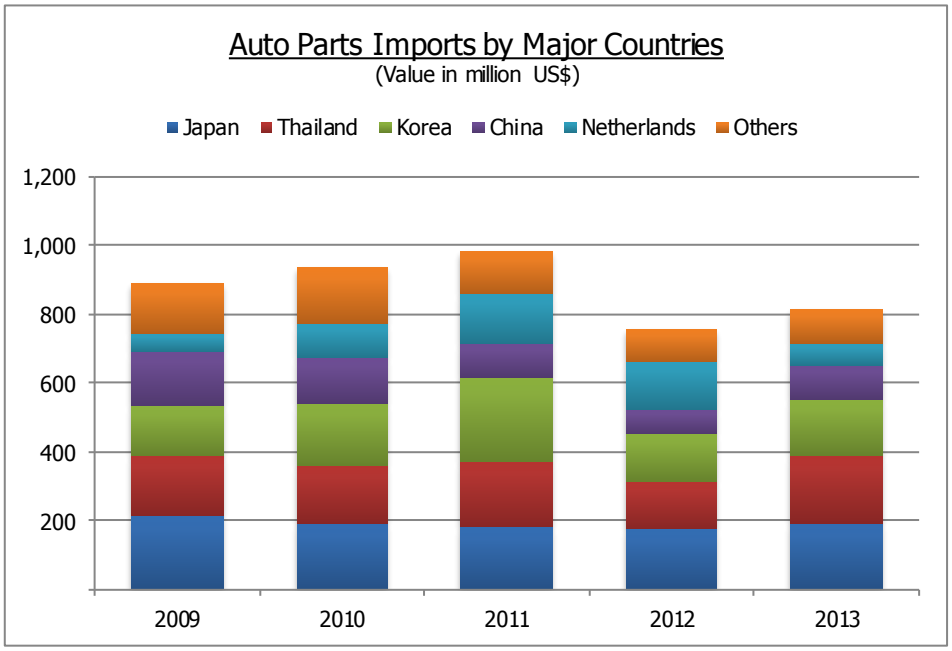
In Viet Nam, the importation of used parts is prohibited by the trading system rules (Decree 12/2006/ND-CP).

Assuming there are not so many used parts distributed within the country because of the regulation stated above, there should not be a lot of exportation of used parts going on in Viet Nam.

Country :	Viet Nam

On the other hand, according to the trade statistics of Japan, the importation of used parts from Japan is ¥25,555 million.

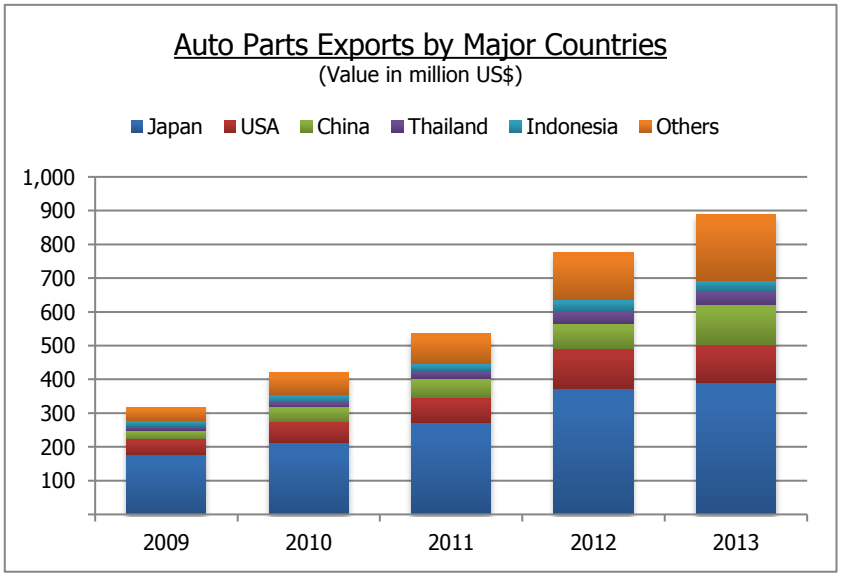
Figure A-XIV.3: Viet Nam's Auto Parts Imports



Source: UN Comtrade Database.

Export

Figure A-XIV.4: Viet Nam's Auto Parts Exports



USA = United States of America.
Source: UN Comtrade Database.

Country：	Viet Nam

References

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(3) Plans and regulations relating to import regulations

Trade Control

A used automobile may be imported to Viet Nam but the import duties are high and the procedure is a complicated one. The present owner of the vehicle must be the original owner. If the automobile has changed ownership since the original title was issued, the vehicle cannot be imported into Viet Nam. The vehicle must have been legally registered in the owner's home country for at least six months, have a minimum mileage of 10,000 kilometres, and cannot be more than five years old.

Vehicles may enter the country through one of its four ports: Cai Lan in Ha Long City, Hai Phong, Danang, or Ho Chi Minh City. Vietnam Customs is in charge of the importation of any vehicle into Viet Nam. Two- or three-wheeled vehicles of 175 cubic centimetres and above are required to have an import licence.

Types of vehicles banned from import, according to Decree No. 12/2006/ND-CP, dated 23 January 2006, by the government include:

· Right-hand drive vehicles including converted drive vehicles or disassembled vehicles, except for special purpose vehicles with right-hand drive operating in a small area such as: crane lorries, breakdown lorries, road sweeper lorries, spraying lorries, rubbish lorries, passenger buses at airports, pick-up trucks, concrete-mixer lorries, and vans working in parks and golf courses.

· Second-hand vehicles including:

- Engines, frames, inner tubes, tires, accessories, and suspensions of cars, tractors, and two-wheel and three-wheel vehicles

- Under-carriage frames of motorised cars and tractors (including new underframes with second-hand motion and/or second-hand underframe with new motion)

- Motorised two-wheel and three-wheel vehicles

- Ambulances

- All types of cars with structures and functions altered from the original design.

Duties and Taxes

Table A-XIV.2: Duties and Taxes for Automobile Parts

Parts and accessories of the motor vehicles of headings 87.01 to 87.05.	HS code	Unit	Import Rate
Bodies (including cabs), for the motor vehicles of headings 87.01 to 87.05.			
- For the vehicles of heading 87.03:	8707.10	Kg	28 - 30 %
- Other:	8707.90	Kg	10 - 28 %
Parts and accessories of the motor vehicles of headings 87.01 to 87.05.			
- Bumpers and parts thereof:	8708.10	Kg	15 - 20 %
- Other parts and accessories of bodies (including cabs):	8708.20	Kg	15 - 20 %
- Brakes and servo-brakes; parts thereof:	8708.30	Kg	10 - 20 %
- Gear boxes and parts thereof:	8708.40	Kg	10 - 20 %
- Drive-axles with differential, whether or not provided with other transmission components, and non-driving axles; parts thereof:	8708.50	Kg	5 - 20 %
- Road wheels and parts and accessories thereof:	8708.70	Kg	15 - 25 %
- Suspension systems and parts thereof (including shock- absorbers):	8708.80	Kg	5 - 20 %
- Other parts and accessories:	8708.90	Kg	10 - 20 %

HS = Harmonised system, Kg = kilogram.
Source: General Department of Viet Nam Customs.

References

General Department of Vietnam Customs.

http://www.customs.gov.vn/Home.aspx?language=en-US (accessed September 2015).

Vietnam Trade Promotion

Agency.http://www.vietrade.gov.vn/en/index.php?option=com_content&view=section&layout=blog&id=21&Itemid=172 (accessed September 2015).

Country：	Viet Nam

(4) Plans and regulations relating to vehicle registration

There are three types of Vietnamese automobile registration. These are: new registration, changing registration, and erasing registration. The system is regulated by Circular 06/2009/TT-BCA-C11 issued by the Minisry of Public Security, based on the Road Transportation Law. In Viet Nam, cars used for business intentions has a limited amount of years in use: 25 years for private cars; and 22 years for commercial cars.

New Car Registration

New car registration needs to be done within 10 days of purchase. The owner would get a number plate and a registration certificate with the owner's name, address, car number, and other details.

Any vehicle, purchased or imported, is required by law to be registered at the designated local police traffic office. All required documentation, including the Certificate of Vehicle Inspection, the Vehicle Registration Declaration, proof of insurance, and the owner's valid passport, visa, and work permit is required for registration. Registration fee ranges from 12 percent to 15 percent of the purchase price in Viet Nam.

Transfer or Selling of Licence

Whenever the owner of the car changes, the changing of registration is required within 30 days from the change. Also, the transfer registration would be necessary when the owner moves out from the municipalities of Viet Nam. Change of registration is also necessary when the car colour is changed, the number plate is damaged and a new one needs to be reissued, and the owner loses the registration certificate or number plate.

Re-registration

The renewal of vehicle registration certificates is required under the following cases: converted vehicles; changed paint colours; definite-term extension of vehicle registration certificates; faded or ragged vehicle registration certificates; vehicles being a common asset of spouses which have been registered under the husband's or the wife's name but now the spouses wish to register it as their common asset; and number plates are faded, broken or damaged.

Country：	Viet Nam

Deregistration

Disposal registration is necessary when a car is being scrapped for the following reasons: involved in an accident, engine or chassis has been removed, fixed years have been exceeded, owner lost the car, and many more. Apart from those, automobiles temporarily imported to Viet Nam in order to export it to another country would need to register for this as well.

Documents required for this registration are: disposal application, registration certificate, number plate, and disposal certificate in case the car was stolen. After receiving complete documents for revocation of vehicle registration certificate and number plate, agencies in charge of revocation shall grant certificates of revocation of vehicle registration and number plates to vehicle owners.

The cars exceeding the year limits will be notified by the inspection department and would not be able to pass the inspection system, and the registration would automatically be disposed.

Inspection

All vehicles in Viet Nam are required to undergo regular vehicle inspections. There are no required roadworthiness tests for motorcycles. Conditions to satisfy the requirements for roadworthiness are different for private cars and for commercial vehicles that are used to transport goods or passengers.

Under the direction of the Ministry of Transport, the Viet Nam Register is the government department in charge of administering quality and safety tests for all vehicles as well as the issuing authority for certificates of roadworthiness.

The rules governing vehicle inspection are set forth in the Ministry of Transport Circulation No. 07/2014/VBHN-BGTVT and Circular No. 22/2009/TT-BGTVT.

Non-commercial cars must be tested for roadworthiness the first time that they are registered in a city or province. Any imported car must be tested at the time of its initial registration, and any car that is produced in Viet Nam will need to be tested after it has been in use for 30 months. Any vehicle that has been bought or sold will require testing as part of the requirements for a new registration. Following the initial testing, vehicles need to be inspected every 18 months. Any inspection required after the initial certification can be done at an

authorised inspection centre in Viet Nam.

Passenger cars that are more than 15 years old must be inspected every three months, as well as trucks that are more than 20 years old. Cars licensed for commercial use need to be inspected at the time of the initial registration. They must be re-inspected after the vehicle has been in use for 24 months, and every 12 months thereafter.

Tax

The special consumption tax (SCT) is a form of excise tax that applies to the production or importation of specific goods and certain services. The current SCT rates on automobiles with fewer than nine seats range from 45 percent to 60 percent, depending on engine capacity.

Insurance

All vehicles driven in Viet Nam are required to be insured. Having a civil liability insurance policy is compulsory and complies with the requirements of the law. Uninsured drivers may be fined and are at risk of having their vehicles confiscated.

The process of insurance is the same for Vietnamese and foreign residents. To obtain insurance, applicants need to present their personal identification and valid documents such as passport, visa, or identity card.

Additional insurance coverage may be purchased to augment the compulsory civil liability insurance. Policies are available to cover the following eventualities:

- Physical damage insurance covers the damage to a vehicle in case of an accident. The cost for this coverage is generally 1.5 percent of the vehicle's value.
- Insurance to cover the medical expenses of the driver or passengers if the vehicle is involved in an accident.
- Insurance that insures the goods within a vehicle in case of accident.

Discounts are available for drivers who have had no accidents or claims in Viet Nam in the previous year. However, having no claims or accidents while driving in other countries is not taken into consideration when calculating premiums.

Penalty

Country：	Viet Nam

According to the Road Traffic Law, the car owner not compliant with the car registration requirement is liable to a fine of D6 to D10 million.

The car owner who does not take out insurance is liable to a fine D400,000 to D600,000.

References

Angloinfo. http://hcmc.angloinfo.com/information/transport/vehicle-ownership/vehicle-roadworthiness/ (accessed September 2015).

Ministry of Public Security. http://www.mps.gov.vn/web/guest/vanbanphapquy/-/vlegalcontent/sses/116133/0/0 (accessed September 2015).

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(5) Handling of imported used cars and/or accident status quo cars

In case cars cannot be repaired, parts are removed and bodies are sold as scraps to recycling villages such as Te Lo. Cars are usually brought in by the car owner or car dealer to the recycling village.

In some cases, dismantlers and used car parts dealers buy damaged cars, putting an advertisement on the web.

References

Field Survey of the Study Team.

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(6) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: end-of-life vehicle

Volume

The total number of ELVs was estimated at 6,000 in 2014.

Country：	Viet Nam

The table below shows the forecast of Yano Research Institute of the number of ELVs in Viet Nam.

Table A-XIV.3: Forecast of the Number of ELVs in Viet Nam

Year	2013	2014	2015	2016	2017	2018	2019	2020
# of ELVs	6,000	6,000	6,000	6,000	6,000	6,000	6,000	8,000

ELV = End-on-life vehicle.
Source: Yano Research Institute.

Model year

In Viet Nam, cars are generally used for a long time. However, cars used for business intentions have an expiration period for use — 25 years for private cars and 22 years for commercial cars.

Price

According to a dismantler located in Te Lo Village, they buy ELVs at about D10,000 per kilogram.

Distribution

In Viet Nam, the penetration rate of vehicles is low. Drivers tend to use their vehicles until they are broken. Therefore, the number of ELVs is low. ELVs are broken into parts informally and sold as parts. Some resources from ELVs are recycled. Automobile recycling business is mainly conducted in areas such as Te Lo Village. Operators who collect ELVs bring ELVs to these areas where they are broken into pieces by hand.

About 30 percent of parts taken by dismantlers are sold as valuables. Steel scraps are sent to scrap traders or electric furnaces located in neighbouring areas and other parts are sold to specialised recyclers such as engines, tires, plastics and so on.

Waste disposal and recycling is conducted in ‘Craft Villages’ or industry integrated areas mainly located in the Red River Delta and South Central Coast region in Viet Nam. Craft villages tend to deal with one type of item in industrial clusters, such as Datien Village for tires, Mansart or Kuando Village for aluminum.

Processing Situation

Country：	Viet Nam

Dismantling is being done by the informal sector in recycling villages such as Te Lo, and components and scraps are circulated to the informal route. Vehicle dismantling is mainly conducted by small low-technology units such as gas burners with low yield and capacity. Environmental measures such as prohibition on illegal dumping of wastes and collection of CFCs, and the like are insufficient. Dismantling of ELVs is done manually, causing adverse effects on worker's health.

References

Field Survey of the Study Team.

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(7) Volume, distribution, flow, model years, sale prices, processing situation, items on trading, and resources: recycled parts

Distribution and Flow

Many used parts shops are located in Cho Gioi. They are mainly trading used parts imported from other countries. Used parts from Te Lo are too old to be utilised. Therefore, used parts dealers do not often sell used parts from Te Lo.

The demand for automobile parts are met because, in addition to imitation parts made in China, the number of cars itself is low in Viet Nam. Therefore, in many cases, used auto parts are used in agricultural machinery.

In Viet Nam, there are remanufacturing companies dealing with car parts such as drive shafts, alternators, starters, compressors, and so on. They provide one- to two-year guaranty for their products.

Prices

According to several interviewees during the field study, imitation parts imported from China are priced about 50 percent, used parts are priced at 50 to 70 percent, and remanufacturing parts are priced at about 70 percent of brand new parts.

Country：	Viet Nam

References

Field Survey of the Study Team.

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(8) Volume, distribution, flow, model years, sales prices, processing situation, items on trading and resources: steel and non-ferrous metals

Viet Nam is importer of the steel scrap. The import is mainly from Japan and USA. Most Steel makers such as Hoa Phat and Southern Steel rely on the import for procurement of raw materials.

Table A-XIV.4: Import of Steel Scrap in Viet Nam

Year	2008	2009	2010	2011	2012	2013
Steel Scrap (thousand ton)	853	1,830	1,889	1,451	2,169	2,195

Source: World Steel Association, Steel Statistical Yearbook 2014.

Steel is brought to areas where relatively modern large-scale steel plants are integrated. For instance, Tisco Steel in Thai Nguyen has a large furnace. However, majority of the receivers of steel scraps are small household businesses. In many cases, steel scraps are sent to this type of business located in recycling villages. For instance, there are many small-scale steel plants in Da Hoi Village. They process steel for construction materials from steel scraps by small electronic furnace. Small-scale steel plants do not have appropriate pollution prevention equipment there to cause air pollution.

According to the interview during the field study, steel scrap is sold at D6,000 per kilogram.

Recycling of non-ferrous metals is carried out in craft villages that are specified for metals or resources. Like other wastes, after sorting the metals brought by collectors manually, they are refined. As for circuit boards, since there are no facilities that can deal with rare metals, the substrate is exported to China without doing anything.

There are also many household manufacturings for recycling non-ferrous metals such as

alminium. In Bac Giang, there is an area where many such companies gather. Workers here do not work with appropriate equipment such as masks. Therefore, there might be potential of occuupational health risk.

As for circuit boards, since there are no facilities that can deal with rare metals, the substrate is exported to China without doing anything.

There are also some recylcers of copper. However, the volume is low compared to that of aluminium.

Plastics from ELVs are collected and pelletised. Plastic scraps are sold to plastic manufacturing companies or traders.

References

Field Survey of the Study Team.

World Steel Association, Steel Statistical Yearbook 2014.
https://www.worldsteel.org/dms/internetDocumentList/statistics-archive/yearbook-archive/Steel-Statistical-Yearbook-2014/document/Steel-Statistical-Yearbook-2014.pdf
(accessed September 2015).

Yano Research Institute, *ASEAN Automobile Recycling 2014*

(9) Distribution volume, flow, model years, sale prices, and processing methods during dismantling (batteries, tires, and waste fluids, among others)

Decision 50/2013/QD-TTg, issued by the Prime Minister, prescribes that enterprises producing waste products are responsible for the retrieval and disposal of discarded products, which include hazardous substances such as batteries from 1 January 2015. Before the decision was promulgated, discarded products were manually dismantled and no CFC collection facilities were there and no waste oils were collected.

Batteries:

Batteries are collected and dismantled by small household manufacturing businesses that are

mainly from the informal sector. Batteries are cut by spaces without appropriate pollution prevention measures. In many cases, sulfuric acid is discharged into rivers without treatment. Also, occupational health risk is a huge problem because workers cut battery without masks and gloves. Workers face a potential of lead poisoning.

Used tires:

Used tires are collected by small companies, mainly from the informal sector. Used tires are cut manually. After being cut into small parts, used tires are sold to traders or companies that use them as fuels for manufacturing.

Waste oils:

There are many cases where small-scale waste oil collectors dump the waste oil into sewers, rivers or soil without proper treatment.

Reference

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(10) Factual survey of end-of-life two-wheeled vehicles

The number of two-wheeled vehicles produced in 2013 was about 3.7 million. The import and export values of motorbikes in the same year were US$48 million and US$372 million respectively.

Table A-XIV.5: Number of Assembled Motorbikes Produced (in thousand pieces)

Year	2009	2010	2011	2012	2013
# of motorbikes	3091.5	3506.6	4070.2	3634.5	3682.5

Source: General Statistics Office of Viet Nam.

Country：	Viet Nam

Table A-XIV.6: Import/Export of Motorbikes (in million US$)

Year	2009	2010	2011	2012	2013
Import Value	135	124	94	72	48
Export Value	32	60	108	187	372

Source: UN Comtrade Database.

In Viet Nam, motorbikes and vehicles are dismantled in recycling villages. In Te Lo Village, there are motorcycle dismantlers and traders. Used motorcycles are collected, some of which are sold as second-hand motorcycles or dismantled by taking out the available parts and selling the scraps.

Steel scraps and aluminum generated in the dismantling process are sold to electric furnace companies. Tires and plastics are sent to specialised traders. Tires are recycled into asphalt and sandals.

A dismantler dealing with motorbikes interviewed by the Study Team treats 10 to 30 units per month.

References

Field Survey of the Study Team.

General Statistics Office of Vietnam. http://www.gso.gov.vn/default_en.aspx?tabid=779 (accessed September 2015).

United Nations Comtrade Database. http://comtrade.un.org/data/ (accessed September 2015).

(11) Type of operation and number of recycling-related companies

Dismantlers

Among all disposal wastes, the volume of automotive parts to be treated is low. Various wastes, including home appliances, are dismantled and sorted manually. Then, the metals retrieved in

Country：	Viet Nam

the process go to other craft villages which speciliases in the item.

In Te Lo Village, there are more than 200 used parts dismantlers and traders. The dismantlers mainly dismantle commercial vehicles. There are only two or three dismantlers of private vehicles.

Scrap Trading Companies

In Van Mon Village in Bac Ninh Province, there are scrap trading companies. The village collects various metals such as steel, copper, aluminum, and the like. Vehicles are being dismantled by gas burners. Most of the resources can be sold, however, some companies illegally dump invaluable materials on the roadsides.

Downstream Recycling Companies

Van Loi company conducts aluminum recycling business. The company exports filter tube cartridge aluminum connectors, or filter tubes from Taiwan, and lading goods from Viet Nam.

Other Related Companies

Batteries:

Upon the initiative of the Vietnamese Government, recycling facilities of batteries and lead were established. There are seven permitted battery recycling facilities in Viet Nam with capacity of around 100 tons per day. One of them is Thye Ming Company.

Thye Ming Company is located in My Phuoc 2 Industrial Park, Lot C-8A-CN & C-3A-CN, NA5 St., Ben Cat Dist., Binh Duong. The company is one of the largest lead recycling smelters that leads the standard in Viet Nam.

Other companries dealing with batteries in Viet Nam include:

- Thang Long Metals Co., Ltd.
- Cong ty tnhh ngoc thien
- Ngoc Thien Co.,Td.
- Eni-florence Vietnam Co., Ltd.

Country：	Viet Nam

Dismantling is mostly conducted by the informal sector but reclamation of lead isconducted by the above-mentionned companies.

Tires:

Used tires are collected by small companies, mainly by the informal sector. After being cut into small parts, used tires are sold to traders or companies that use them as fuels for manufacturing companies, e.g. cement companies.

Waste oils:

There are 23 permitted facilities in Viet Nam with capacity of around 10 tons per day, besides other illegal recycling facilities. One of them is Long Hung Company.

Their characteristics are as follows:

- Oil distillation (fractional distillation and simple distillation)
- Oil water separation by mechanical method (centrifugation) and heat
- Simple distillation technology (simple equipment, easy to manufacture, install and operate, and low investment)
- Fractional distillation technology (produce diesel oil).

References

Do Tien Doan. Hazardous Waste Management Division, Waste Management and Environment Improvement Department, Vietnam Environment Administration. *Introduction on ELV Management in Vietnam. (Presentation material of WG expert).*

Field Survey of the Study Team.

Yano Research Institute. *ASEAN Automobile Recycling 2014.*

(12) Management of recycling-related companies

The number of employees of the recycling-related companies interviewed by the Study Team range from 2 to 100. The former is from a household business entity and the latter from an aluminum recycling company.

Country：	Viet Nam

Their revenues vary, depending on the size and domain of the business. For example, the annual revenue of a scrap trading company interviewed by the Study Team is D500 million to D700 million.

Reference

Field Survey of the Study Team.

2. Current challenges and considerations in automobile recycling laws and institutional systems in vehicle recycling

(1) Challenges in the vehicle recycling system (illegal dumping, inappropriate processing of waste, stringent final disposal site, dismantling technology, safety, efficiency, and recycling rates)

While the Environmental Protection Law of 2005 broadly delegates the responsibility of recovering expired or discarded means of transport to owners (Art. 67, 1.a/), there is still no existing regulation specific to the management of ELVs and/or vehicle recycling.

Other related challenges include:

- No legal document specialised for e-waste
- Poor separation at source
- Lack of a large-scale centralised treatment complex for industrial solid wastes and hazardous wastes
- Recycling is small-scale, spontaneous, difficult to control, and technologically unsophisticated.

In Viet Nam, dismantling is done by the informal sector, and components and scraps are circulated through the informal route. Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity. Dismantling of ELVs is done manually, and is causing adverse effects on workers' health.

Country：	Viet Nam

Environmental measures such as prohibition on illegal dumping of wastes and collection of CFCs and the like are insufficient. Although proper waste oil recyclers are present, a mechanism that ensures the flow of waste oils to proper waste oil recyclers, not to the informal sector, is still not well established.

Due to the lack of processing facilities, CFCs are released into the atmosphere without being properly recovered.

References

Field Survey of the Study Team.

Law on Environmental Protection (No. 52/2005/QHl I).
http://faolex.fao.org/docs/pdf/vie64190.pdf (accessed September 2015).

Pham Thi Nguyet Nga. Vietnam Environment Administration, Vietnam Ministry of Natural Resources and Environment, *Mapping Needs and Activities on Waste Management in Vietnam.*
http://www.unep.org/ietc/Portals/136/Events/ISWM%20GPWM%20Asia%20Pacific%20Workshop/Vietnam_Presentation.pdf (accessed September 2015).

(2) Trend in vehicle recycling policies and related automobile recycling law, and the enforcement, presence, and details of related institutions.

Decision No. 16-2015 QD TTg on the extended producer responsibility (EPR) principle was issued by Prime Minister in August 2013.

The Decision requires manufacturers and importers to take back and treat their sold products.

The Circular to guide this Decision is being drafted to:

- Not require the percentage of the product to be taken back
- Apply to household levels only, not for manufacturing facilities
- Guide the reporting responsibility of manufacturers and importers.

Country：	**Viet Nam**

Decision No. 16-2015 QD TTg covers the following waste types related to vehicles. As indicated in the table, the take back scheme of automotive products is considered under the Decision.

Table A-XIV.7: Waste Types of EPR Target

No	Waste type	Effective time
I	Battery	01/01/2015
II	E-waste	—
1	Fluorescence lamp	01/01/2015
2	Computer, printer, camera, camcorder, cell phone, scanner	01/01/2015
3	Photocopier, TV, air conditioner, refrigerator, washing machine	01/01/2016
III	Waste oil	01/01/2015
IV	Expired chemicals (used in medical care, plant protection, aquaculture)	01/01/2015
V	Tire	01/01/2016
VI	Vehicle (motor, car)	01/01/2018

EPR = Extended Producer Responsibility.
Source: Decision 50/2013 on extended producer responsibility.

a) Status of institutional system collateral of improper processing of three Designated Recovery items (fluorocarbons, airbags, and ASRs)

Fluorocarbons

During the repair of an air conditioner, R134a is used. However, collected CFCs are released into the atmosphere.

In general, due to the lack of processing facilities, CFCs are released into the atmosphere without being properly recovered.

Country：	Viet Nam

Airbags

Normally, damaged airbags are not repaired due to low awareness of safety. The repair of airbags cost D10 million.

Automobile Shredder Residues

There is no official vehicle shredder location.

b) Demarcation of roles (obligation and economic burden) among production officers (manufacturers and importers), related operators, vehicle users, and government agencies (including local governments)

The following are the demarcation of roles in the vehicle type approval/conformity system in Viet Nam:

- Manufacturers (applying for Type Approval Certificate)
  - Preparation of sample motor vehicles for technical service testing
  - Submission of information package (Information folder + Test report)
  - Sales, pre-delivery inspection, and mass production (upon certification)
- Importers (applying for Certificate of Conformity)
  - Secure required documents for import of vehicles
  - Submit imported vehicle for testing
  - Finish the Customs formalities (upon certification)
- Users
  - Comply with road transport regulations (licence, periodic inspection for technical safety, environmental protection, and roadworthiness)

•Government Agencies

- Ministry of Natural Resources and Environment (MONRE)
  - Approving authority
  - Check documents

Country：	Viet Nam

- Carry out waste mangement
- Issue certificates

- Vietnam Environment Administration (VEA)
- Sub-organisation of MONRE
- Approve lincence
- Carry out waste management

- Ministry of Transport (MOT)
- Approving authority
- check documents
- Carry out vehicle tests
- Issue certificates

- Vietnam Register (VR)
- Approving authority
- Conduct periodic vehicle inspection

- Vietnam Motor Test Center (VMTC)
  - Test motorcycles

- National Emission Testing Center (NETC)
  - Test motorcycles

- Police
  - Inspect licence plates.

Reference

Do Tien Doan, Hazardous Waste Management Division, Waste Management and Environment Improvement Department, Vietnam Environment Administration, *Updates of Regulation and*

Country：	Viet Nam
Control Activities to Implement the Basel Convention in Vietnam. http://www.env.go.jp/en/recycle/asian_net/Annual_Workshops/2014_PDF/Day1_S1_08_Vietnam.pdf (accessed September 2015).	

(3) Presence or absence of environmental regulations (such as landfill and incineration ban, and heavy metals use ban)

Viet Nam is in the process of introducing legislation to control ELV recycling and making preparations for the introduction of an ELV legislative management system.

Viet Nam has a number of existing environmental regulations such as the following:

Environmental Protection:

- Decree No. 59/2007/NĐ-CP, dated 9 April 2007 of the government, promulgating the regulation on solid waste management activities, and the right and duty of the person related to solid waste management.
- Decree No. 81/2006/NĐ-CP, dated 9 August 2006 of the government, promulgating the sanctions against administrative violations in the field of environmental protection (replacing Decree No. 121/2004/NĐ-CP).
- Decree No. 80/2006/NĐ-CP, dated 9 August 2006 of the government, detailing the implementation of the law on environmental protection.
- Law on Environmental Protection, dated 29 November 2005, took effect on 1 July 2006 (replacing the Environmental Protection Law 1993).
- Decision No. 64/2003/QĐ-TTg, dated 22 April 2003 by the Prime Minister, approving the plan for managing the establishments causing serious environmental pollution.

Solid and Hazardous Wastes:

- Decision No. 23/2006/QĐ-BTNMT, dated 26 December 2006 of MONRE, promulgating the list of hazardous wastes.
- Circular No. 12/2006/TT-BTNMT, dated 26 December 2006 of MONRE, on instructions on the condition, documentation, registration, and code of hazardous

Country：	Viet Nam

waste management.

- Decree No. 23/2005/CT-TTg, dated 21 June 2005 of the Prime Minister, strengthening the activities on solid waste management in urban areas and industrial zones.
- Decree No. 13/2003/NĐ-CP, dated 19 February 2003 of the government, prescribing the commodities that are dangerous/toxic and their transportation via roads.
- Decision No. 60/2002/QĐ-BKHCNMT, dated 8 August 2002 of the Ministry of Science, Technology and Environment (MOSTE), guiding the implementation of hazardous waste burying technique.
- Circular No. 02/2001/TT-BKHCNMT, dated 15 February 2001 by MOSTE, on instructions on the treatment of special wastes that encourage investment.
- Decision No. 155/1999/QĐ-TTg, dated 16 July 1999 of the Prime Minister, promulgating the regulation on hazardous waste management.
- Inter-Ministerial Circular No. 1590/1997/TTLT/BKHCNMT-BXD, dated 17 October 1997 of the Ministry of Construction and MOSTE, giving instructions to implement Directive 199/TTg by the Prime Minister on urgent measures on the management solid wastes in urban areas and industrial zones.

Circular 12/2011/TT-BTNMT stipulates that ELVs are in the hazardous waste list. In this Circular, the recycling and treatment facilities must possess hazardous waste management permits:

- Treatment of waste oils and batteries must have hazardous waste management permits. However, tires are not required to have a permit.
- Vehicles must manage the hazardous wastes in case the hazardous waste components are not separated.

Under Circular 12/2011/TT-BTNMT, the VEA is competent to grant and revoke hazardous waste management licences to entities operating in areas covering two or more provinces or centrally run cities. Provincial-level people's committees or natural resources and environment departments empowered by provincial-level people's committees are competent to grant and revoke hazardous waste management licences to entities operating in areas within their

Country：	Viet Nam

respective provinces.

DONRE requires e-waste generators to transfer wastes to licensed collectors, transporters, and treatment facility operators. Those generators, collectors, and treatment operators will need to report to MONRE and DONRE every six months regarding the control situation of their facility.

Decision No.16-2015 QD TTg of the Prime Minister on the retrieval and treatment of end-of-life products:

- Waste oils: 2015
- Batteries: 2015
- Tires: 2016
- Vehicles: 2018

The Decision is being revised and the guidance to implement the Decision will be developed.

In the Decision, the following items are stipulated:

- Setting up of points for the retrieval and disposal of discarded products.
- Receiving the discarded products which have been sold in Viet Nam.
- Transporting and disposing the discarded products.
- Notifying MONRE about the retrieval locations and facilities for disposal of discarded products.
- Annually reporting the quantity of products produced or imported, which have been sold in Viet Nam; and the results of retrieval and disposal of discarded products in accordance with MONRE guidelines.

Recycling：

- Decision No. 03/2004/QĐ-BTNMT, dated 2 April 2004 of MONRE, on importing wastes as materials for domestic production.
- Official Letter No. 1146/BKHCNMT-MTg, dated 6 May 2002 of MOSTE, approving the national action plan for cleaner production.

Country：	Viet Nam

References

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Annex III

Results of the field surveys

1. Indonesia

(1) Schedule

Table 1. Schedule of field survey in Indonesia

DAY	TIME	INTERVIEWEES
March 30	9:00	Scrap trading company
	13:00	Insurance company
	16:00	Used parts market
March 31	11:00	Dismantling company
	15:00	Steel plant
April 1	11:00	Remanufacturing company
	15:00	Repair company
April 2		1st Working Group meeting
April 3	10:00	Dismantling company
	11:00	Used parts market

(2) ELV Dismantling in Indonesia

The team visited some dismantling companies in Jakarta. These types of businesses are not registered in the municipality and are in the informal sector. The companies collect and buy ELVs by themselves. Sometimes, vehicle owners bring them to the dismantling company. ELVs are bought at Rp3,900 per kilogram. Based on the interview, the number of purchases of ELVs has decreased. In some cases, the companies do not buy any ELV for a month due to lack money.

The ELVs are used as used cars or sold as scrap. Before selling as scrap, parts such as engines, suspensions, and interiors, among others, are taken out from ELVs and sold to used parts shops, repair shops, and car owners. However, most of the auto parts are too old to be bought. Therefore, most of the parts are sent to scrap trading companies, recycling

companies, or a steel plant in Pulogadun. Aluminium is sold to companies in Jakarta. When an ELV is sold as scrap, it is first dismantled by a gas burner, divided into small parts and segregated by auto components/materials. Oftentimes, they request other dismantling companies to dismantle but, if the amount is small, the company may dismantle them by themselves. Working batteries are usually reused, while non-working batteries are sold to battery recyclers. Waste oil is disposed in junkyards. Tires can be sold, reused, or recycled as rubber products such as cushion materials and flip-flops, among others. Airbags of cars that have figured in accidents are destructed but airbags of non-accident cars can be reused or sold.

Recently, the price of steel scrap has decreased. Previously, steel scrap could be sold at Rp7,000 per kilogram. Currently, the price is Rp3,800 per kilogram. Due to this price decrease, the ELV is stored without being sold, waiting for the price of scrap to increase. Recently, used cars may be sold as second-hand cars. However, such cases have become rare.

Figure 12. Yard for ELV

Figure 13. Used parts taken from ELV

Figure 14. Used parts

Figure 15. Yard for ELV

(3) Small repair and parts shops

In some areas in Jakarta, several small repair and parts shops are located in one area. The shops sell new genuine parts as well as imitation parts, used parts, among others.

Figure 16. Small repair shops

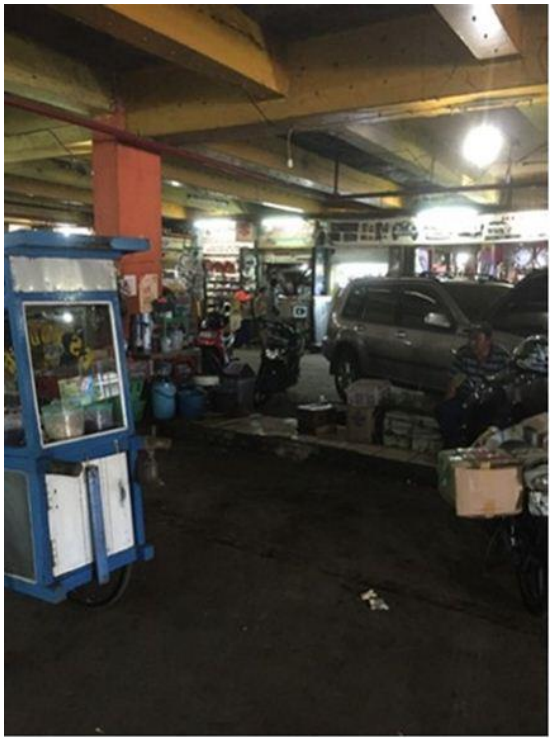

Figure 17. Small parts shops

Figure 18. Used parts shops

Figure 19. The area where many repair shop and parts shops gather

In other areas in Jakarta, there are markets where some shops sell used parts.

Figure 20. Market in Jakarta

Figure 21. Used parts shop

Figure 22. Used handle

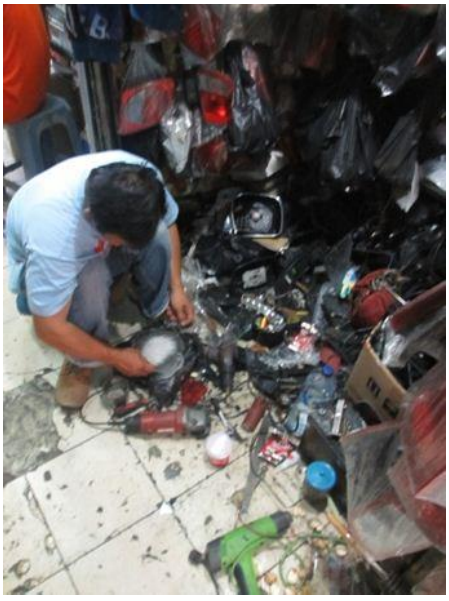

Figure 23. Repair of used part

(4) Steel plants

In Jakarta, there are many steel plants. One such plant is Pulogadun. This plants stores steel scraps and makes steel from steel scraps.

Figure 24. Store of steel scrap

Figure 25.Store of steel scrap

(5) Repair shop using used tires

The study team interviewed a shop that uses used tires in Jakarta. The used tires are sold to the shop by a trader. Used tires that cannot be utilised are sold to manufacturing companies like a cement company, which uses the tires as fuels in a cement rotary kiln. There are also manufacturers who make steel bars from used parts in Cikarang and Karawang. Repair shops in Jakarta consider retreaded tires unsafe, however they are widely used in the local area.

2. Malaysia

(1) Schedule

Table 2. Schedule of Field Survey in Malaysia

DAY	TIME	INTERVIEWEES
March 16	9:30	Department of Environment Ministry of Natural Resources and Environment (NRE)
	14:00	Malaysia Automotive Institute (MAI)
	16:00	Scrap trading companies
March 17	10:00 - 18:00	Malaysia Automotive Recyclers Association (MAARA) and member companies (4 used parts factories, 1 scrap trader, and used parts factory)
March 18	AM	Car workshops in Kuala Lumpur
	13:30	Car manufacturing company
	16:00	Used parts factory
March 19	10:00	Steel plant
	PM	Car workshops in Kuala Lumpur

(2) MAARA and Used parts resellers

The Malaysia Automotive Recyclers Association (MAARA) consists of used parts sellers (70 percent) and scrap sellers (30 percent). Approximately 20 companies have the licence to dismantle ELVs. Around 30 to 40 used parts companies are located in Kepong. Every company is dealing with approximately one to two 40-feet containers per day. Approximately 5,000 containers are imported annually.

Figure 26. Inside of container

Figure 27. Taking used parts from a container

Figure 28. Transfering the body

Figure29. Warehouse

Used parts are stored in warehouses with roofs. Engines are stacked in warehouses. When the engine is being sold, the belt is checked if it can be rotated or not.

Suppliers are usually trusted because they provide warranty. Warranty of used parts depends on the shops. Generally, one- to three-month warranties are provided.

The shops sell various used parts such as engines, alternators, transmissions, lights, and so on. However, body parts are not good in terms of revenue. Imitation parts are imported from China, Taiwan, and Thailand, and price competition with them is very severe. The difference in price between used parts and imitation parts is 100:120. In some cases, imitation parts are cheaper than used parts.

Many traders come to the factories from Africa, Middle East, Pakistan, China, among others, to buy used parts, in particular engines and transmissions. Prior to the trade, the parts are cleaned in their own countries. The ratio of domestic use and re-export is 20:80.

Figure 30.Used engines

Figure 31. Used engines and transmissions

Figure 32. Used parts (speaker)

Figure 33. Used body parts

In case used parts are not working, the parts are dismantled into smaller parts. The disassembly shops also remanufacture gear boxes and others.

Figure 34. Dismanting used parts to smaller parts

Figure 35. Remanufacturing a gear box

(3) Scrap recycling companies

Among MAARA members, one used parts factory in Klang is conducting a scrap trading business. Scrap is collected from used parts factories in Klang and sold to domestic shops or exported.

Figure 36. Alminium scrap

Figure 37. Plastic scrap

(4) Workshop in Klang using used parts

In north Klang, there is an area where many repair shops are located. In case cars are broken, car owners decide whether to use new genuine parts, new imitation parts, or used parts.

Figure 38. Repair shop (mainly repairs the engines)

Figure 39. Used engine parts

Cars that have figured in accidents are sent to repair shops that have special contracts with insurance companies. Accident cars may be repaired, however, when cars cannot be repaired, the ELV is sold to scrap trading companies.

Figure 40. CFC collector

Figure 41. Collection of CFC

Figure 42. Repair shop for accident cars

Figure 43. Repairing an accident car

(5) Steel plant and shredder

There are 10 steel manufacturing companies in Malaysia. Two of them are large steel manufacturing companies manufacturing approximately 30,000 tons per month. There are two shredders are installed in Malaysia. One of them is Amsteel. Originally, the intention was to shred soft press imported from Japan. However, after the export of soft press was prohibited, the shredders have not been working at full capacity.

Figure 44. Shredder

Figure 45. Scrap for shredding

Figure 46. Automobile parts scrap

(6) Scrap traders

Some scraps (steel, non-ferrous, plastics) are sold to scrap traders who export scraps to China.

Figure 47. Scrap trading companies

Figure 48. Scraps for export

(7) Malaysia ELV policy

Malaysia revised its National Automotive Plan in 2014 (NAP 2014). Currently implementation measures are being discussed. ELV policy is part of NAP 2014.

In 2009, the prohibition on the importation of used parts was being discussed by the Malaysian Government as they considered used parts as having safety problems. In collaboration with universities, MAARA submitted a report to MAI, Ministry of Transport (MOT), and MITI proving that there is no safety problem with used parts. As a result, the prohibition on the importation of used parts was not implemented. Only the importation of batteries, tires, and brake pads were prohibited. On the other hand, the Malaysian Government requested MAARA to develop a quality standard. Currently, MAARA is trying to develop the standards. MAARA member companies are also providing a three-year warranty.

MAARA is considering the used parts control system, in particular recycle parts information system, in implementing NAP. Used parts import data are collected by Customs and sales data of used parts are also registered in the system. Under the system, technical support for repair shops is also considered.

The importation of used cars was prohibited before. However, it was allowed under the licence scheme. The problem in Malaysia is that there is no inspection scheme for private vehicles. Therefore, ELVs are seldom generated.

3. Myanmar

(1) Schedule

Table 3. Schedule of Field Survey in Myanmar

DAY	TIME	INTERVIEWEES
May 21	10:30	Myanmar Economic Corporation (MEC) factory (observed from outside of the facility)
	11:00	Steel processing factory
	14:15	Road Transport Administration Department (Yangon Region), Ministry of Rail Transport
	16:00	Steel product manufacturing and trading company
May 22	10:00	Japanese used parts dealer
	10:15	Yangon repair factory
	12:00	Car dismantling factory of Myanmar Economic Corporation (MEC) at Thilawa (observed from outside of the facility)
	15:00	Tamwe used cars market
	19:00	Meeting with a representative of JETRO, Yangon Office

(2) MEC's dismantling firm in Myanmar

Myanmar Economic Corporation (MEC), which is a corporation under the Myanmar Government, launched two ELV dismantling plants in Myanmar. Due to a replacement programme announced by the Myanmar Government in 2011, there is an overwhelming amount of cars, making a 3-kilometre queue, waiting to be scrapped in scrapped car plants. Brokers come to take off the used parts from the cars at this line to buy it from car owners.

According to the dealer in Yangon, there are used parts deals within the plant which make the process slower and not many cars are processed every day.

Scrapped cars brought to Myingyen are taken to the iron factory that is supervised by the Myanmar Ministry of Technology and put inside an electric furnace. This iron factory has temporarily stopped its work, but it is estimated that the factory can deal with about 20 tons of iron annually.

Nonetheless, although iron is recycled under the strict control of the ministry system, it seems many other valuable metals are not recycled at all. In fact, data shows that there are no government-related facilities for copper and aluminium recycling. Moreover, many people who were not aware that there are rare metals in mufflers and they put these mufflers inside the electric oven with the other scrapped parts as iron scraps. However, rare metals might not have been used in old models of cars made in Myanmar. If the same process were to be conducted in the future, this could become an enormous loss of resource.

Figure 49. Car dismantling factory of MEC at Thilawa (1)

Figure 50. Car dismantling factory of MEC at Thilawa (2)

Figure 51. Steel plant of MEC at Yangon

Figure 52. Steel plant of MEC at Yangon

(3) Informal sector's recycling in Myanmar

Due to the replacement programme announced by the Myanmar Government in 2011, there are overwhelming amounts of cars waiting to be scrapped in scrapped car plants. Before sending ELVs to dismantling facilities, car owners request the informal sector to take off the used parts. Brokers come to buy used parts from car owners.

Figure 53. Informal sector taking used parts from an ELV

Figure 54. Informal sector taking used parts from an ELV

(4) Used parts in Myanmar

Tamwe used car parts market are dealing with used parts, mainly imported ones. Half-cuts are prohibited to be imported, however, are illegally imported by some shops.

Figure 55. Used parts shop (body parts)

Figure 56. Area where many used parts shops gather

Figure 57. Used parts shop

Figure 58. Imitation parts

Figure 59. Area where many used parts shops gather

A Japanese used parts dealer has a local storage and shop in Yangon. Since the importation of half-cuts are not allowed, used parts such as used engines, transmissions, body parts, lumps, among others, are imported from Japan. Not a lot of engines and transmissions are sold compared to other countries.

Figure 60. Japanese used parts dealer's warehouse

Figure 61. Japanese used parts dealer's warehouse

Figure 62. Used body parts

Figure 63. Used stearing rack

Figure 64. Used rear doors

4. Thailand

(1) Schedule

Table 4. Schedule of Field Survey in Thailand

DAY	TIME	INTERVIEWEES
May 18	10:30	Used auto parts markets—Worachak District at the centre of Bangkok old town; and at Pathum Wan at the centre of Bangkok (located behind the Chulalongkorn University)
	14:00	Iron and Steel Institute of Thailand
	16:00	Thailand Automotive Institute
	17:45	Tokio Marine Insurance (Thailand) Public Company Limited
	19:15	Toyota Tsusho (Thailand) Company Limited
May 19	10:00	King's diesel
	11:15	Passakorn Service
	13:45	Kaiho (Thailand) Company Limited
	16:15	KI-Ecotech Company Limited
	19:00	Dinner with Mr Hajime Yamamoto, an expert in the Asian auto industry (former employee of MRI)
May 20	10:00	Hidaka Yookoo Enterprises Company Limited
	11:30	Used car auction at Manheim
	13:30	Suksawass Taxi
	15:00	Bangna used cars parts market

(2) ELV Dismantling in Thailand

There is a huge hub of used parts trade in Thailand. Thailand imports many half-cuts and used parts from other countries, mainly from Japan. Many used parts recyclers/traders dismantle the half-cuts. Some of the used parts are domestically used and the others are exported.

Areas where used parts dealers gather are dotted in Thailand. Small scale dealers conduct their business in those areas. There are dealers that specialise in specific items. They deal with used parts from both inside and outside the country. Those dealers send their skilled staff to dismantling workplaces in Japan and then import used parts from Japanese dismantling sites where their staff work. In addition to automotive repairers and parts' brokers, end users sometimes purchase the parts directly.

Dismantlers and used parts traders that import half-cuts and used parts are located in specific areas such as Bang Na, Ptathumwang, and Phaholyothin Frontage Rd. Originally, such dismantlers and used parts traders were mainly located in Ptathumwang, real estate owned by Chulalongkon University. Chulalongkon University rents out apartments at very cheap prices in this area and, therefore, the informal sector gathers in this area. In 1990, the contract between the dismantlers and used parts traders and Chulalongkon University expired. In 2000, Chulalongkon University requested the dismantlers and used parts traders toleave the area. At first, the dismantlers and used parts traders opposed the relocation. Recently, the dismantlers left Ptathumwang and moved to Bang Na and Phaholyothin Frontage Road and other areas.

Figure 65. Used parts shop in Ptathumwan

Figure 66. Road close to used parts shop in Ptathumwan (1)

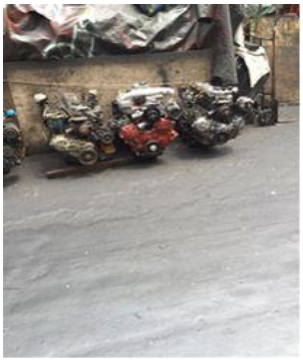

Figure 67. Road close to used parts shop in Ptathumwan (2)

Figure 68. Used parts shop in Phaholyothin Frontage Road (1)

Figure 69. Used parts shop in Phaholyothin Frontage Road (2)

Figure 70. Used parts shop in Bang Na (1)

Figure 71. Used parts shop in Bang Na (2)

Figure 72. Used parts shop in Bang Na (3)

Figure 73. Used parts shop in Bang Na (4)

Figure 74. Imported engine

Figure 75. Imported half-cut

(3) Auction of accident cars/used cars

Accident cars and used cars are sold by auction. There are three major auctions in Bangkok: Manheim, Apple, and Union. Some of the used cars are actually moved and displayed in the auction area but some ELVs are unable to be moved and photos are shown to buyers.

Figure 76. Auction of motorcycles

Figure 77. Auction of ELVs

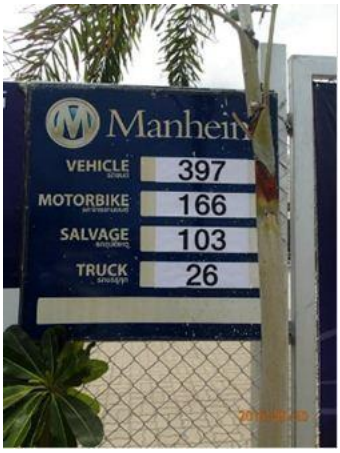

Figure 78. The number of vehicles auctioned in one day

Figure 79. Aucition centre

Figure 80. Auction of used cars

(4) Taxi companies

Taxi companies maintain the taxi cabs by themselves. For repair, they select new genuine parts, imitation parts, or used parts after considering the quality and price. Used parts are used for expensive parts such as gear boxes, compressors, and so on. Imitation parts are made in China and Taiwan. If new genuine parts were sold at B100, imitation parts would be sold at B30 and used parts would be sold at B30. For engines, used parts are used. For newer car models, there are not so many used parts. Therefore, new genuine parts are used at first and, after one year, imitation parts are used. After 2 or 3 years, used parts start being used. Used parts shops provide a two-year warranty. Recently, used parts imported from Japan cannot be used as there is a minor difference in specification between the same model sold in Thailand and Japan.

Taxi cars are allowed to be used for a maximum of 9 years. After 9 years, two out of ten cars are stored for utilising parts for repair, and the others are sold to used car dealers. Sometimes, taxi drivers buy the parts at a low price. Taxi drivers either use the parts or sell them to the other owners. In addition, many parts are designed for automatic cars and, therefore, parts cannot be easily used as second hand.

Based on other information, used tires are sold to used tire dealers. Airbags started to be installed from 2014 following Thai regulations.

Figure 81. Maintainance at a taxi company

Figure 82. Used cars stocked in a taxi company

(5) Scrap trading companies in Thailand

Some of the industrial scrap trading companies are considering to introduce shredder and guilotine shears but the amount of generation is not enough to introduce shredders and guilotine shears for ELVs.

Figure 83. Guilotine shear

Figure 84. Shredder

5. Viet Nam

(1) Schedule

Table 5. Schedule of Field Survey in Viet Nam

DAY	TIME	INTERVIEWEES
June 15	11:00 - 11:30	Repair factory
	15:00	Remanufacturing Company in Hanoi
	22:00	Da Hoi Village
June 16	10:00	Vietnam Environment Administration (VEA)
	10:30	Cho Gioi used parts market at Hanoi
	15:30	Auto dismantling factory at Te Lo village
June 17	10:00	Waste oil collector
	11:30	Battery recycling companies
	14:30	Dismantler and aluminium scrap collector
	16:00	Aluminium recycle company
June 18	9:00	Scrap trade company
	10:30	Automobile inspection centre
	14:30	Collector/dismantler of used motorcycles at Te Lo Village
	15:30	Tire recycler at Te Lo Village
June 19	9:00	Scrap trade company

DAY	TIME	INTERVIEWEES
	11:15	Battery collector
	15:00	Insurance company

(2) Car recycling village in Viet Nam

In Te Lo Village, there are more than 200 used parts dismantlers and traders. The dismantlers mainly dismantle commercial vehicles. There are only two or three dismantlers for private vehicles.

Figure 85. Dismantlers for private vehicles

Figure 86. Dismantlers for private vehicles

Figure 87.Dismantlers for passenger vehicles

Figure 88. Dismantlers for passenger vehicles

(3) Motorcycle recycling village in Viet Nam

In Te Lo Village, there are motorcycle dismantlers and traders. Used motorcycles are collected. Some are sold as second-hand motorcycles or dismantled by taking out the available parts, and the dismantlers sell the remaining parts as scrap.

Figure 89. Dismantlers for motorcycles

Figure 90. Dismantlers for motorcycles

(4) Scrap trading companies.

In Van Mon Village in Bac Ninh Province, there are scrap trading companies. The village collects various metals such as steel, copper, aluminium, among others. Vehicles are dismantled by gas burners. Most of the resources can be sold. However, some companies illegally dump valueless materials on the roadsides.

Figure 91. Junkyard of scrap

Figure 92. Gas burner

Figure 93. Dismantling mannually

Figure 94. Future End-of-life vehicle to be dismantled

Figure 95. Dismantling mannually

(5) Used parts shops

Many used parts shops are located in Cho Gioi. The shops mainly trade used parts imported from other countries. Used parts from Te Lo are too old to be utilised. Therefore, used parts shops do not often sell used parts from Te Lo.

Figure 96. Used parts shop: parts for engine

Figure 97. Used parts shop: starters and alternators

Figure 98. Used parts shop: body parts

Figure 99. Used parts shop

(6) Steel plants

There are many small-scale steel plants in Da Hoi Village. Most of the steel plants have steel for construction materials from steel scraps by small electronic furnaces. Small-scale steel plants do not have appropriate pollution prevention equipment, thus causing air pollution.

Figure 100. Small electronic furnance

Figure 101. Small electronic furnance

Recycling of non-ferrous metals is carried out in 'Craft Villages' which are specified for metals or resources. In the craft villages, there are also many household businesses that recycle non-ferrous metals such as alminium. In Bac Giang, there is an area where many such businesses operate. Like other wastes, after being sorted out by recyclable collectors manually, the scrap

metal is refined for recycled material. Workers do not work with appropriate equipment or gears such as masks. Therefore, they face potential occupational health risks.

Figure 102. Scrap yard

Figure 103. Small furnance

Figure 104. Warehouse for recycled material

Figure 105. Small furnance

Figure 106. Recycled alminium

Figure 107. Scrap yard

Figure 108. Small furnance

Figure 109. Warehouse for recycled material

(7) Batteries

Batteries are collected and dismantled by small household businesses that mainly belong to the informal sector. Batteries are cut in spaces that have inappropriate pollution prevention measures. In many cases, sulfuric acid is discharged to rivers without treatment. Occupational health risk is a huge problem because workers cut batteries without masks and gloves. Workers face the risk of lead poisoning. Following an initiative of the Vietnamese Government, recycling facilities of batteries and lead were established in Chi Dao Village, Hung Yen Province. However, dismantling is still being conducted by the informal sector, while the reclamation of lead is conducted by companies.

Figure 110. Battery and lead recycling company

(8) Used tires

Used tires are collected by small companies that mainly belong to the informal sector. Used tires are cut manually. After being cut into small parts, used tires are sold to traders or companies that use them as fuels for manufacturing like cement companies.

Figure 111. Used tire (cut)

Figure 112. Stored used tires

Figure 113. Cutting used tire

(9) Waste Oils

Waste oils discharged from repair shops are collected by the informal sector. Waste oils are stored and sold to traders. Afterwards, traders sell waste oils to manufacturing companies or recycling companies. Waste oils may be recycled as lubricant oil or grease, among others.

Figure 114. Storage of waste oil

Figure 115. Storage of waste oil

(10) Car inspection facility

In Hanoi, there is car inspection facility. The facility was originally operated by the Vietnamese Government but now it is operated by a private company. The facility installed various equipment for inspections.

Figure 116. Car inspection facility

Figure 117. Explanation of theprocess of inspection

Annex IV

Comparison among target countries

Table 12. Status of ELV recycling in each country

№	ELV system		Country									
			Cambodia	Lao PDR	Myanmar	Viet Nam	Thailand	Malaysia	Indonesia	Philippines	India	Japan
1	Design for Recycling	Current Status	Currently no automobile manufacturing in Cambodia.	Currently no automobile manufacturing in Lao PDR	Currently no automobile manufacturing in Myanmar	Major manufacturing companies are promoting DfR according to their global standards.	Major manufacturing companies are promoting DfR according to their global standards.	Proton is promoting DfR to adhere to the requirements of the EU ELV directive.	Major manufacturing companies are promoting DfR according to their global standards.	Major manufacturing companies are promoting DfR according to their global standards.	Multinational companies in India are promoting DFR as per their global standards. Two major Indian car companies also made their export vehicles comply with EU standards. The entire production of Maruti Suzuki Limited complies with DfR standards.	<Status before ELV Law> Major manufacturing companies are promoting DfR according to their global standards. <Current Status> Article 3 of the ELV Law requires manufacturing companies to adopt measures to promote DfR.
		Regulation	No regulation	No regulation	No regulation	No regulation	No regulation	No regulation	No regulation	No regulation	AIS 129 covers design aspects for M1 and two- and three-wheelers. Will be promulgated shortly and become effective from agreed dates for	<Status before ELV Law> ・The Law for Promotion of Effective Utilization of Resources specifies the responsibility of business entities to adopt the 3R measures. <Current Status> Manufacturing companies are

No.	ELV system		Country									
			Cambodia	Lao PDR	Myanmar	Viet Nam	Thailand	Malaysia	Indonesia	Philippines	India	Japan
											implementation.	required by the ELV Law to adopt the DfR measures in terms of car design and selection of components and raw materials, and to provide relevant information to related parties.
2	End-of-Life/Service of Vehicle (including inspection system)	Current Status: State of use of old car	Car owners continue to use old cars although there is an inspection system.	Car owners continue to use old cars although there is an inspection system.	Car owners continue to use old cars although there is an inspection system.	Expiration period (End-of-Service of Vehicle) is set by regulation: 25 years for private cars and 22 years for commercial vehicles.	・Car owners continue to use old cars although there is an inspection system. ・If used cars become older, they are likely to move from urban to rural areas or be exported to neighbouring countries.	・Car owners continue to use old cars because there is no inspection system for private vehicles. ・If used cars become older, they are likely to move from urban to rural areas or be exported to neighbouring countries.	・Car owners continue to use old cars although there is inspection system. ・If used cars become older, they are likely to move from urban to rural areas or be exported to neighbouring countries.	Car owners continue to use old cars although there is inspection system.	Inspection and maintenance systems are not effective. Vehicle owners continue to use old vehicles for much longer than they should. Some vehicles also move from urban to rural areas and interiors.	<Status before ELV Law> ・Car owners cannot continue to use old cars because there is an inspection system. <Current Status> ・Car owners cannot continue to use old cars because there is an inspection system. ・The entire life cycle of an ELV is managed by an e-manifest scheme.
		Current Status: Disposal of ELV	No information	No information	・Total estimated number of ELVs is:138,184 (2014) ・ELVs generated in Yangon are sent to MEC's dismantling factory.	・Total estimated number of ELVs is: about 6,000 ・Drivers tend to use their vehicles until they are broken. Therefore, the number of ELVs is low.	・Total estimated number of ELVs is:164,934 (2014) ・In case cars cannot be repaired, parts are removed and bodies as scrap are sold to waste traders.	・Total estimated number of ELVs is: 61,430 (2013) ・In case cars cannot be repaired, parts are removed and bodies as scrap are sold to waste traders. The number of	・Total estimated number of ELVs is: 124,002 (2013) ・Accident cars are sold to auction companies. Auction companies sell it by auction. ・Some imported used cars and accident cars sold by insurance companies are broken up by vehicle dismantlers and	・Total estimated number of ELVs is:17,866 (2013) ・ELVs would first flow to repair shops where usable parts are taken out. Then they, along with accident cars,	・Total estimated number of ELVs is: 5,047,205 (2013) ・Accident cars are sold to auction companies. Auction companies sell the cars through	<Status before ELV Law> ・There were many illegal cases of dumping and improper disposal due to the rising costs of shredding and scarcity of disposal sites. ・Dismantlers sell recyclable parts to parts markets and metal markets.

No.	ELV system		Country									
			Cambodia	Lao PDR	Myanmar	Viet Nam	Thailand	Malaysia	Indonesia	Philippines	India	Japan
						・In case cars cannot be repaired, parts are removed and bodies as scrap are sold to recycling villages such as Te Lo.	・In case accident cars cannot be repaired, the ownership of the car is transferred to the insurance company; car owners receive the insurance payment; the insurance company sells accident cars to repair shops or car dealers through auctions.	ELVs is very small because old cars are still utilised in rural areas. ・In case accident cars cannot be repaired, the ownership of the car is transferred to the insurance company; car owners receive the insurance payment; the insurance company sells accident cars to the junkshops through auctions.	'bengkels', which are small-scale car repair shops in Indonesia. ・In case cars cannot be repaired, parts are removed and bodies as scrap are sold to waste traders.	would be sent to junkshops. ・In case cars cannot be repaired, parts are removed and bodies as scrap are sold to junkshops.	auction. Currently, small informal sector businesses are taking in ELVs. ・In case cars cannot be repaired, parts are removed and bodies as scrap are sold to waste traders.	<Current Status> ・Total estimated number of ELVs is: 3,430,000 (2013) ・Dismantlers sell recyclable parts to parts markets and metal markets. ・Manufacturing companies are required by the ELV Law to properly process the three Parts DfR - (fluorocarbons, airbags, and ASRs).
		Regulation: Registration	・All vehicles must be registered. The Department of Transport, Ministry of Public Works and Transport is responsible for issuing vehicle licences and registration certificates. ・Compulsory insurance is also required	All vehicles must be registered and have licence plates in accordance with the regulations of the Ministry of Communication, Transport, Post and Construction.	・All vehicles must be registered under the Motor Vehicle Law. ・Compulsory insurance is also required.	・All vehicles must be registered. ・Compulsory insurance is also required.	・All vehicles must be registered. - DLT inspects vehicles; and - Private inspection stations authorised by DLT carry out inspection of motorcycles and taxis, i.e. vehicles registered under MVA. ・Car owners have to pay the Road Tax.	・All vehicles must be registered. ・Car owners have to pay the Road Tax. ・Compulsory insurance is also required.	・All vehicles must be registered. The Indonesian National Police is the agency responsible for motor vehicle and driver registration/identification. ・Annual renewal of registration is requested and car owners have to pay Road Tax. ・Compulsory insurance is also required.	・All vehicles must be registered under the standards and procedures for motor vehicle inspection. Drivers are required to pass the LTO registration process ・Car owner have to pay MVUC・Compulsory insurance is also required.	・All vehicles must be registered. Owners of motor vehicles must register with a registering authority who has jurisdiction over his residence or place of business. ・Third party insurance is compulsory	<Status before ELV Law> ・RTVA stipulates the vehicle registration in following cases: -purchase of new car -reuse of used car without number plates -change of the car owner's name, address, and the like. <Current Status> See above

No.	ELV system		Country								
			Cambodia	Lao PDR	Myanmar	Viet Nam	Thailand	Malaysia	Indonesia	Philippines	India	Japan
			for commercial vehicles.				・Compulsory insurance is also required.				for all vehicles.	
		Regulation: Deregistration	No information	No information	・If a car owner sends an ELV to MEC's factory, the owner can receive a licence to import a new used car. This system works like deregistration. ・There is a system that if the renewal of registration is not done for 5 years, the car will be automatically deregistered.	Deregistration is necessary when: car has been involved in an accident; car's engine or chassis has been removed; car exceeds the expiration period, owner lost the car, among others. ・Take back scheme of ELVs are considered under the Prime Minister's notification.	・ Deregistration is obliged within 15 days after owner has stopped to use the vehicle. ・If a car owner does not pay the registration fee for more than 3 years, the car will be automatically deregistered.	・Car owners can deregister a vehicle at any time. ・If car owner does not deregister a vehicle for more than 2 years, the car will be automatically deregistered.	・Car owners need to deregister their cars at police stations. ・In practice, car owners often sell ELVs to repair shops.	Although there is the system of deregistration, the system is mostly not used.	Currently, there is no formal deregistration system in operation. AIS 129 proposes a formal deregistration system to be implemented along with a destruction certificate for ELVs.	<Status before ELV Law> ・Before the revision of RTVA coincided with the ELV, exported vehicles and vehicles dismantled cannot be tracked due to the lack of the system of permanent deregistration and temporary deregistration. <Current Status> ・Car owners are required under RTVA to deregister their vehicles in case of end-of-use or dismantling of cars. ・Due to the integration of the e-manifest system and the Vehicle Registration System, permanent and temporary deregistration, and information about ELVs are managed just as the vehicle in use.
		Regulation: Inspection	・All vehicles are required to undergo General Inspection by the	・All transport vehicles are required to take technical inspections within the	・Automobile inspection is mandatory and owners need to take initial	・Commercial and personal vehicles are required to be inspected. ・The duration	・Personal vehicles must be inspected every year after 7 years from new	・Commercial vehicles have to be inspected annually. Random	・Commercial vehicles, personal vehicles, and public vehicles are required must be inspected every six months.	・All vehicles are required to take mandatory inspections prior to their	・The inspection system is in the process of elaboration. ・The	<Status before ELV Law> All vehicles must be subjected to mandatory inspection under the RTVA.

No.	ELV system		Country									
			Cambodia	Lao PDR	Myanmar	Viet Nam	Thailand	Malaysia	Indonesia	Philippines	India	Japan
			Department of Public Work and Transport once every 2 years.	specified period and at technical inspection stations.	inspection, renewal inspection, and transfer inspection. ・Owners need to take renewal inspections every year. ・Vehicle inspections are conducted in 53 inspection places supervised by the road transportation bureau.	of first time and renewal inspections depends on the car types. Insurance certification is required for inspection.	registration. ・Commercial vehicles have to be inspected every year after registration.	inspection is conducted on the road. ・There is no inspection system for private vehicles but plans for introducing an inspection system for private cars are often proposed in connection with deregistration policy.	・Introduction of the inspection system for all vehicles is currently under discussion.	registration. ・New cars must be inspected every year after 3 years.	Government of India will set up 10 Motor Vehicle Inspection centres across the country as part of a pilot program.	<Current Status> See above
3	ELV Dismantling Facility	Current Status: Dismantling	・Dismantlers process cars for repair rather than for dismantling. ・Steel and wires are removed from the ELVs. ・Dismantling is conducted mainly by hand and threatens labour safety. <Treatment of steel, non-ferrous metals,	Old cars are dismantled in rural areas. ・Dismantling is conducted mainly by hand and threatens labour safety. <Treatment of steel, non-ferrous metals, plastics: No information>	・MEC operates two dismantling facilities. One is in Thilawa and the other is in Myingyen. ・Used parts are taken off and bodies are dismantled manually by gas burner, then pressed by guillotine shear, and shredded. ・Steel is sent to the steel plant of MEC. ・Dismantling is also	・ELVs generated near Hanoi are dismantled by the informal sector in recycling villages. ・There is no permitted ELV dismantling facility. ・Dismantling is conducted mainly by hand and threatens labour safety. ・Steel scraps are sent to steel recycling plants in recycling	・ELVs generated domestically and imported are dismantled in dismantling companies. ・Dismantling is conducted mainly by hand and threatens labour safety. ・Steel scraps are sent to recyclers and mufflers, including rare metals, are sold to recyclers. <Treatment of	・There are ATFs for ELVs and dismantling is done in compliance with the requirements of ELV regulations. ・Used parts are taken off and bodies are dismantled manually by gas burners. ・Steel scraps are sent to recyclers and mufflers, including rare metals, are sold to recyclers.	・Generally, the informal sector plays a central role in the operation of waste collection/recycling. ・Used parts are taken off and bodies are dismantled manually by gas burners. ・Non-ferrous metals are sent to aluminium product manufacturers. <Treatment of plastics: No information> ・'*Lapak*s', the intermediaries between collectors and informal dealers, perform the function of collection, selection,	・Vehicle dismantling is mainly conducted by repair shops and junkshops. ・Dismantling is conducted mainly by hand and threatens labour safety. ・Steel scraps, aluminium, mufflers, including rare metals and plastics, are each sent to specialised collectors.	・Vehicle dismantling is mainly conducted by small low-technology units with low yield and capacity. ・The working condition is very bad for the estimated 100,000 recycling workers who face severe health threats. ・There is not enough space for the facility and the facility is located in residential	<Status before ELV Law> ・There were cases of improper treatment of CFCs and airbags. ・Dismantlers hand over the used parts to parts markets and retrieved steel to metal markets. <Current Status> ・Approximately 6,600 dismantling places exist. ・Dismantlers have mainly three functions: -hand over the used parts to parts markets and the retrieved steel to metal markets;

No.	ELV system		Country									
			Cambodia	Lao PDR	Myanmar	Viet Nam	Thailand	Malaysia	Indonesia	Philippines	India	Japan
			plastics: No information>		conducted informally and manually in the areas close to MEC's facilities. <Treatment of non-ferrous metals, plastics: No information>	villages. ・Non-ferrous metals and plastics are sent to plants in recycling villages.	plastics: No information>	<Treatment of plastics: No information>	separation, cleansing, and pre-treatment.		areas/city centres. ・An estimated 410,700 tons of scraps (metals, aluminium and plastics) are sent to scrap dealers. ・7,800 tons of rubbers and plastics that cannot be recycled are dumped in open garbage areas.	-request the airbag collection to JARP; -transfer the ELV carcass to shredding operators. ・Recycling fee is supported by car users.
		Current Status: Shredding	<Existence of shredder> ・No information ＜Shredding of automobile ＞ ・No official vehicle shredder location.	<Existence of shredder> ・No information ＜Shredding of automobile ＞ ・No official vehicle shredder location.	・MEC introduced the shredding facility	<Existence of shredder> ・No shredding ＜Shredding of automobile ＞ ・No official vehicle shredder location.	・Local company has shredding facility to shred automobile scraps.	・Shredding and sorting plant is added to the ATFs. ASRs will be sent to ASR incinerators. ・Amsteel Mills installed shredding facilities to treat soft press imported from other countries. However, it became difficult to import and now it works much less than capacity.	<Existence of shredder> ・No information ＜Shredding of automobile＞ ・No official vehicle shredder location.	<Existence of shredder> ・No information ＜Shredding of automobile ＞ ・No official vehicle shredder location.	Currently, there is no shredder in operation in India for ELVs. The small volumes do not make a shredder economically viable to operate. The Ministry of Steel is proposing to install shredders where ELV volumes are guaranteed.	<Status before ELV Law> Due to rising cost of treatment, lack of collection system and shortage of landfill sites for ASRs, there were illegal dumping and low rate of ASRs. <Current Status> ・There are 1,083 shredding operations (2013) and 1,364 shredding sites (2013). ・Shredding operators cover the following functions in the framework set up by the ELV Law: -crushing of frame and exterior; -recovery of useful metals; and -handover of shredder dusts to the

No.	ELV system		Country									
			Cambodia	Lao PDR	Myanmar	Viet Nam	Thailand	Malaysia	Indonesia	Philippines	India	Japan
												manufacturers. ・Recycling fee is supported by car users.
		Current Status: Pollution control	・Little treatment is done for hazardous materials, resulting in air, water, and soil pollution.	・Little treatment is done for hazardous materials, resulting in air, water, and soil pollution.	Pollution does not seem to be properly controlled because of lack of capacity building.	・Most of the factories do not introduce appropriate pollution control measures. ・Materials that cannot be sold are illegally dumped in roadsides or rivers and generate environmental pollution.	Recycling companies that have Department of Industrial Works licence code-105 and 106 have to introduce appropriate pollution prevention measures.	・ATFs must have a waste management licence from the appropriate environmental agency and must meet standards to ensure that they: -store and treat ELVs in a way that does not harm the environment; -remove all hazardous components and liquids (known as 'depollution'); and -recycle, store and dispose the parts appropriately.	Pollution does not seem to be properly controlled because of lack of capacity building.	・Little treatment is done for hazardous materials, resulting in air, water, and soil pollution.	・Little treatment is done for hazardous materials, resulting in air, water, and soil pollution.	<Status before ELV Law> Dismantlers are required to conduct pollution control measures in compliance with relevant environmental regulations. <Current Status> Dismantlers have to conduct the dismantling in compliance with the recycling requirements under the ELV Law.
		Regulation: Licence	No information	No information	Only MEC operates ELV dismantling facilities.	Batteries and waste liquids from ELVs are in the hazardous waste list. The recycling and treatment facilities must possess hazardous waste	Recycling companies have to acquire licence (105 and 106) according to the Notification of MOI No. 15 B.E. 2544 (2001).	・ATFs are sites that have been licensed to accept ELV motor vehicles.	Only certified dismantling facilities, certified and authorised recycling workshops, or collection points that have been nominated by the manufacturer are permitted to issue these certificates.	No information	AIS129 stipulates that collection centres and dismantling centres shall obtain an authorisation from the concerned Government Certifying Agency.	<Status before ELV Law> There is no common licence scheme (some dismantlers had the licence under the Waste Management and Public Cleansing Act). <Current Status> Dismantlers have to obtain licence from

No.	ELV system		Country									
			Cambodia	Lao PDR	Myanmar	Viet Nam	Thailand	Malaysia	Indonesia	Philippines	India	Japan
						management permits.						local governments under the ELV.
		Regulation: Pollution control	No information	No information	The Environmental Conservation Law and related regulations have been introduced to prevent environmental pollution.	Even though Viet Nam's environmental protection law has been introduced, environmental pollution from recycling villages is not properly controlled.	・Various notifications of MOI control environmental pollution from dismantling facilities such as the Notification of MOI B.E. 2548 (2005) which controls pollution from industries. ・Municipalities monitor the implementation.	・The Environmental Quality Order 1989: -prescribes the types of waste treatment and disposal facilities and licence. -prescribes the procedure when owners of facilities change, and the obligation of informing the amount of waste accepted, treated, stored, and disposed.	・Law No. 32/2009 covers environmental management. ・Law No. 18/2008 covers municipal waste. ・Government regulation No.101/2014 covers hazardous wastes. ・Basel Convention (hazardous wastes), Convention on Climate Change-international treaties, provincial environmental legislations, local environmental legislations are also applicable.	No information	AIS129 requires collection centres and dismantling centres to conduct the depollution treatment for the dismantling of ELVs.	<Status before ELV Law> Not all dismantlers were requested to introduce pollution control measures. <Current Status> Dismantlers are required to comply with environmental conditions in obtaining the licence under the ELV law.
4	Reuse of Parts	Current Status: Generation of used parts	Small used parts dealers deal with imported parts from mainly Malaysia, Japan, and Thailand	No information	・Imported used parts come from mainly Thailand, Malaysia, Japan, and UAE. ・In some cases, domestic used parts compete with imitation parts from China.	・There is a used parts market called 'Gioi' but the volume of domestic parts is low. ・New imitation parts from China meet the demand for automobile parts.	・Demand for used parts imported from Japan becomes less and less because they are not fit to the current model in Thailand. ・Some dealers send their staff to Japan and import used parts from Japanese dismantling	・The importation of used parts to Malaysia is very huge. Malaysia worked as a hub of trade of used parts. ・In some cases, domestic used parts compete with imitation parts from China.	・Imported used parts come from Japan and Singapore although there is prohibition on importation of used parts. ・In some cases, domestic used parts are taken from the accident cars and used cars.	Used parts are mainly imported from Japan and Thailand. These parts compete with new imitation parts from China.	Used parts are mainly generated domestically due to prohibition in the importation of used motor vehicle parts.	<Status before ELV Law> ・Used parts are generated by the dismantlers and they flow to the parts markets and metal markets. ・Used parts are exported to Malaysia, UAE, Russia, and Thailand and others, as well as are circulated domestically <Current Status> See above

No.	ELV system		Country								
			Cambodia	Lao PDR	Myanmar	Viet Nam	Thailand	Malaysia	Indonesia	Philippines	India	Japan
							sites where their workers work. ・Imported used parts could be re-exported to neighbouring countries as well as circulated domestically.					
		Current Status: Remanufacturing	No information	No information	No remanufacturing	Some companies are remanufacturing alternators, drive shafts, starters, among others.	Some companies are remanufacturing.	Some companies are remanufacturing transmissions, among others.	Some companies are remanufacturing alternators, starters, among others.	Some companies are remanufacturing chassis, bodies, engines, among others.	Rewinding of motors, starters, alternators, among others, takes place in a crude manner in the informal sector. There is no organised industry for remanufacturing used car parts.	<Status before ELV Law> There is market for remanufactured parts such as alternators and starters. <Current Status> See above
		Current Status: Sales of used parts	The majority of parts dealers deal with small parts and some dealers sell used engines and half-cut bodies.	No information	・There are many used parts dealers in Myanmar dealing mainly with Japanese car parts ・These dealers specialise in specific parts.	・There is a used parts market called 'Gioi' with many used parts dealers. ・The demand for car parts is met by the imitation parts from China and the market size for domestically generated	・There are many used parts dealers in Thailand. ・These dealers specialise in specific parts.	・There are many used parts dealers in Malaysia.	・There are many used parts dealers in Indonesia. Used parts are sold in the agglomerated market of 'bengkel', car repair shops, and parts dealers.	・Used parts are sold at auctions in the form of parts package in containers.	Used parts are recovered, refurbished and sold by dismantlers to second-hand spare outlets located in the same scrap yards.	<Status before ELV Law> Used parts and rebuilt parts are sold in the domestic market. At the same time, those products are exported to foreign countries such as mainly, Malaysia, UAE, Russia, and others. <Current Status> See above

No.	ELV system		Country								
			Cambodia	Lao PDR	Myanmar	Viet Nam	Thailand	Malaysia	Indonesia	Philippines	India	Japan
						used parts is relatively small. ・Even though importation of used parts is prohibited, used parts are imported from the neighbouring countries.						
		Current Status: Use of used parts	No information	No information	Recycled parts generated domestically are generally not used because most of them are old and of low quality.	Most used parts are used domestically.	・Most used parts are used domestically and some are exported. ・The car insurance system provides incentives for car owners and workshops to use used parts.	・Only 30 percent of imported used parts are used domestically. ・Others are exported to mainly the Middle East and Africa. ・The car insurance system provides incentives for car owners and workshops to use used parts.	・Used parts such as shock absorbers, diesel engines, lamps, and bumpers are reused. ・The car insurance system provides incentives for car owners and workshops to use used parts.	Used parts such as wheels, engines, and others are reused.	Used parts such as bumpers, head lamps, bonnets, steering wheels, batteries, and others are used	<Status before ELV Law> Used parts such as exterior parts (doors, bumpers, lamps, and others), interior parts (compressors, engines, alternators, starters, and others) are used. <Current Status> ・Due to the rising need and social requirement to reuse used parts, the secondary market of used parts has been expanding. ・The rising rate of automobile insurance in the event of car accident leads to the expansion of the used parts market because the car users have the incentive to self-repair and lower the repairing cost.
		Regulation: Regulation on import/export	No information	The importation of used cars or	Importation of half-cuts are prohibited.	Importation of used parts is prohibited.	Thailand has basically prohibited the	Used tires, brake pads, batteries are	Importation of used parts is prohibited.	Importation of used parts is partially	Importation of used cars and	<Status before ELV Law> There is no specific

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				used parts for remanufacturing is effectively prohibited.	Parts are allowed to be imported.		importation of used vehicles and parts to protect and promote its own motor industries.	prohibited to be imported.		prohibited. For example, car bodies and chassis are prohibited to be imported.	parts are not allowed.	regulation on used car parts imports. On the other hand, the export of used car parts must comply with the Basel Convention and the Waste Management and Public Cleansing Act. Used parts must be exported as valuable for reuse. <Current Status> There is no specific regulation on used car parts imports. On the other hand, the export of used car parts must be properly treated of CFCs and airbags for half-cut bodies before being exported under the ELV law.
		Regulation: Licence	No information	No information	No information	No specific licence is required for trading used parts.	Used parts dealers are required to obtain the licence as second-hand articles dealers.	No information	No information	No information	No information	<Status before ELV Law> ・Used parts dealers are required to obtain a licence under the Second-hand Articles Dealer Act. ・Dealers must submit the document to local police and obtain police approval. <Current Status> See above
		Regulation: Quality management	No regulation	No regulation	No regulation	Some companies use assurance for a few years	No regulation	・If used parts are sold domestically,	Remanufacturers are required to register the year of production. The aim is to ensure	No regulation?	AIS 129 controls the quality listing the	<Status before ELV Law> No specific regulation on quality assurance

No.	ELV system		Country									
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						but generally no assurance of quality for used parts.		one to three month warrantee is provided and the quality of product is assured to some extent.	the quality at a certain level.		component parts deemed to be non-reusable.	of used parts. Many dealers provided certain quality guarantee in certain period to the buyers.
												<Current Status> Uniformed standard for the quality guarantee was established among 3 related associations. Additionally, the expansion of scope of the guarantee is under consideration
5	Downstream Recycling and Treatment Facility	Current Status: Resource utilisation	・Steel scraps, non-ferrous scraps, plastics seem to be exported. ・Wire harnesses are retrieved from half-cut bodies and reused.	Wastes such as paper, plastics, aluminium and copper are recycled domestically, and flow of recyclable wastes from Lao PDR to neighbouring countries has been observed: paper to Thailand; plastics to China or Viet Nam; and aluminium and copper to Viet Nam.	・Steel scraps are recycled domestically. Non-ferrous scraps and plastics seem to be exported. ・Scraps dismantled by MEC are also utilised by steel manufacturing facilities of MEC. ・There are no government related facilities for copper and aluminium recycling.	・Steel scraps, non-ferrous scraps, and plastics seem to be recycled domestically. ・Steel is brought to areas where relatively modern large-scale steel plants are integrated. ・Recycling of non-ferrous metals is carried out in 'Craft Villages' that are specified for metal or resources.	・Steel scraps are recycled in steel manufacturing companies. Steel scraps are sent to scrap trading companies, and then sold to steel manufacturing companies. ・Non-ferrous metals are recycled in manufacturing companies. Non-ferrous metals are also sent to scrap trading companies and sold to manufacturing companies. ・Recyclers collect wastes from either car	・Steel scraps are recycled in steel manufacturing companies. Steel scraps are sent to scrap trading companies and then sold to steel manufacturing companies. ・Non-ferrous metals are also sent to scrap trading companies and sold to manufacturing companies. Some amounts are exported to China, and others.	・The remaining car body is manually cut into steel scraps. Iron recyclers buy and process these scraps. ・Recyclable materials such as glass, tires, large plastic parts, among others, are processed using separate recycling techniques.	・Valuable metals are separated/ recovered from scrapped cars manually and open incineration. ・Retrieved metals are sold to metal factories. ・Other wastes such as wire harnesses, plastics, and rubbers are recycled.	・Generally, scrapped metal items such as sheet metals, aluminium and plastics are retrieved and reused. ・Unusable items such as rubber parts, excluding tires, insulation materials, glasses, among others, are discarded to municipal garbage.	<Status before ELV Law> ・The Law for Promotion of Effective Utilization of Resources specifies the responsibilities of business entities to adopt the 3R measures. ・Steel scraps and non-ferrous metals, catalysts and tires are reused or recycled.
												<Current Status> See above

No.	ELV system		Country									
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							owners nearby or brokers. Then, after separating recyclable wastes and processing them, recyclers sell processed wastes to steel plants and plastic recyclers.					
		Current Status: Waste treatment	・Lead battery is not properly treated, and this causes emission of hazardous wastes.	・Lead battery is not properly treated, and this causes emission of hazardous wastes.	・Lead battery is not properly treated, and this causes emission of hazardous wastes. ・Some of the hazardous wastes are not properly treated.	・For lead batteries, there are seven permitted battery recycling facilities with capacity of around 100 tons per day. Not all batteries are recycled. ・Not all waste oils are collected. Some waste oils are disposed in the sewage, and the like, but some from the informal sector use waste oil inappropriately, harming the environment.	・Not all batteries are recycled. ・Waste oils and CFCs are not recycled. Waste oils and CFCs are not properly treated and may cause soil and air pollution.	・Not all batteries are recycled. ・All fluids are drained and stored for respective recyclers. Mercury and other pollutant agents are removed to storage at this stage.	・Batteries are partly recycled. ・Oils are accumulated and resold to recycling shops, while CFC is generally not recovered and released in the air without processing even though recovery instruments are distributed to some factories.	・Batteries are sold to specialised battery stores or junkshops, among others. ・Waste oils are not retrieved or resold and are mostly dumped. ・CFCs are not retrieved during processing and are released in the air as there is no CFC collecting facility.	・Batteries are sold to spare shops, among others, although there are formal regulations concerning disposal of used batteries. Regulations exist for return and recycling of batteries but these are not strictly enforced. ・Little treatment is done for hazardous materials, resulting in air, water, and soil pollution in recycling facilities.	<Status before ELV Law> ・The Law for Promotion of Effective Utilization of Resources specifies the responsibilities of business entities to adopt the 3R measures. ・Lead-acid battery is properly treated. ・The Waste Management and Public Cleansing Act specifies the responsibilities of business entities to adopt the 3R measures and to conduct proper treatment of ASRs, discarded tires and half-cuts containing airbags, among others, as waste products. <Current Status> Regarding

No.	ELV system		Country								
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						・CFCs are not recycled.					・Testing of formal mechanised recycling process has been started at the Recycling Demo Unit of Global Automotive Research Centre, which can properly treat batteries, oils, airbags and other materials.	downstream retrieval of ELVs, the proper treatment of the three items, designated as the three negative cost components, are required: - CFCs approximately 20,000 recovery places and 8 collection/neutralisation plants; - Airbags: 26 airbag collection centres and 5 recycling plants; and -ASRs: 54 recycling facilities and 33 incinerators and landfills. ・JARP is in charge of the management of the destruction of CFCs and airbags.
		Regulation: Licence	No adequate legal system for the treatment of hazardous wastes.	No information	No regulation	Some companies have recycling a licence from MONRE but most of the companies operate without any licence.	Recycling companies have to acquire a licence according to Notification of MOI No. 15 B.E. 2544 (2001).	・The Environmental Quality Order 1989: -Prescribes the types of waste treatment and disposal facilities and licence. -Prescribes the procedures when owners of facilities change and the obligation of informing the amount of	Only certified dismantling facilities, certified and authorised recycling workshops, or collection points which have been nominated by the manufacturers are permitted.	No information	AIS 129 incorporates provision for accreditation of dismantling standards after they meet specified standards.	<Status before ELV law> Industrial waste disposal operators are required to obtain the license in the Waste Management and Public Cleansing Act <Current Status> Fluorocarbon collector and shredding operator are required to obtain the license in the ELV law.

No.	ELV system		Country								
			Cambodia	Lao PDR	Myanmar	Viet Nam	Thailand	Malaysia	Indonesia	Philippines	India	Japan
								waste accepted, treated, stored, and disposed.				
		Regulation: Waste treatment	See above	・The Environmental Protection Law stipulates that - waste disposal sites must be allocated; and - wastes should be separated before disposal. ・ The governments supports the implementation of technologies for waste treatments, reuse, and recycling.	The Environmental Conservation Law and related regulations have been introduced to prevent environmental pollution.	・Decision 50/2013 of the Prime Minister on retrieval and treatment of end-of-life products: waste oil: 2016; batteries: 2016; tires: 2016; vehicle: 2018. Take back schemes for batteries and waste oils are considered under the decision. ・The Environmental Protection Law has been introduced to prevent environmental pollution. Waste treatment companies are also controlled under this Act.	・Notification of MOI B.E. 2548 (2005) controls pollution from industries. ・The notification indicates the responsibilities of dismantlers and polluters, and lists the hazardous wastes such as waste oils and liquids, CFCs, lead batteries, and catalysts.	See above	・Law No. 32/2009 covers environmental management. ・Law No. 18/2008 covers waste management. ・Government Regulation of No.101/2014 covers hazardous wastes. ・Basel Convention - hazardous wastes, Convention on Climate Change-international treaties, PEL and LEL are also applicable.	・DAO2004-36 prescribes the responsibilities of polluters for hazardous wastes as follows: -Sulfuric acid -Waste oils -Ozone-depleting substance (CFCs and halon)	AIS 129 requires collection centres and dismantling centres to possess equipment and facilities for hazardous wastes.	<Status before ELV Law> Polluters is responsible for the treatment of industrial waste generated from its business in the Waste Management and Public Cleansing Act. <Current Status> ELV Law prescribes ASR recycling target: 30 percent in 2005; 50 percent in 2010; and 70 percent in 2015, and Airbags recycling target: 85 percent.

AIS = Automotive Industry Standard, ASR = Automobile Shredder Residue, ATF = Authorised Treatment Facilities, CFC = Chlorofluorocarbons, DfR = Design for Recycling; DLT = Department of Land Transport, ELV = End-of-Life Vehicles; EU = European Union, JARP = Japan Auto Recycling Partnership, Limited, LEL = Local Environmental Legislation, LTO = Land Transportation Office, MEC = Myanmar Economic Corporation, MOI = Ministry of Industry, MONRE = Ministry