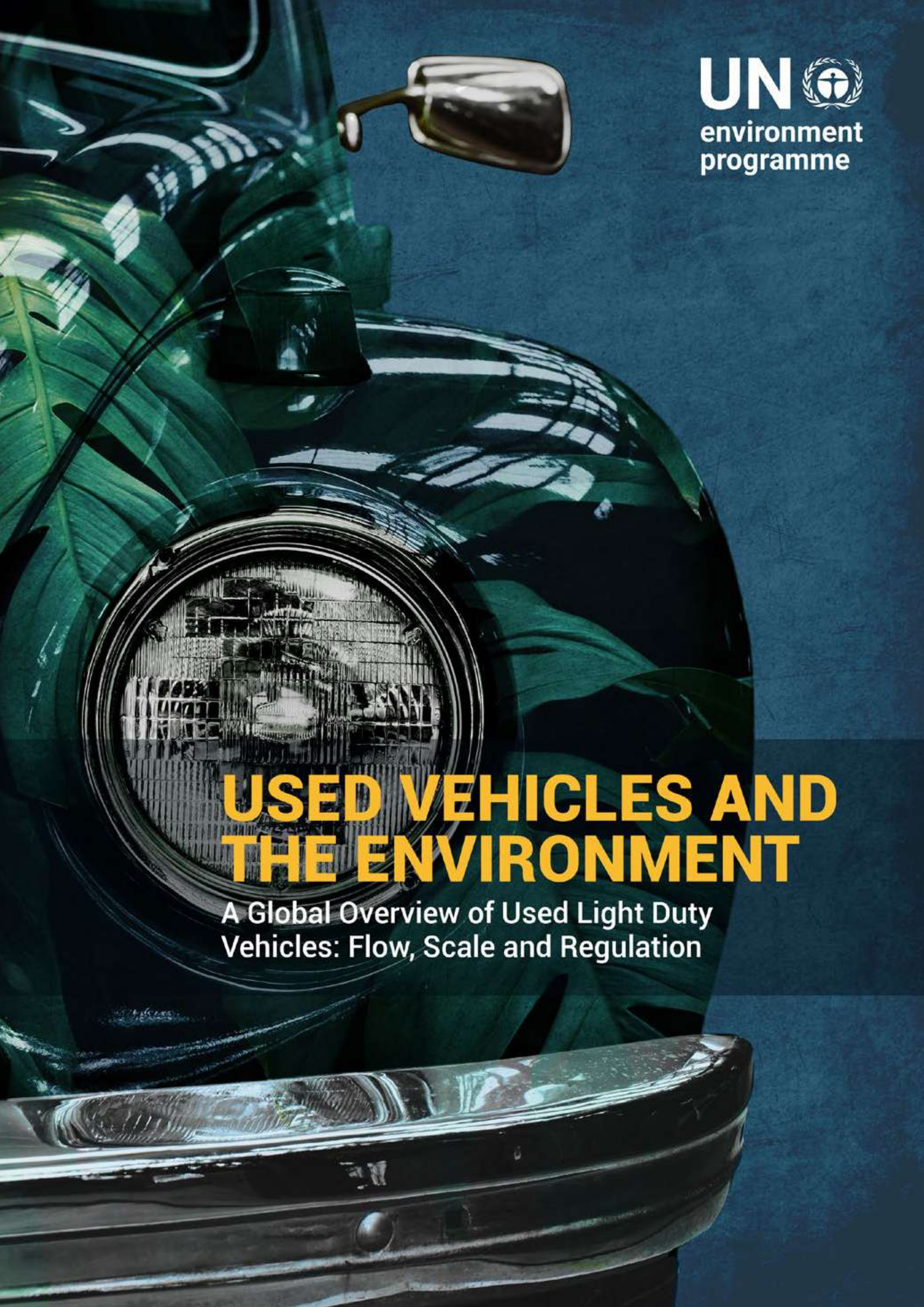

UN environment programme

USED VEHICLES AND THE ENVIRONMENT

A Global Overview of Used Light Duty Vehicles: Flow, Scale and Regulation

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Glossary

OFFICIAL COUNTRY NAMES

Islamic Republic of **Afghanistan**
Republic of **Albania**
People's Democratic Republic of **Algeria**
Republic of **Angola**
Antigua and Barbuda
Republic of **Argentina**
Republic of **Armenia**
Commonwealth of **Australia**
Republic of **Azerbaijan**
Commonwealth of the **Bahamas**
Kingdom of **Bahrain**
People's Republic of **Bangladesh**
Barbados
Republic of **Belarus**
Belize
Republic of **Benin**
Kingdom of **Bhutan**
Plurinational State **of Bolivia**
Bosnia and Herzegovina
Republic of **Botswana**
Federative Republic of **Brazil**
Negara **Brunei Darussalam**
Republic of **Bulgaria**
Burkina Faso
Republic of **Burundi**
Kingdom of **Cambodia**
Republic of Cameroon
Canada
Republic of **Cabo Verde**
Central African Republic
Republic of **Chad**
Republic of **Chile**
People's Republic of **China**
Republic of **Colombia**
Union of the **Comoros**
Republic of **Congo**
Republic of **Costa Rica**
Republic of **Côte d'Ivoire**
Republic of **Cuba**
Democratic Republic of the Congo
Republic of **Djibouti**
Commonwealth o**f Dominica**
Dominican Republic
Republic of **Ecuador**
Arab Republic of **Egypt**
Republic of **El Salvador**
Republic of **Equatorial Guinea**
State of **Eritrea**
Kingdom of **Eswatini**
Federal Democratic Republic of **Ethiopia**
Republic of the **Fiji** Islands
Gabonese Republic **(Gabon)**
Republic of the **Gambia**
Georgia
Federal Republic of **Germany**
Republic of **Ghana**
Grenada
Republic of **Guatemala**
Republic of **Guinea**
Republic of **Guinea-Bissau**
Co-operative Republic of **Guyana**
Republic of **Haiti**
Republic of **Honduras**
Republic of **India**
Republic of **Indonesia**
Islamic Republic of **Iran**
Republic of **Iraq**
State of **Israel**
Jamaica
Japan
Hashemite Kingdom of **Jordan**
Republic of **Kazakhstan**
Republic of **Kenya**
State of **Kuwait**
Kyrgyz Republic **(Kyrgyzstan)**
Lao People's Democratic Republic
Lebanese Republic **(Lebanon)**
Kingdom of **Lesotho**
Republic of **Liberia**
State of **Libya**
Republic of **Madagascar**
Republic of **Malawi**
Malaysia
Republic of **Maldives**
Republic of **Mali**
Islamic Republic of **Mauritania**

Republic of **Mauritius**
United Mexican States **(Mexico)**
Mongolia
Montenegro
Kingdom of **Morocco**
Republic of **Mozambique**
Republic of the Union of **Myanmar**
Republic of **Namibia**
Republic of **Nauru**
Federal Democratic Republic of **Nepal**
Kingdom of the **Netherlands**
New Zealand
Republic of **Nicaragua**
Republic of the **Niger**
Federal Republic of **Nigeria**
Republic of North **Macedonia**
Sultanate of **Oman**
Islamic Republic of **Pakistan**
Republic of **Palau**
Republic of **Panama**
Independent State of **Papua New Guinea**
Republic of **Paraguay**
Republic of **Peru**
Republic of the **Philippines**
Republic of **Poland**
State of **Qatar**
Republic of **Korea**
Republic of **Moldova**
Russian Federation **(Russia)**
Republic of **Rwanda**
Saint Kitts and Nevis
Saint Lucia
Saint Vincent and the Grenadines
Independent State of **Samoa**
Democratic Republic of **Sao Tome and Principe**
Kingdom of **Saudi Arabia**
Republic of **Senegal**
Republic of **Serbia**
Republic of **Seychelles**
Republic of **Sierra Leone**
Republic of **Singapore**
Slovak Republic **(Slovakia)**
Federal Republic of **Somalia**
Republic of **South Africa**
Republic of **South Sudan**
Democratic Socialist Republic of **Sri Lanka**
Republic of the **Sudan**
Republic of **Suriname**
Republic of **Tajikistan**
Kingdom of **Thailand**
Democratic Republic of **Timor-Leste**
Togolese Republic **(Togo)**
Republic of **Trinidad and Tobago**
Republic of **Tunisia**
Republic of **Turkey**
Turkmenistan
Republic of **Uganda**
Ukraine
United Arab Emirates
United Kingdom of Great Britain and Northern Ireland
United Republic of **Tanzania**
United States of America
Eastern Republic of **Uruguay**
Republic of **Uzbekistan**
Bolivarian Republic of **Venezuela**
Socialist Republic of **Viet Nam**
Republic of **Zambia**
Republic of **Zimbabwe**

NON-SELF-GOVERNING TERRITORIES

Bermuda
Turks and Caicos Islands

OTHER TERRITORIES MENTIONED

Aruba
French Guyana

This glossary provides the official names of various countries and territories mentioned in this report

Shack
MARKET

Key findings

The report makes the following key findings:

The global fleet of light duty vehicles (LDVs) **is set to at least double by 2050.** Some 90 per cent of this growth will take place in non-OECD countries which import a large number of used vehicles.

Despite the critical role they play in road accidents, air pollution, and efforts to mitigate climate change there are currently no regional or global agreements on the trade and flow in used vehicles.

The **three largest exporters of used vehicles, the European Union (EU), Japan, and the United States of America (USA), exported 14 million used light duty vehicles (LDVs) worldwide between 2015 and 2018.** The EU was the largest exporter with 54 per cent of the total followed by Japan (27 per cent) and the USA (18 per cent).

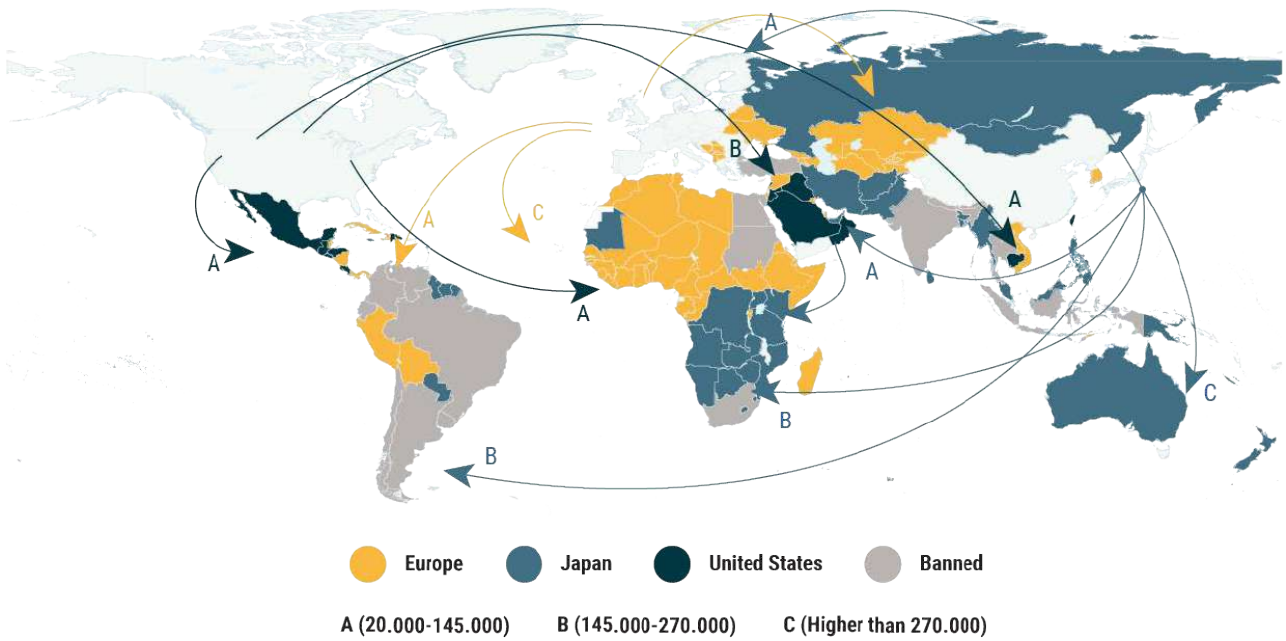
The major destinations for used vehicles from the EU are West and North Africa; Japan exports mainly to Asia and East and Southern Africa and the USA mainly to the Middle East and Central America.

Seventy per cent of exported LDVs head to developing countries. Africa imported the largest number (40 per cent) in the period studied followed by Eastern Europe (24 per cent), Asia-Pacific (15 per cent), the Middle East (12 per cent) and Latin America (nine per cent).

Key concerns are:

- **pollutant and climate emissions of used vehicles;**
- **the quality and safety of used vehicles;**
- **energy consumption;**
- **and the costs to operate used vehicles.**

This trade needs to be supervised. Regulation is essential to ensure the quality of the vehicles and reduce (urban) air pollution and global climate emissions.



Source: *UNEP, based on data collected from major exporters, 2017*

Most developing countries have limited or no regulations on governing the quality and safety of imported used vehicles and rules which do exist are often poorly enforced. **Equally, few developed countries have restrictions on the export of used vehicles.**

Regulations can take many forms from complete import bans to age restrictions, fiscal incentives, labelling and awareness requirements. Regulations reduce imports of old and polluting used vehicles, and encourage the imports of cleaner used vehicles, including very low and no emissions vehicles.

Out of the 146 countries surveyed in the report, 18 have **adopted a complete ban on the import of used vehicles**. While bans prevents old and polluting used vehicles from entering markets, they can also reduce the affordable access to advanced technology -- especially where new vehicles are imported or produced under weak vehicles standards and policy regimes. Many countries block the import of used vehicles not (only) for environment and safety reasons but also to protect their own manufacturing industry.

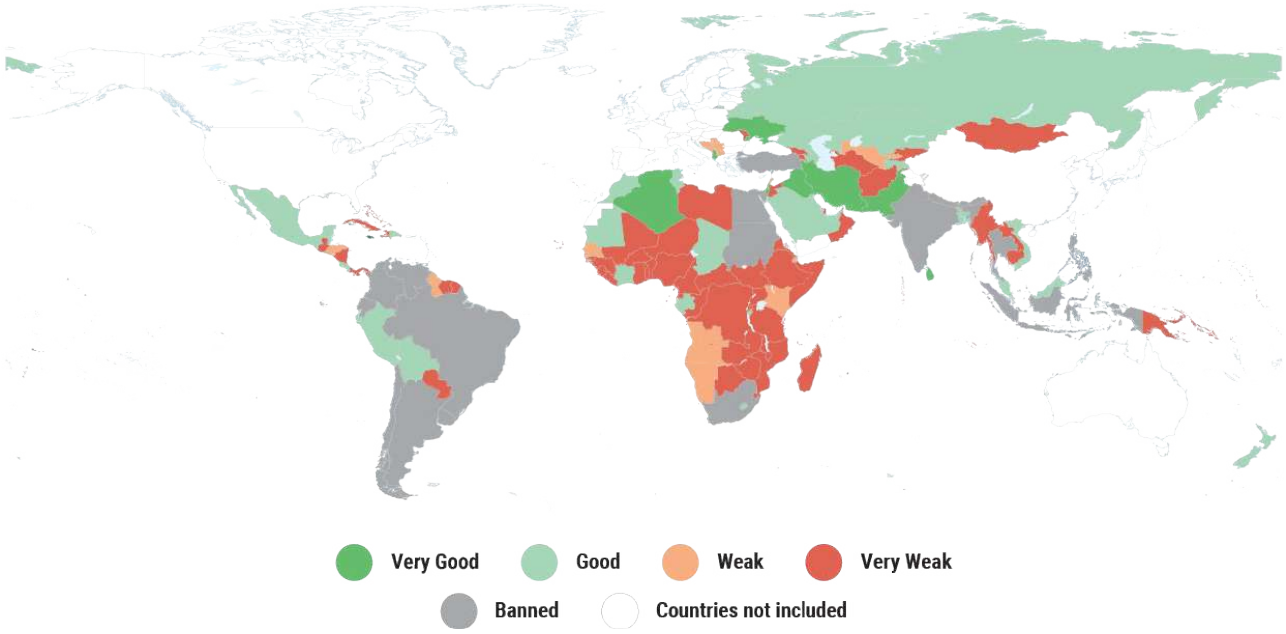
Of the 146 countries studied, 66 limit the age on imported vehicles. These age restrictions are popular partly because they can be easily enforced. They tend to vary from three to 15 years.

Few countries have adopted advanced **vehicle emissions standards for used vehicles**. From the 146 countries studied, 28 have adopted vehicles emissions standards and 100 countries have no vehicles emissions standards at all. The remainder have banned used vehicles imports.

Fiscal instruments can be an effective means to regulate the import of used vehicles. Examples are age-based taxation, progressive excise tax based on CO_2 emissions or engine size, and exemptions for specific vehicles, such as hybrid electric and electric vehicles.

Some countries use **selective bans**, for example barring diesel vehicles above a certain age from city centres. Some countries have introduced **mandatory labelling of used vehicles**, to show consumers a vehicle's fuel consumption and emissions.

This report has compared and combined the different measures into one **overview that shows the current regulatory environment for used vehicles**.



Source: *UNEP, based on data collected from the 146 countries analysed, July 2020*

This analysis finds that about two-thirds of the countries surveyed (86 out of 146) have 'weak' or 'very weak' policies to regulate the import of used vehicles. About one-third (43 countries) have 'good' or 'very good' policies. While 60 per cent of annual registrations in Africa are of used vehicles - only nine out of 54 countries, around 17 per cent, have a 'good' or 'very good' regulatory framework on used vehicles imports. The analyses show there is little harmonization between countries.

The gap in policy measures between exporting and importing markets has led to a global trade in used vehicles which are obsolete, aging, unsafe and polluting. While a large share of the used vehicles traded do meet advanced standards and contribute to affordable access to vehicles with advanced environment features, an equally **large share lack basic environment requirements and are a major contributor to air pollution and climate emissions in recipient countries.** Most developing markets today import vehicles that would not be allowed to circulate on exporting country roads.

The stricter an importing country is on regulating the import of used vehicles and associated technology, the cleaner and more efficient the vehicle technology brought into a national market. When combined with appropriate fuel quality in the importing country, used vehicles which meet emission standards can lower the impact from both CO_2 and non-CO_2 emissions. **Road safety can also be improved.**

Some countries have been providing incentives for the **import of used hybrid electric (HEV) and electric (EV) vehicles** and this has assisted a switch to cleaner fleets. Some countries which had banned the import of all used vehicles are now permitting used hybrid electric vehicles or all-electric vehicles.

The report presents **three case studies** that give concrete data and challenges in the trade of used vehicles.

Kenya - more than 95 per cent of vehicles currently being added to Kenya's rapidly growing light duty vehicle fleet are imported used vehicles, mainly from Japan. Kenya has an age limit for used vehicle import of maximum 8 years. This results in the majority of the vehicles imported being around 7 years old.

The Kenyan fleet is relatively young and clean compared to other countries in the region, most notably Uganda and Rwanda which similarly import used vehicles from Japan. Uganda imposed an age limit of 15 as recently as 2019. Rwanda has no age limit for used vehicle imports. **As a result the fleets in Uganda and Rwanda are much older than the Kenyan fleet. Consequently, average fuel consumption and CO_2 emissions are about one quarter higher than in Kenya.**

The Netherlands is an important exporter of used vehicles through its Rotterdam and Amsterdam ports, exporting 35,000 vehicles to West Africa in 2017-2018. Most of those vehicles did not have a valid roadworthiness certificate at the time of export. Most of them were between 16 and 20 years old and fell below Euro4 vehicles emission standard. Morocco is exceptional in that it has set up Euro4 standards and Ghana has established age and fiscal policies which result in import of Euro4 standard used vehicles.

In December 2019, the Human Environment and Transport Inspectorate of the Dutch Ministry of Infrastructure and Water Management tested 160 vehicles in the port of Amsterdam set for export to Africa. **More than 80 per cent of the vehicles were below Euro 4 standard and most of the vehicles did not have valid roadworthy certificates.** A significant number had key emissions and safety equipment removed or not working.

In 2021 West African countries, coordinated by the regional cooperation body ECOWAS, will introduce minimum requirements for used vehicles. **Most vehicles currently exported from The Netherlands will not meet this requirement.**

Mauritius - is a small island developing state that has successfully introduced a set of policies to improve the quality of used vehicles. Mauritius only allows used vehicles which are not older than three years. It also introduced a CO_2 based vehicle taxation scheme and set up a verification and inspection scheme for used vehicles. Recently Mauritius introduced fiscal incentives for low and no emissions vehicles. As a result it has seen a major increase in the import of used (hybrid) electric vehicles.

RECOMMENDATIONS

More research is needed to detail further the impacts of the trade in used vehicles, including that of heavy duty used vehicles.

At global and /or regional level harmonized regulations should be developed that regulate the trade in used vehicles to put an end to the trade of obsolete, unsafe, dirty, and faulty used vehicles. The regulation should encompass measures to ensure used vehicles make meaningful contributions towards shifting to cleaner, safer, and affordable mobility.

Regulations should be gradually tightened in the coming decade. **Used low and no emissions vehicles should be promoted as an affordable way for middle- and low-income countries to access advanced technologies.**

Exporting and importing countries have a shared responsibility to improve and regulate used vehicles to minimize their negative impacts.

A strong **implementation and enforcement mechanism** should be introduced to check compliance and enforcement of the agreed regulations.

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Introduction

This report is a first attempt at gathering, analysing, and presenting an overview of the global trade in used vehicles for the purpose of environmental policymaking. This includes information on the supply chains, scale and the physical 'flows' in trade from exporting markets to importing markets. The direction of this trade is usually from higher-income to lower-income, developing markets that are motorizing rapidly. This report also details and evaluates the national and (sub)regional regulatory environments and policy measures that seek to control the trade in used vehicles.

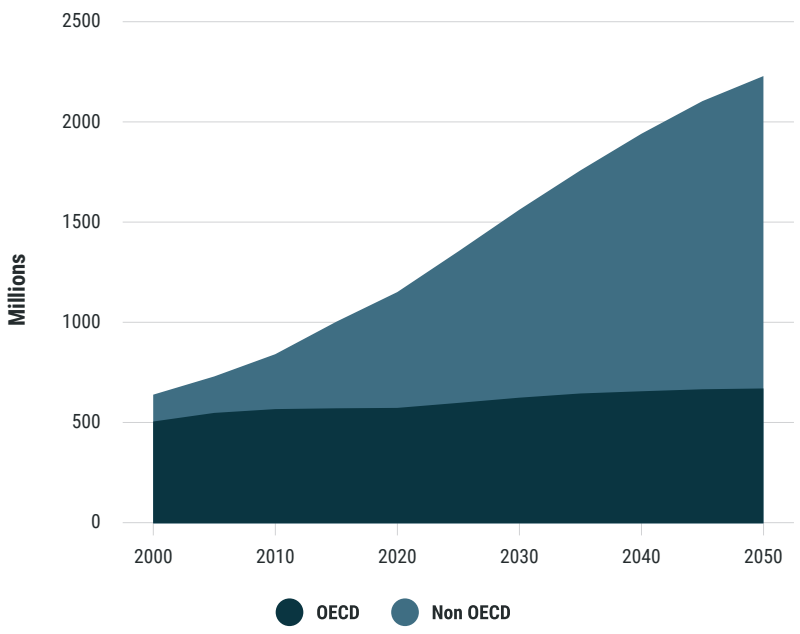
The global fleet of light duty vehicles (LDVs) is set to at least double by 2050. Over 90 per cent of this growth will take place in non-OECD countries, as vehicle fleets in OECD countries are largely saturated. The vehicle growth in non-OECD countries is a mix of new vehicles that are imported or locally produced and imports of used vehicles.

In 2018, about 86 million new light duty vehicles were sold, the majority in developed countries. The import of used vehicles differs per country and region. Some countries have completely banned the import of used vehicles while others have used vehicles accounting for more than 90 per cent of their vehicle growth.

Light Duty Vehicles (LDVs) in general do not exceed a gross weight of 3.5 tons, and include saloon cars, SUVs and minibuses. Vehicles above 3.5 tons are categorized as Heavy Duty Vehicles (HDVs) and these include different types of trucks and buses.

FIGURE 1

Growth of the Global Light Duty Vehicle Fleet 2000 to 2050 – OECD vs non-OECD (IEA 2017)



Source: *International Energy Agency , 2017*

In Africa more than 60 per cent of vehicles added to their fleet annually is through the importation of used vehicles. This varies greatly, from zero in South Africa which has a total ban on imports to 97 per cent in Kenya. In South America, many countries ban imports of used vehicles, but some like Paraguay, add more than 90 per cent of used vehicles each year to their fleets. Most vehicle growth in Central America and the Caribbean is from used vehicles. In Asia and the Pacific, the share of used vehicle imports is lower, because India, China, and many Southeast Asian countries ban the import of used vehicles. However, there are substantial imports of used vehicles in Pakistan, Sri Lanka, Bangladesh, Myanmar, and Cambodia, among others.

The global vehicle fleet is a major contributor to air pollution and climate change. Vehicle emissions are a major source of small particulates (PM2.5) and nitrogen oxides (NOx) which, among others, are major sources of urban air pollution. The recent COVID-19 pandemic has shown that when transportation plummets, air quality improves significantly, especially in cities[1]. The global vehicle fleet is responsible for about one quarter of energy related global greenhouse gas emissions. This is set to increase to one-third by 2050, growing faster than any other sector[2]. Additional issues related to the growth in the global vehicle fleet include road safety, fossil fuels dependence, waste, noise pollution, (urban) planning and space issues.

To address these issues, countries and cities are increasingly adopting policies and setting targets to reduce emissions from their vehicle fleets. They use a set of measures for this – including better urban planning, prioritizing non-motorized transport, promotion of public transport, and cleaner vehicles.

Cleaner and more efficient vehicles can make a key contribution to a low and ultimately zero emissions transport sector. The Intergovernmental Panel for Climate Change (IPCC), in its October 2018 report on achieving a 1.50 Celsius Climate Scenario, has stated that "*electric vehicles, electric bikes and electric transit need to displace fossil-fuel powered passenger vehicles by 2035-2050 to remain in line with 1.50 C consistent pathway.*"

Used vehicles play a major role in addressing some of the issues and achieving these targets. Used vehicles represent both an increasing share of the global fleet and are the major reason for growing fleets in developing countries. Many of the challenges and solutions for used vehicles are not

1 See for example https://www.unece.org/info/media/news/environment/2020/declines-in-air-pollution-due-to-covid-19-lockdown-show-need-for-comprehensive-emission-reduction-strategies/doc.html

2 https://www.seforall.org/partners/global-fuel-economy-initiative

different to new vehicles, but some are specific to used vehicles.

'Used vehicles' should not per definition connotate vehicles that are more polluting or obsolete. And promoting national and international efforts to rationalize and regulate used vehicles should not mean that the trade in used vehicles should be blocked. Used vehicles can be cleaner and more energy-efficient than the existing vehicle stock. They can even be cleaner (and safer) than new vehicles being sold in low- and middle-income country markets[3].

The demand for mobility is growing in low and middle income economies, but it should be noted that both developed and developing markets have a high demand for used vehicles (Capgemini, 2007) . While future vehicle sales will take place mainly in developing countries, it is important to note that the purchase of used vehicles is not specific to developing countries. For example, in the European Union more used vehicles are sold internally than exported to developing countries outside the EU. The main factors that drive the global used vehicle trade include:

- Used vehicles offer consumers mobility at a lower cost – this reason makes regulation sensitive both for consumers and for policymakers.

- Stringent emission standards in exporting countries (along with motor vehicle inspections and registration/road taxation) makes vehicle replacement more frequent in developed markets. This can result in export of broken and unroadworthy vehicles (vehicles that fail the inspection are shipped to developing country markets), but it can also make more advanced technology (including electric and hybrid electric vehicles) affordable and accessible to developing markets;

- Responsible disposal of used vehicles can be expensive due to strict environmental protection regulations in originating markets. This can make exporting used vehicles, including obsolete vehicles, to developing markets more attractive and lucrative (AccessJ, 2012).

Fuel quality is improving at a rapid pace globally. The global introduction of lead-free, low-sulphur auto fuels in recent years has enabled the introduction of advanced cleaner vehicle technologies in both developed and developing markets. As such developing countries increasingly have the fuel quality necessary to operate advanced vehicles technologies. With the worldwide elimination of the use of lead additives in petrol over past decades, the quality of the petrol fuels is such that advanced vehicle technologies can be operated in almost all countries. The introduction of low and ultra-low sulphur petrol fuels further improves the effectiveness of vehicle exhaust emission control equipment. The operation of advanced diesel vehicles, especially those equipped with particulate filters, requires low sulphur fuels (of 50 parts per million or less).

On 20 February 2017 the UN Economic Commission for Europe and the UN Environment Programme organised a one-day conference about the trade in used vehicles[4]. UNEP and UNECE prepared a background paper that outlined the key challenges for the trade in used vehicles[5]. The conference highlighted the lack of data, limited national regulation, the lack of a global regime and the lack of harmonisation. The conference resulted

3 Often standards in developing countries for locally produced vehicles, and/or newly imported vehicles are less stringent than those in developed countries. Used imported vehicles from developed countries to these developing countries can easily exceed the environment and safety standards of the new vehicles in the same countries. For an example see footnote 11 in Chapter 2.
4 https://www.unece.org/trans/events/2017/itc-70th-anniversary/itc_unep_conference.html
5 https://www.unece.org/fileadmin/DAM/trans/doc/2017/itc/UNEP-ITC_Background_Paper-Used_Vehicle_Global_Overview.pdf

in UNEP developing a global programme on used vehicles, of which this report is a first result. In 2018, the Partnership for Clean Fuels and Vehicles (PCFV), for which UNEP hosts the implementing Secretariat, set up a working group to provide advice to developing countries on regulating used vehicles. The PCFV working group issued a report with recommendations[6]. This report builds on the UNECE/UNEP conference and the PCFV report.

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6 Find the report here: https://wedocs.unep.org/handle/20.500.11822/27789

This report has three main sections:

Chapter 1: Supply Chain and Scale of Used Vehicle Flows provides a comprehensive picture of the global supply chains and scale of used vehicle flows to the five regional markets (Africa; Asia- Pacific; Eastern Europe, the Caucasus and Central Asia; Latin America and the Caribbean; and the Middle East) from the three major global used vehicle exporters (the European Union, Japan and the United States). The exporters role in determining the quality of used vehicle technology will be reviewed. Remaining data and knowledge gaps in analysing the supply chain and scale of used vehicle flows is discussed.

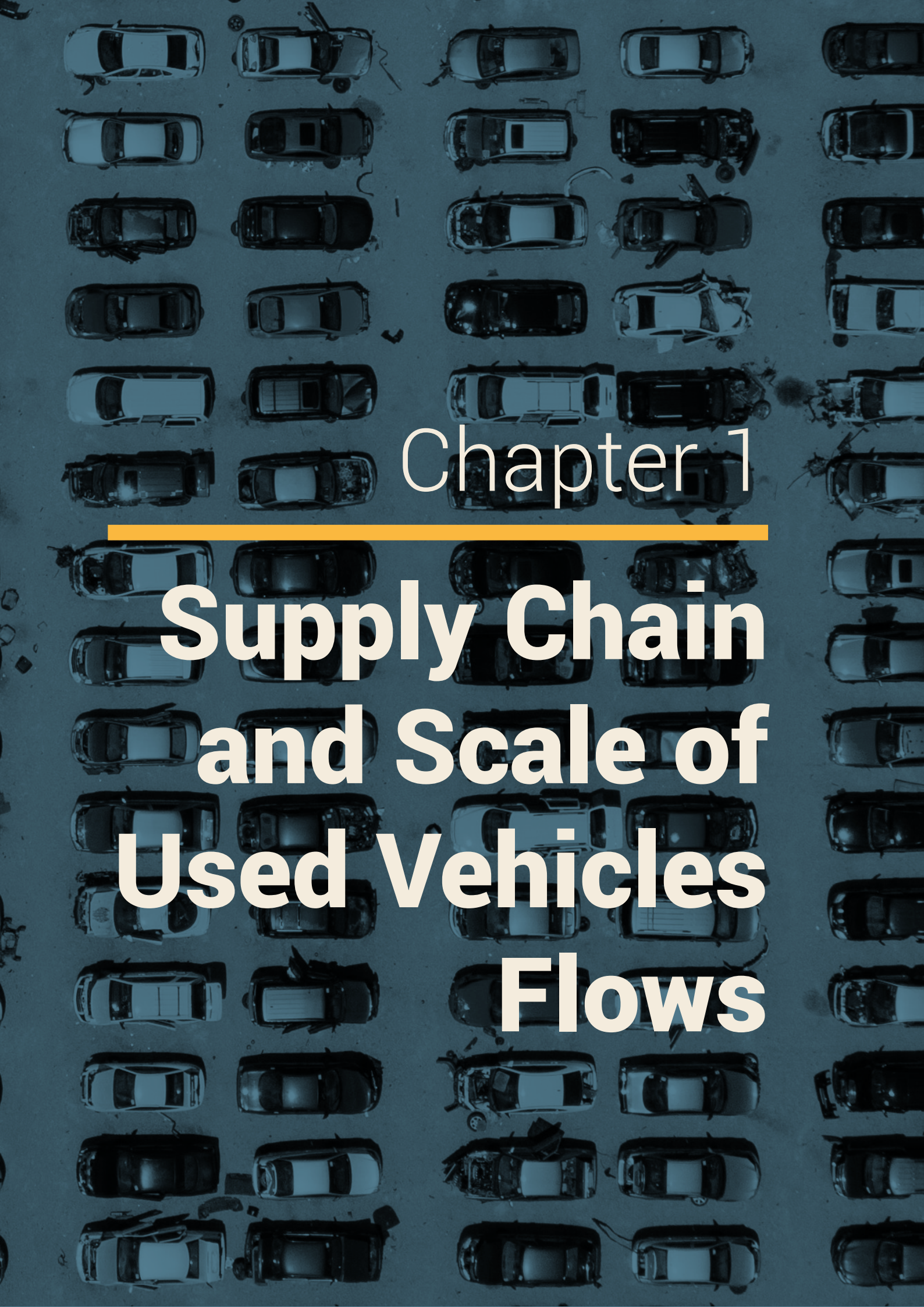
Chapter 2: The Global Regulatory Environment analyses current national, regional and sub-regional regulatory environments as well as policy measures that seek to incentivize cleaner, more energy-efficient used vehicles. The report categorizes national regulatory environments in a ranking system. The results will enable national, regional, and international comparison of policy actions that can be used to develop regulatory pathways for ensuring better quality used vehicles for developing and transitional markets. Further, the report reviews international agreements and goals that link to the impacts of the trade in used vehicles.

Chapter 3: Case Studies supports the overall report findings with three concrete case studies: Kenya, where almost all vehicles added to the fleet are used ; The Netherlands, that is a major exporter of used vehicles; and Mauritius that has introduced a set of policies to regulate the import of used vehicles.

Regional reports, showing the supply chain and regulatory environments in more details for five regions (1) Africa, (2) Asia-Pacific, (3) Eastern Europe, the Caucasus and Central Asia (EECCA), (4) Latin America and the Caribbean (LAC), and (5) the Middle East (ME), will be published separately in 2021.

These regional reports will provide a more detailed analysis for each of the five regions. The release of a report focused on the used heavy-duty vehicles is also planned for 2021.

The Global Regulatory Environment analyzes current national and (sub)regional regulatory environments as well as policy measures that seek to incentivize cleaner, more energy-efficient used vehicles.



Chapter 1

Supply Chain and Scale of Used Vehicles Flows

This chapter provides an overview of the three major global exporters of used light duty vehicles (LDVs): the EU, Japan, and the USA. These three major exporting markets separate new and used vehicles in their export statistics. Extracting data from the Japanese International Auto Trade Association (iATA), the United States Department of Commerce, and the European Commission's Eurostat Comext Database provides a fair approximation of the market size and the directional flow of used vehicle exports to Africa, Asia-Pacific, Eastern Europe, the Caucasus and Central Asia, Latin America and the Caribbean, and the Middle East. The data used for this report was collected for 2015-2018 and covers 97 per cent of Japanese total worldwide exports (top 50 countries) and 94 per cent of the US total worldwide exports (top 34 countries) while the EU dataset covers the full supply chain of used LDV exports. However, data on exports from South Korea, India, Thailand, China, or Canada, among others, was not included[7].

The data does not include the level of detail necessary to determine the quality of the vehicles traded both in terms of environmental and safety specifications. For example, vehicle type, model year, emission and safety ratings are not available. There is no globally harmonized certificate of conformity for vehicles that could ensure the global transfer of cleaner and safer used vehicles. There are regional and national bodies that issue these certificates, but they vary in content. Additionally, the available data only accounts for the source or initial destination of the vehicle and not for final destinations. For example, most imports of used vehicles from the EU that go to Benin have final destinations in Niger, Mali, Burkina Faso, and Nigeria. Similarly, the United Arab Emirates act as a major hub for the onward trade of used vehicles to African countries, both from the EU and Asia.

This report focuses on LDVs as most used vehicles traded around the word are in this category. However, it also provides some limited figures and analysis on the scale and flow of used heavy duty vehicles (HDVs) from the EU and Japan in the same period (2015-2018, see Part 1.3)[8].

1.1 Global Supply of Used Light-Duty Vehicles

In 2018 an estimated 86 million new LDVs were sold, the biggest markets were China (28.1 million), Europe (17.7 million) and the USA (17.3 million)[9]. The global trade in used vehicles has been valued at US$17.6 billion in 2014[10].

Globally, the total number of used vehicles sold is estimated to be at least double that of new vehicles sold. Most of the used vehicle sales take place within countries and regions. For example, for the EU, the majority of used LDV trade takes place internally; in 2018, 55 per cent of used LDVs sold by EU exporters were sold to other EU member states.

However, a significant share, of used vehicles is exported to developing countries. Based on the 146 countries reviewed in this report, an estimated 90 per cent of used vehicles (LDVs) exported from the three leading exporters go to developing and transitional countries, with 70 per cent going to developing countries.

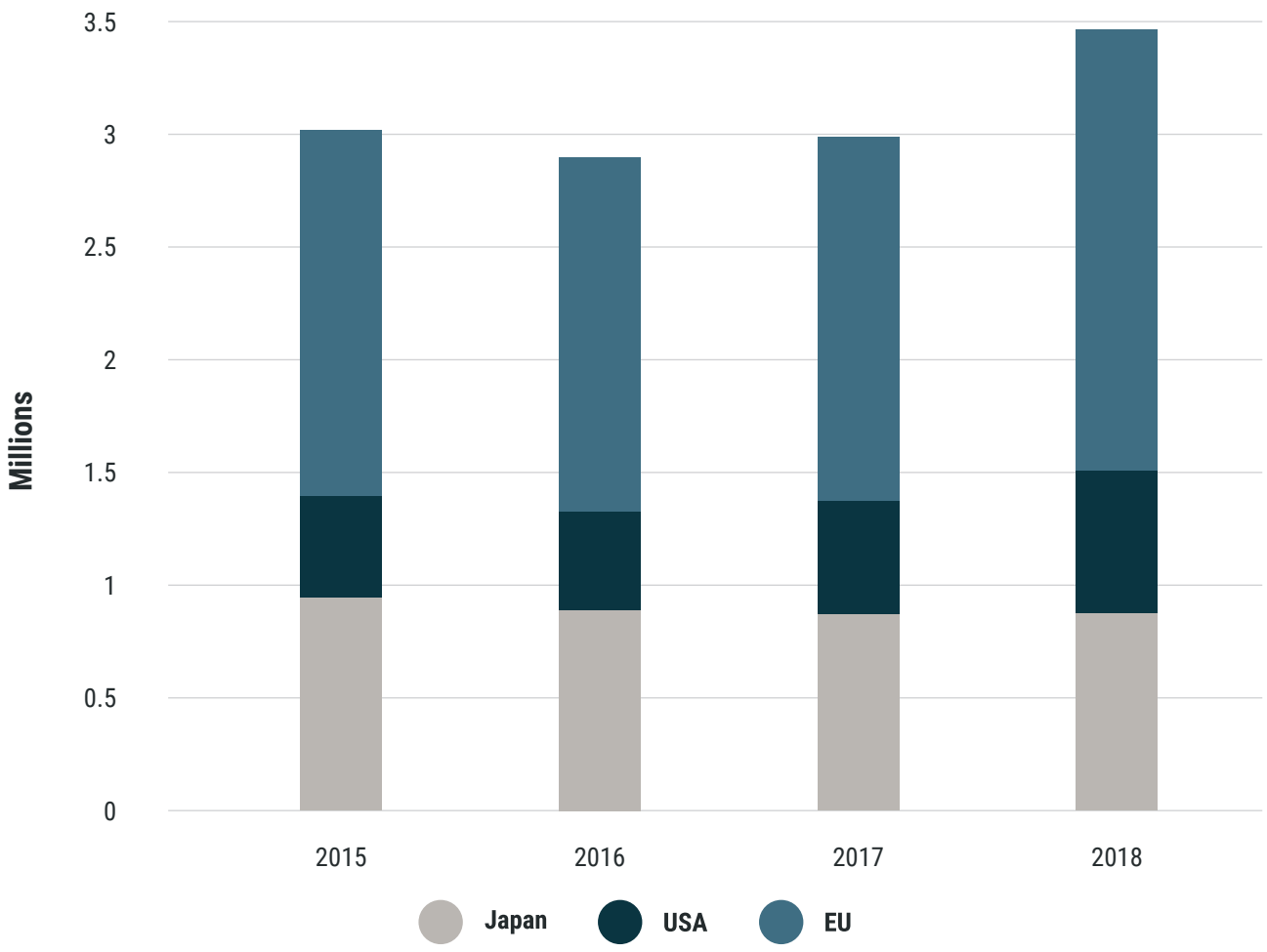
From 2015-2018, the EU, Japan, and the USA, exported in total just under 14 million used LDVs worldwide. In this period, the EU was the biggest exporter with 7.5 million, Japan exported approximately 3.9 million (940,000 units in 2018 alone), and the USA exported

7 See for example https://www.bloomberg.com/opinion/articles/2019-07-27/china-is-set-to-conquer-global-used-car-export-market
8 In June 2020 the Climate and Clean Air Coalition (CCAC) approved a grant to UNEP to support it to do a more detailed study in the trade and use of used HDVs.
9 https://www.best-selling-cars.com/global/2018-full-year-international-worldwide-car-sales-and-global-market-analysis/
10 Coffin, 2015, quoted in https://www.unece.org/fileadmin/DAM/trans/doc/2017/itc/UNEP-ITC_Background_Paper-Used_Vehicle_Global_Overview.pdf

close to 2.6 million (with 800,000 in 2018). In 2018 alone, used LDV exports from these three markets totalled 3.9 million. The EU was the largest exporter (54 per cent of total), followed by Japan (27 per cent) and the USA (18 per cent).

FIGURE 2

Share of Used Light-Duty Vehicle Exports from the EU, USA, and Japan, 2015-2018



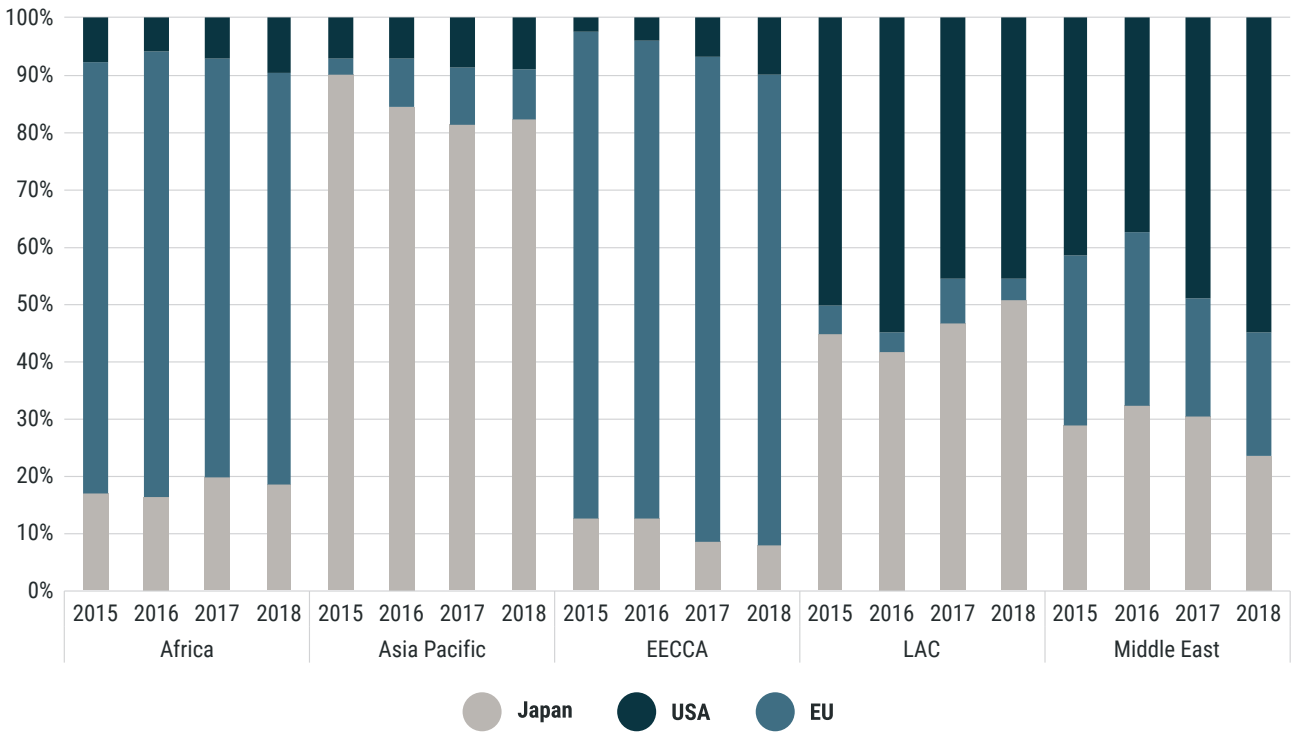
Source: *UNEP, based on data from 146 countries studied from the Japanese International Auto Trade Association (iATA), the United States Department of Commerce, Bureau of the Census, Foreign Trade Division & the European Commission- Eurostat Comext Database, 2019*

From 2015 -2018, Africa received by far the largest share of exported LDVs from the main three exporters– approximately 40 per cent, Asia-Pacific received 15 per cent, the Middle East 12 per cent and Latin America 9 per cent, the rest went to EECCA and other countries.

Eastern Europe, Caucasus and Central Asia (EECCA) countries have seen a steady increase of imports from the EU, rising on average by 10 per cent each year. Asia-Pacific has seen a steady decrease of used vehicle imports from Japan, by 8 per cent on average each year. Used vehicle exports to the Middle East and Latin American and Caribbean countries have remained constant.

FIGURE 3

Share of Used Light-Duty Vehicle Exports from Japan, EU, and USA to Africa, Asia-Pacific, EECCA, LAC, Middle East between 2015-2018

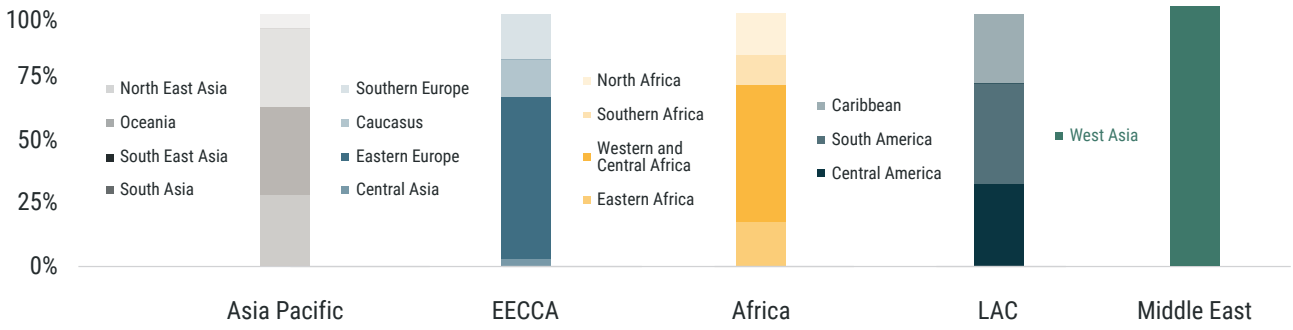


Source: *UNEP, based on data from the Japanese International Auto Trade Association (iATA), the United States Department of Commerce, Bureau of the Census, Foreign Trade Division & the European Commission- Eurostat Comext Database, 2019*

Figure 4 shows the distribution of LDV exports from the EU, USA, and Japan in 2018. The United Arab Emirates receives the most used vehicles in the Middle East and serves as a transit point for exports to other countries in that region as well as to Eastern European and African countries.

FIGURE 4

Distribution of Used Light-Duty Vehicle Exports from the EU, USA, and Japan, 2018

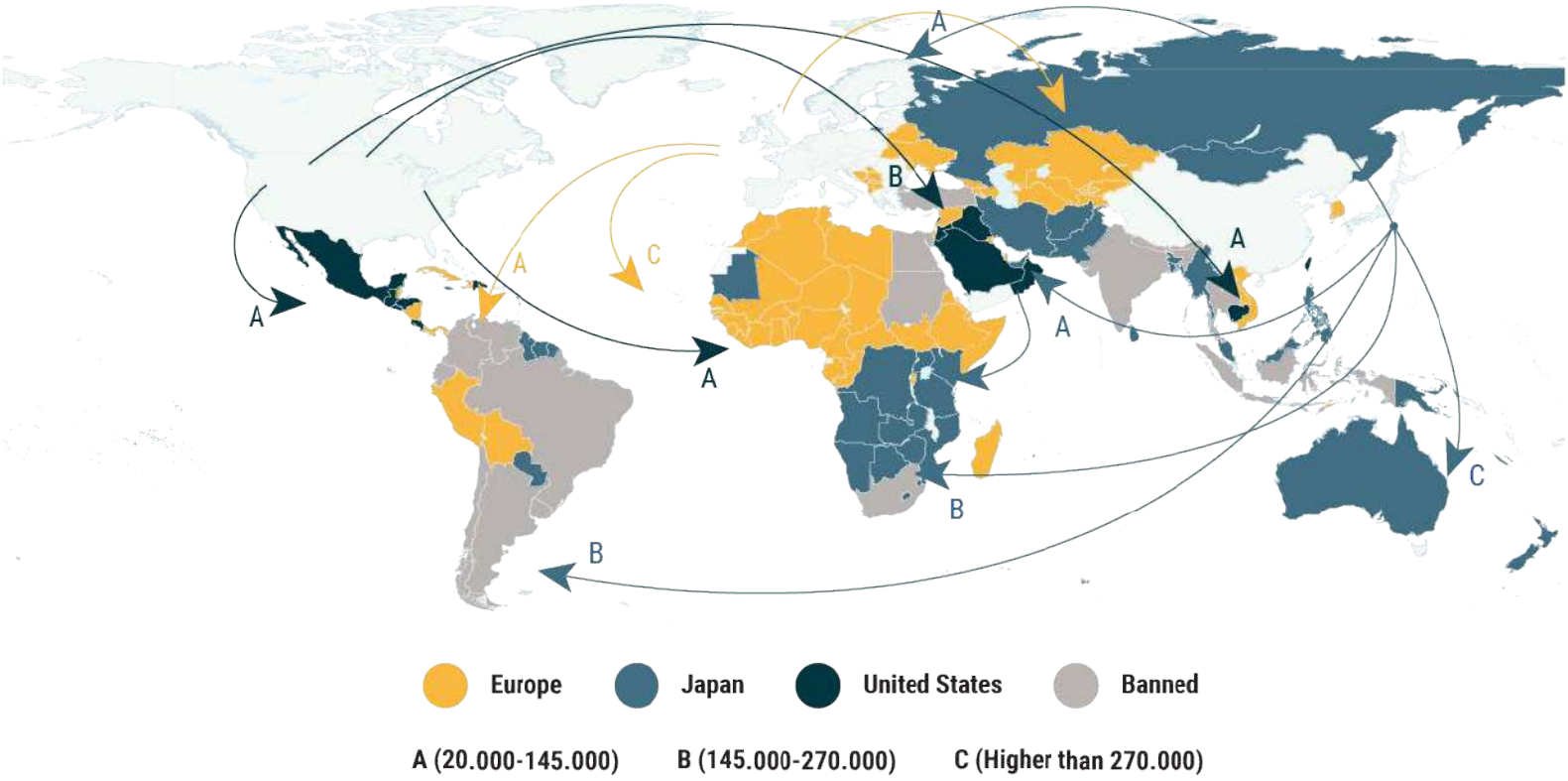


Source: *Compiled by UNEP based on data from the Japanese International Auto Trade Association (iATA), the United States Department of Commerce, Bureau of the Census, Foreign Trade Division & the European Commission- Eurostat Comext Database, 2019*

The map below depicts the flow and scale of used light duty vehicles from the three major exporters in 2017. It is important to note that these might not be the final destinations, as some countries that ban or regulate imports of used vehicles for national use, allow them for re-exporting in their regions. Examples are South Africa, Chile, and the United Arab Emirates.

MAP 1

Used Light Duty Vehicles Quantity and Flow to Main Destination Markets from the EU, USA, and Japan (2017)



Source: *UNEP, based on data collected from major exporters, 2017*

TABLE 1

Top Markets for Used Light Duty Vehicle Exports from the Three Major Global Exporters in 2018

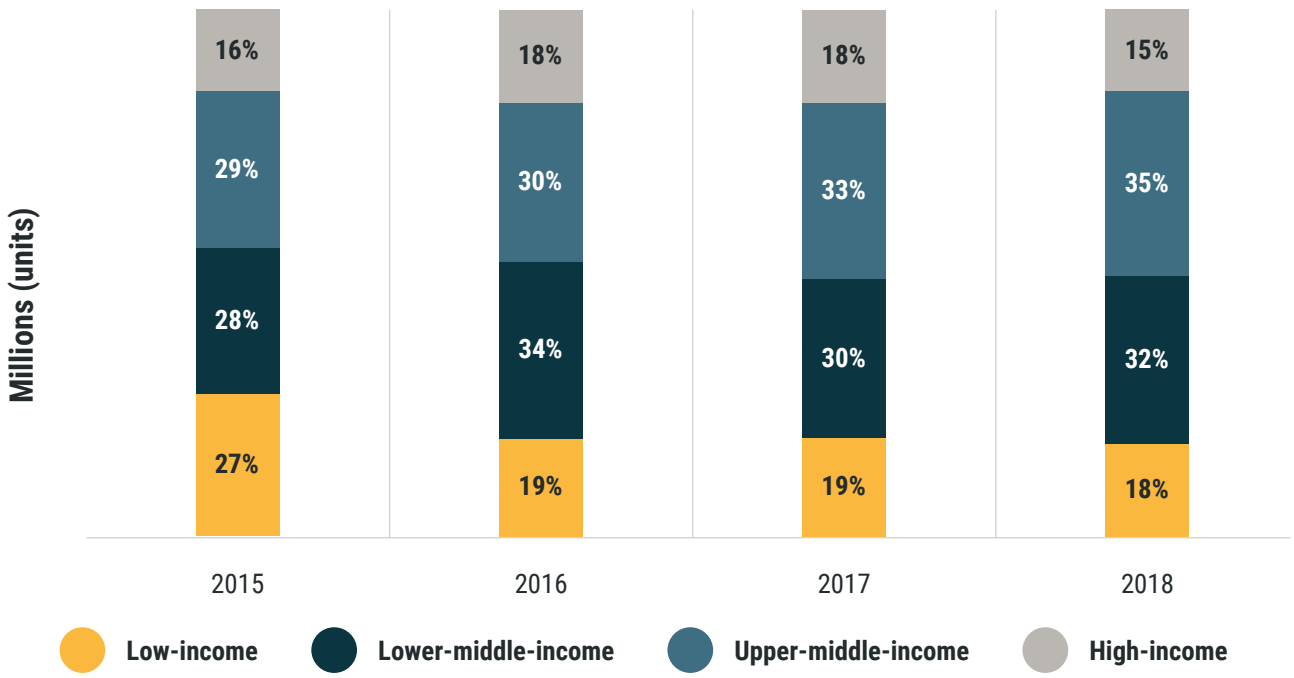
Country	Economy	GNI Status	2018 Used vehicle imports	% of regions imports
Africa				
Nigeria	Developing	Lower-middle-income	238760	16%
Libyan Arab Jamahiriya	Developing	Upper-middle-income	161814	11%
Tanzania	Developing	Low-income	125845	9%
Guinea	Developing	Low-income	81069	6%
Ghana	Developing	Lower-middle-income	80104	5%
Asia - Pacific				
New Zealand	Developed	High-income	101034	31%
Sri Lanka	Developing	Lower-middle-income	48150	15%
Myanmar	Developing	Low-income	43489	13%
Cambodia	Developing	Lower-middle-income	32193	10%
Pakistan	Developing	Lower-middle-income	31391	9%
EECCA				
Serbia	Transition	Upper-middle-income	260078	27%
Ukraine	Transition	Lower-middle-income	173011	18%
Bosnia and Herzegovina	Transition	Upper-middle-income	132586	14%
Georgia	Transition	Lower-middle-income	125745	13%
Russian Federation	Transition	Upper-middle-income	75928	8%
LAC				
Chile	Developing	High-income	91827	32%
Mexico	Developing	Upper-middle-income	52744	18%
Dominican Republic	Developing	Upper-middle-income	32082	11%
Jamaica	Developing	Upper-middle-income	24930	9%
Guatemala	Developing	Upper-middle-income	22072	8%
Middle East				
United Arab Emirates	Developing	High-income	238810	58%
Jordan	Developing	Upper-middle-income	52044	13%
Lebanon	Developing	Upper-middle-income	26923	7%
Israel	Developing	High-income	25888	6%
Qatar	Developing	High-income	24232	6%

Source: *UNEP,Income designations based on UNDESA classification. Japanese International Auto Trade Association (iATA), the United States Department of Commerce, Bureau of the Census, Foreign Trade Division & the European Commission- Eurostat Comext Database, 2019. Note: Countries socio-economic classifications were taken from the World Economic Situation and Prospects 2018 report by the Department of Economic and Social Affairs of the United Nations Secretariat (UN/DESA,2018).*

The 146 countries analysed, in Africa, Asia-Pacific, Eastern and Central Europe, Latin America and the Caribbean, and the Middle East, were categorized according to their *World Economic Situation and Prospects 2018* report socio-economic classification. Figure 5 below shows that in the years from 2015-2018, around 90 per cent of used LDVs from the EU, Japan and USA were destined for middle and low-income countries[11].

FIGURE 5

Share of Used Light Duty Vehicle Exports Headed to Countries Based on their Economies by Per Capita GNI, 2015-2018



Source: *UNEP. Income designations based on UNDESA classification. Japanese International Auto Trade Association (iATA), the United States Department of Commerce, Bureau of the Census, Foreign Trade Division & the European Commission- Eurostat Comext Database, 2019*

1.2 Supply and Demand of Used Vehicles

The EU, Japan and the USA are currently the three major used vehicle exporters. All are developed economies with manufacturing capacity, consumers with higher purchasing power, well-developed vehicle inspection and maintenance regimes, and incentive schemes that encourage new vehicle ownership. However, vehicle ownership growth rates in these top three markets has stagnated as markets are largely saturated. A large share of new vehicle purchases does not add to total vehicle stock but rather replace older vehicles. Increasingly, greater numbers of vehicles are replaced before their useful economic life is complete. The high rates of vehicle replacement in these markets create a continuous supply of used vehicles for the global trade in lower-income markets.

Due to both income and policy reasons, the average vehicle's price depreciates faster in a high-income national economy than in a lower-income one. In Japan, the periodic and expensive vehicle-inspection tests, called the 'Shaken' programme, incentivizes the rapid replacement of vehicles. The 'Shaken'

11 This does not include vehicles traded inside the EU.

programme tests the roadworthiness of vehicles over three years with average inspection costs starting at US$1,000 and rising to US$2,500 per vehicle. Further renewals of the obligatory inspection certificates are required at two-year intervals (Clerides, 2004). This has led to many Japanese owners selling their vehicles before the third obligatory test, at around 5 to 7 years of age. The strict regulations in the country lead to a higher rate of depreciation in the value of vehicles in Japan than in other countries with less strict environmental and safety regulations.

The global trade in used vehicles has been described as a "substitute for an explicit cash for clunkers" programme as it reduces the number of vehicles that are scrapped in exporting countries (Collins et al. 2016). It is often more lucrative and cost-effective to export used vehicles than to formally scrap them. Despite formal scrappage programmes in some European markets, there are reports of the illegal shipment of end-of-life vehicles that were destined for scrappage sent instead to Africa and Eastern Europe (see chapter 3 for examples). Many European countries require proof that scrapped vehicles have been sent to disposal facilities, but they do not legally require proof of vehicle destruction. This allows for the shipment of malfunctioning and/or damaged vehicles that have been recalled in advanced markets. In 2018 the European Commission published an assessment of the End of Life Vehicles (ELV) Directive with emphasis on the end of life vehicles of unknown whereabouts[12]. The study showed that each year between 3 to 4 million ELVs across the EU are unknown and that the ELV Directive is not sufficient to monitor the performance of single Member States when it comes to ELVs.

Throughout the used LDV supply chain, there are reports of vehicles that are stripped of their emission control systems – catalysts and filters - before being exported or re-exported via intermediary destinations to middle- and low-income countries. Vehicles can be tampered with for a multitude of reasons, including the market value of platinum, sensors, and particulate filters. Also, the spare parts market for recycled and reusable vehicle components is lucrative and active globally.

Cities around the world are also discouraging old and polluting vehicles from city centres, phasing out diesel vehicles through bans and low emission zones, circulation taxes and congestion charging. This trend has further fuelled the global transfer of used LDVs, including older diesel vehicles, trucks, and buses. Some European countries are introducing stringent annual inspection requirements, for example, some will start testing diesel vehicles for small particulate (PM2.5) emissions starting in 2021. This could further increase the export of used diesel vehicles out of the EU. In summary, there are several drivers fuelling both the supply and demand for used LDVs worldwide.

1.2.1 European Union (EU)

About 60 per cent of the EU trade in used light duty vehicles takes place within the EU, the remaining 40 per cent mainly goes to developing and transitional countries (Lovo, 2015). The EU is the largest exporter of used vehicles to middle- and low-income countries. Over the 2015 to 2018 period, the EU exported around 7.6 million used vehicles to countries outside of the European Union. The principal destinations for EU exports are to West Africa and the EECCA block (Eastern Europe, Caucasus, and Central Asia). In 2018 alone, the EU exported slightly more than 1 million used light duty vehicles to Africa (out of a total import in Africa of about 1.5 million used light duty vehicles that year).

12 https://ec.europa.eu/environment/waste/elv/pdf/ELV_report.pdf

TABLE 2

Top 10 Importing Countries, out of the 146 Analysed in this Report, of Used Light Duty Vehicles from the EU, 2015 to 2018

	2015		2016		2017		2018	
1	Benin	301092	Nigeria	209844	Serbia	206352	Serbia	260078
2	Serbia	151908	Serbia	203650	Ukraine	130926	Nigeria	154212
3	Nigeria	132852	Bosnia and Herzegovina	114044	Bosnia and Herzegovina	115702	Libyan Arab Jamahiriya	140810
4	Bosnia and Herzegovina	108164	Cameroon	82286	Nigeria	102546	Ukraine	138140
5	Georgia	58864	Cote d'Ivoire	74404	Cote d'Ivoire	78528	Bosnia and Herzegovina	132586
6	Cameroon	58080	Ukraine	74144	Guinea	70400	Guinea	79468
7	Guinea	53948	Guinea	72112	Senegal	60214	Tanzania, United Republic of	77786
8	Ukraine	50666	Senegal	56724	Libyan Arab Jamahiriya	55038	Ghana	66834
9	Libyan Arab Jamahiriya	42692	Togo	51778	Togo	52352	Benin	61352
10	Cote d'Ivoire	42036	Georgia	47412	Cameroon	50480	Senegal	61116

Source: *Compiled by UNEP based on data from the European Commission- Eurostat Comext Database, 2019*

Of EU countries, Germany ranks as the largest exporter of used vehicles to countries outside the EU - over half (53 per cent) of total EU exports outside of the EU in 2016. The United Kingdom, ranking second, registered a little less than a quarter of the German export value with a share of 13 per cent (Eurostat, 2017). In 2015, an evaluation of the German re-registration statistics and foreign trade statistics for used LDVs show a total of 2.82 million used LDV exports from Germany of which more than half were to other EU countries (BMUB, 2015). This statistic is an underestimate due to around 0.35 million deregistered vehicles unaccounted for in 2015 by statistics and transits of used light duty vehicles from Germany, that go via other EU countries into non-EU countries not covered by non-EU foreign trade statistics. The principal destination for German exports outside of Europe, in 2015, was West Africa – some 41 per cent - while the EECCA accounted for around 14 per cent.

1.2.2 Japan

Japan is the second largest exporter of used vehicles after the EU. Over the period 2015-2018, Japan exported around 3.8 million used light-duty vehicles. Japanese exports of used vehicles averaged 963,000 per year from 2015-2018. In 2015, Japan exported over one million vehicles, which had slightly dropped to 940,000 used vehicles by 2018. In general, the share of used vehicle exports has declined year-on-year since 2015, with exception of a slight rise of 9,000 units between 2017 and 2018.

From 2015 to 2018, New Zealand and the United Arab Emirates (UAE) accounted for the bulk of used LDV imports from Japan. In Asia, Myanmar, Sri Lanka, and Pakistan account for the largest share of used LDV imports from Japan. In Africa, the major markets are Kenya, South Africa, and Tanzania. Exports to South Africa have grown significantly from 2015 to

2018, an increase of nearly 40,000 vehicles; these exports are destined to neighbouring countries as South Africa bans used vehicles. Similarly, Chile is one of the top 10 importers of Japanese used vehicles, however, they also ban used vehicles. Instead Chile serves as a gateway to South America as these vehicles are reexported to countries including Bolivia, Paraguay, and Peru. Russia, Kyrgyzstan, and Georgia are major markets for Eastern Europe. Dubai, in the United Arab Emirates, serves as a key transit point for used vehicle imports to African countries.

Japan predominantly supplies countries with a requirement of right-hand drive vehicles. This includes most markets in Asia-Pacific, East and Southern Africa. However, Japanese vehicles are exported to many countries where vehicles are left-hand drive such as the UAE, Russia, Georgia, and Chile. In these countries the steering wheel is shifted from the right to the left-hand side. Steering conversion is a vibrant industry in these trans-shipment destinations, before reexport to the third country (G.A.T., 2017). Most countries mandate pre-shipment conversion or provide a timeframe in which the opposite steering is allowed. In 2009, Samoa switched to driving on the left-side of the road to make it more economical to buy Japanese used vehicles.

TABLE 3

Top Ten Destinations, out of the 146 Analysed in this Report, for Vehicle Exports from Japan, 2015 -2018

	2015		2016		2017		2018	
1	New Zealand	112647	United Arab Emirates	117236	New Zealand	120023	United Arab Emirates	99831
2	United Arab Emirates	103836	New Zealand	114908	United Arab Emirates	113082	New Zealand	94160
3	Myanmar	85963	Myanmar	70656	Chile	84322	Chile	84319
4	Kenya	65230	Chile	66908	Kenya	64342	South Africa	77777
5	Chile	58421	Kenya	48673	South Africa	61749	Russian Federation	66496
6	Sri Lanka	51561	Pakistan	43342	Pakistan	56607	Kenya	65381
7	Russian Federation	43980	Russian Federation	43168	Russian Federation	48089	Tanzania	48059
8	Pakistan	43399	South Africa	41089	Myanmar	46191	Myanmar	42875
9	South Africa	38003	Georgia	37630	Tanzania	38791	Sri Lanka	35020
10	Tanzania	35184	Tanzania	31654	Jamaica	27677	Pakistan	30727

Source: *Compiled by UNEP based on data from the International Auto Trade Association (www.iata-odo.jp)*

In 2018, the average Japanese used vehicle was estimated to cost US$5,000 (¥541,903)[13], with the total value of exports to the top 50 countries being valued at around US$4.8 billion. The value of used vehicles differs greatly between export destinations. In Singapore, an average vehicle is valued at US$21,000 almost 16 times more than one to Lesotho at US$1,300. The price differential denotes the quality of vehicle (level of safety and emission features). All countries that qualify as having a 'very weak' regulatory environment towards

13 Based on an exchange rate of 0.0094

importing high-quality used vehicles receive low-valued and low-quality (below average value) Japanese used vehicle exports.

Japan exported around 169,000 electric and hybrid electric used LDVs in 2018 (mainly hybrid electric vehicles), this is a growth of 41,000 vehicles from 2017. This figure is expected to rise as more and more (hybrid) electric vehicles enter the used vehicle market.

1.2.3 United States of America (USA)

The USA is a major exporter of used light duty vehicles to middle- and low-income countries, with the leading regions being the Middle East, West Africa, Central America, and the Caribbean. The USA exports a significant number of used vehicles to Europe, specifically Eastern Europe. The UAE serves as a transit point for used LDV exports to other Middle Eastern countries and to Eastern Europe. Major national markets for the USA used LDVs are Nigeria, Jordan, Mexico, and Georgia. In contrast, the top five markets for USA exports of new light duty vehicles during the same period was Canada, China, Germany, Mexico, and Saudi Arabia.

Over the period 2015 to 2018, the USA exported around 2.6 million used light duty vehicles with an export value of US$24.5 billion. Between 2009 and 2013, used vehicles made up 34 per cent of the total volume of the USA new and used LDV exports (Coffin, Horowitz, Nesmith, & Semanik, 2016). Between 2014 and 2018, used LDV exports made up 24 per cent of total USA LDV exports by volume (and 10 per cent by value). In 2018, used vehicle exports totalled 31 per cent of total USA passenger vehicle exports (and nine per cent by value).

TABLE 4

Top 10 Markets, out of the 146 Analysed in this Report, for Used Passenger Vehicle Exports from the US, 2013- 2018

	2015		2016		2017		2018	
1	United Arab Emirates	85016	Mexico	86938	United Arab Emirates	99651	United Arab Emirates	129489
2	Mexico	80224	United Arab Emirates	75146	Mexico	61893	Nigeria	82267
3	Nigeria	40136	Dominican Republic	32757	Nigeria	48865	Georgia	59481
4	Benin	40022	Nigeria	31868	Jordan	40842	Mexico	52490
5	Cambodia	32925	Cambodia	31503	Georgia	35977	Jordan	47214
6	Dominican Republic	27334	Jordan	27960	Cambodia	33106	Ukraine	34871
7	Jordan	27074	Georgia	22853	Dominican Republic	24090	Cambodia	31167
8	Lebanon	17026	Guatemala	19021	Guatemala	22837	Dominican Republic	27083
9	Saudi Arabia	15891	Ghana	18680	IRAQ	21541	Guatemala	22038
10	Ghana	15025	Lebanon	16213	Lebanon	18059	Libyan Arab Jamahiriya	21004

Source: *Compiled by UNEP based on data from United States Department of Commerce, International Trade Administration, 2019*

The estimated market value of used LDVs varies by importing market (Table 5 below). In 2018, the average cost of a used vehicle imported into Saudi Arabia was US$17,741, while in Honduras US$4,000. Saudi Arabia has a stronger regulatory environment for used vehicle imports than many other destination countries and mandates a 5-year age limit. Honduras has a 7-year age limit. The value of vehicles in import markets can be an indicator of the quality of the vehicle, in terms of its safety and emission features. All countries that qualify as having a 'very weak' regulatory environment towards importing high-quality used vehicles receive low-valued and low-quality (below average value) Japanese used vehicle exports.

The share of used LDV exports from the USA market has fluctuated, mainly decreasing year-on-year since 2010, as compared to new vehicle exports.

TABLE 5

Market Value for Used Passenger Vehicle Exports from the USA, 2013- 2018

	2014		2015		
1	United Arab Emirates	USD 679,904,219	United Arab Emirates	USD 591,620,896	Mexico
2	Mexico	USD 635,931,693	Mexico	USD 451,918,638	United Arab Emirates
3	Nigeria	USD 633,919,365	Benin	USD 279,368,246	Dominican Republic
4	Benin	USD 368,404,714	Nigeria	USD 272,692,129	Jordan
5	Saudi Arabia	USD 312,277,377	Dominican Republic	USD 265,044,088	Cambodia
6	Jordan	USD 306,524,766	Saudi Arabia	USD 262,001,912	Nigeria
7	Dominican Republic	USD 206,126,395	Jordan	USD 251,484,834	Ghana
8	Georgia	USD 204,911,668	Cambodia	USD 240,143,321	Lebanon
9	Cambodia	USD 190,828,892	Lebanon	USD 156,277,238	Saudi Arabia
10	Lebanon	USD 177,758,220	Ghana	USD 99,196,735	Iraq
Total Top 10		USD 3,716,587,309		USD 2,869,748,037	

Source: *Compiled by UNEP based on data from the United States Departments of Commerce, International Trade Administration, 2019*

2016		2017		2018
USD 542,131,838	United Arab Emirates	USD 540,790,885	United Arab Emirates	USD 765,981,067
USD 457,007,824	Jordan	USD 356,420,089	Nigeria	USD 526,641,660
USD 295,782,938	Mexico	USD 297,319,564	Jordan	USD 447,473,033
USD 235,835,614	Nigeria	USD 284,290,412	Ukraine	USD 259,933,034
USD 194,169,646	Dominican Republic	USD 204,517,405	Mexico	USD 246,232,464
USD 181,034,878	Cambodia	USD 197,819,255	Georgia	USD 232,966,055
USD 144,195,967	Iraq	USD 146,925,450	Dominican Republic	USD 225,136,372
USD 131,517,353	Georgia	USD 144,904,503	Cambodia	USD 203,859,871
USD 100,043,129	Lebanon	USD 135,316,723	Iraq	USD 131,094,030
USD 95,694,757	Ukraine	USD 105,654,330	Lebanon	USD 125,534,605
USD 2,377,413,944		USD 2,413,958,616		USD 3,164,852,191

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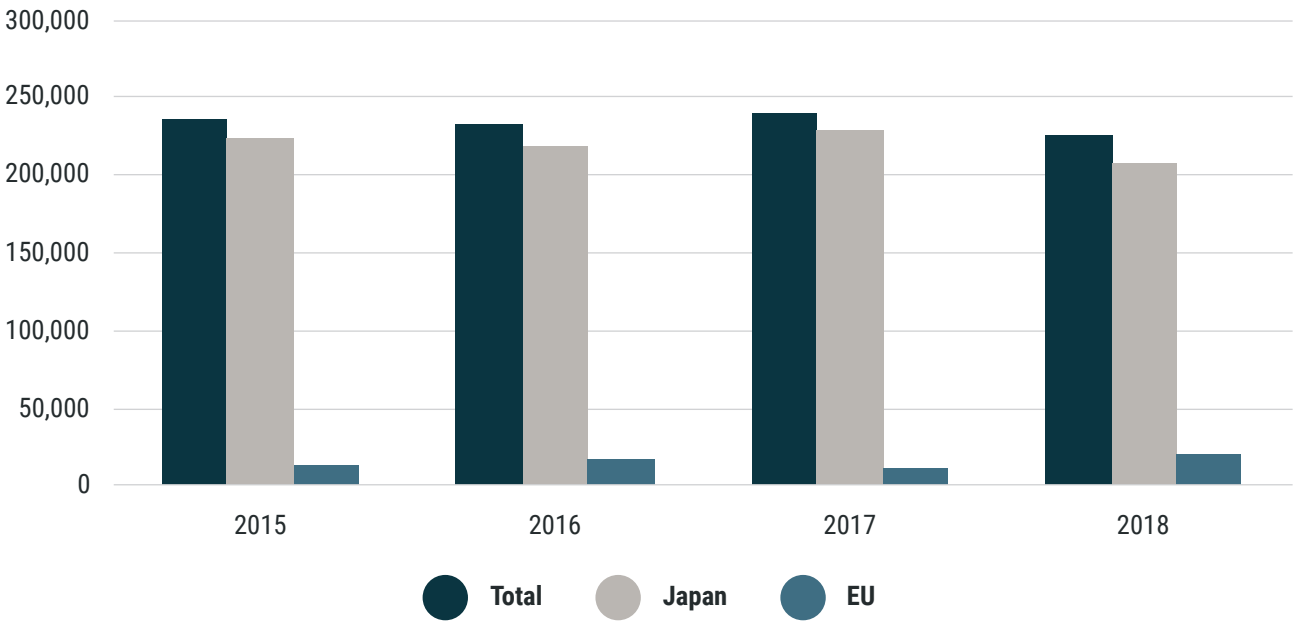
From 2014 to 2015, used LDV exports dropped by 22 per cent to a 5-year low. As a result, the value of used vehicle exports from the USA also dropped from an estimated US$8.5 billion in 2014 to just over US$5.5 billion in 2016 (United States Department of Commerce, International Trade Administration, 2017). For example, exports of used LDVs from the USA to Mexico have fallen 31 per cent from 2013 to 2017 due to several factors, including new laws in Mexico that encourage lending and automaker financing. In 2016, Mexico built almost 3.6 million vehicles, making it the world's no.7 vehicle producer; 1.6 million vehicles were sold domestically, placing it 12th among the world's biggest markets.

1.3 Global Supply of Used Heavy-Duty Vehicles

During 2015-2018 the EU and Japan exported 1.2 million used HDVs worldwide. Japan is the largest exporter of used HDVs, exporting 4.5 times more HDVs than the EU. The size of exports has remained constant over the four years surveyed. Japan separates buses and trucks in its export statistics, but the EU does not disaggregate them. For both categories of vehicle, Asia-Pacific is the major market for Japanese exports followed by East and Southern Africa and the Middle East (Table 6/ Figure 6). The largest portion of EU used HDVs are traded within the EU and in Eastern Europe.

FIGURE 6

Share of Used Heavy-Duty Vehicle Exports from Japan and the EU, 2015-2018



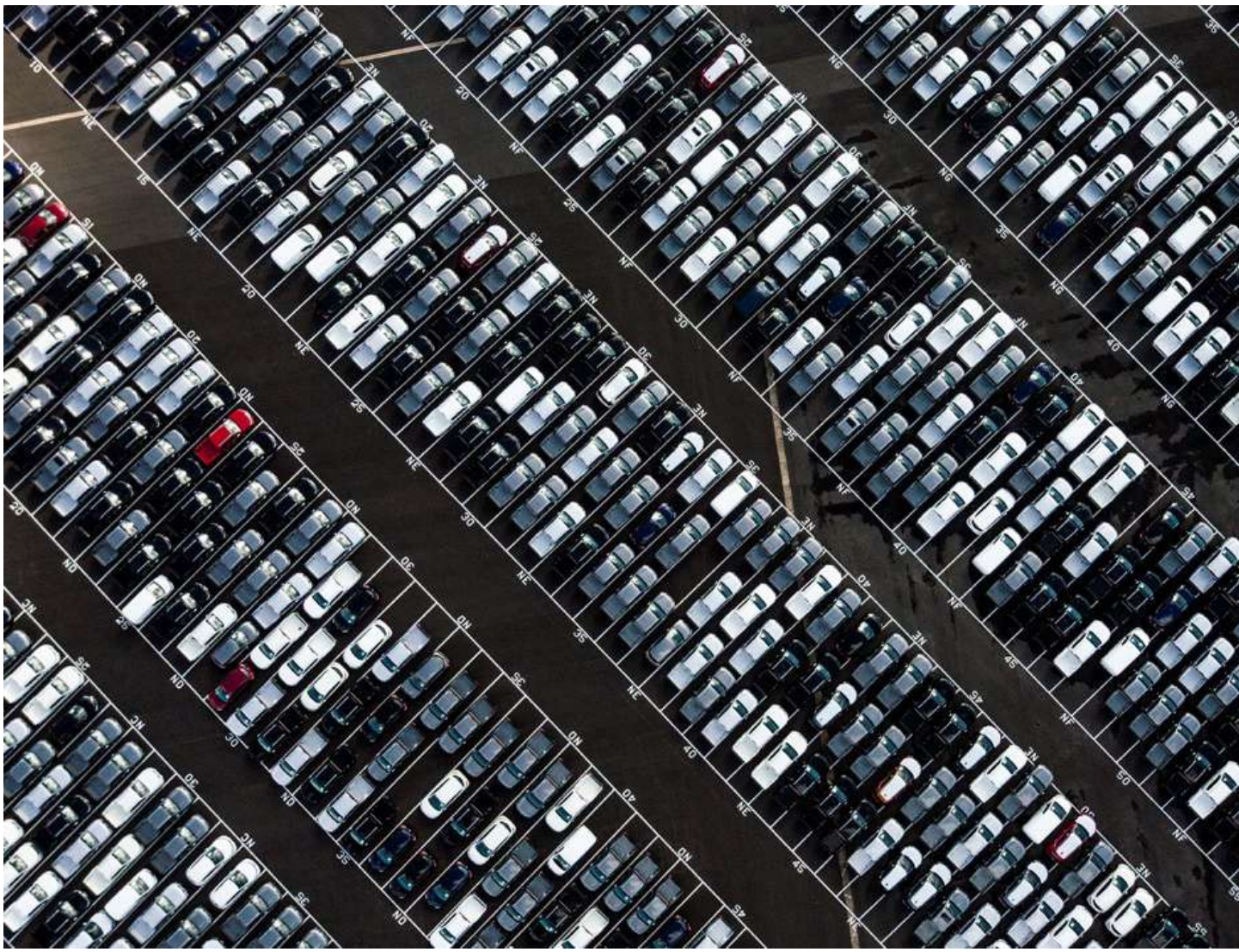
Source: *Compiled by UNEP, based on data from the Japanese International Auto Trade Association (iATA) & the European Commission-Eurostat Comext Database, 2019*

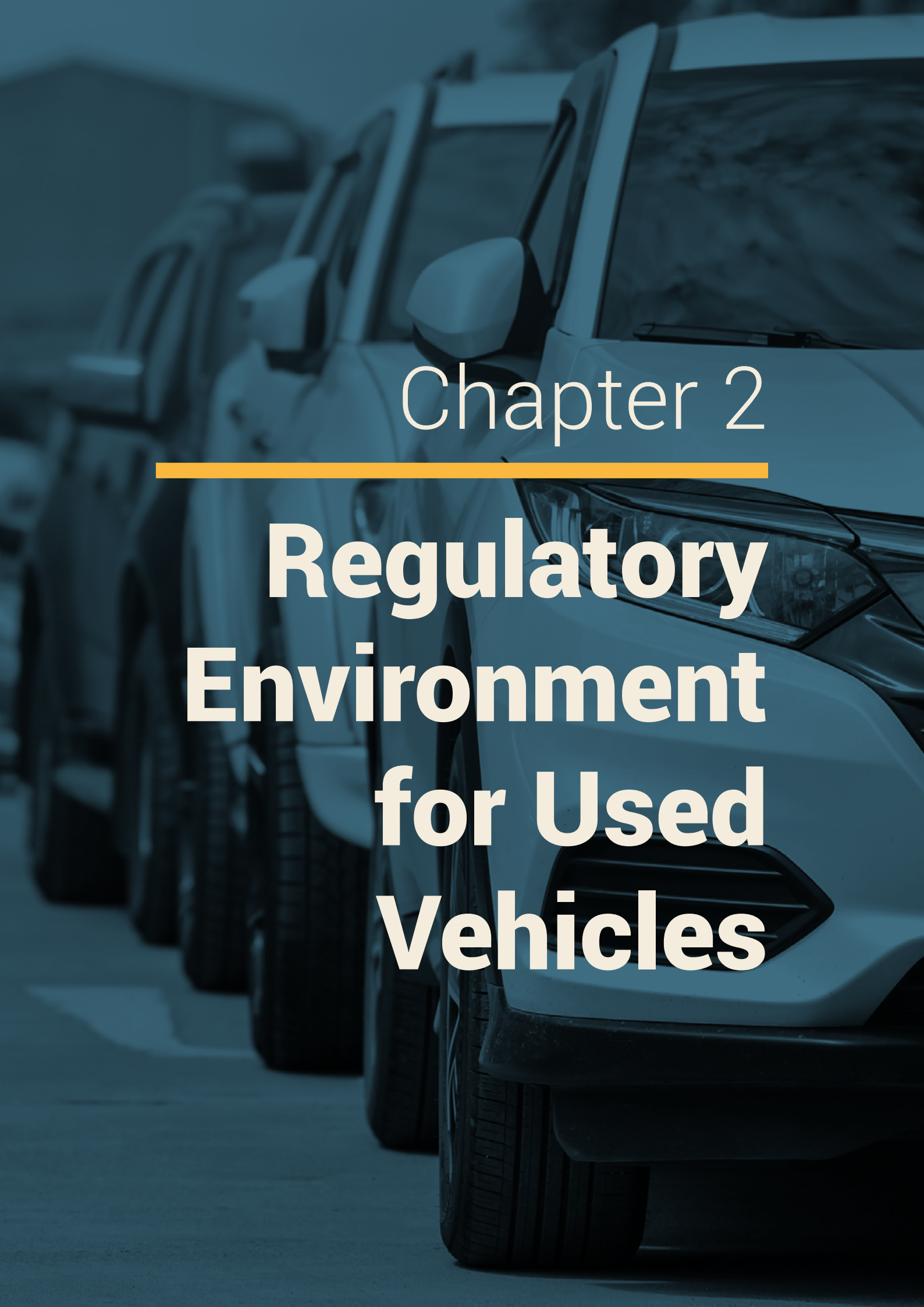
TABLE 6

Top 10 Importers of Japanese Used HDV's, 2015-2018

Country	# of HDVs (trucks & busses)
Myanmar	181,591
Philippines	147,031
United Arab Emirates	123,815
Kenya	38,314
South Africa	37,078
Tanzania	34,535
Pakistan	31,878
New Zealand	28,898
Chile	28,631
Uganda	27,156
Total	678,927

Source: *Compiled by UNEP based on data from the Japanese International Auto Trade Association (iATA)*





Chapter 2

Regulatory Environment for Used Vehicles

This chapter will provide an overview of the regulations currently in place for the import of used light duty vehicles. Regulations can take many forms – complete bans, age restrictions, fiscal incentives, labelling and awareness requirements etc. Sometimes regulations are harmonized at regional and sub-regional levels. There are also wide differences regarding implementation and enforcement of these regulations. Some countries strictly enforce them while others hardly at all. The cross-border trade of used vehicles adds to the challenge of implementing and enforcing these, especially when countries have not harmonized regulations.

Regulations can provide both incentives and disincentives for the import of used vehicles. Incentives can include reduced taxes to promote the uptake of used low and no emissions vehicles, while disincentives can include increased taxes for older, more polluting vehicles. Some countries only allow the import of relatively newer used vehicles, through an age limit or vehicle emissions standards.

Worldwide, these regulations vary widely. There is a patchwork of measures that govern the flow of used vehicles, but currently no regional or global agreements that harmonize the flow to ensure the transfer of best available technology. Used vehicles are notably absent in global, regional, and national strategies for air pollution control, climate mitigation and road safety. While some measures seeking to govern end-of-life vehicles exist, they are not fully developed or consistently adopted.

2.1 Used LDV Importing Country Policies

From the 146 countries reviewed in this report, 87 countries (60 per cent) have some measure(s) in place that regulate used light duty vehicle imports, 59 countries have no regulations in place. This can include limits on vehicle age and/or the vehicle emission standards. Of the 146 countries surveyed, all countries with vehicle manufacturing capacity had in place some form of restriction on used LDV imports. The existence of a domestic manufacturing industry is the most important predictor of an import ban, with the ban used to protect the domestic industry against the importation of less expensive vehicles (Pelletiere and Reinert, 2004).

The countries surveyed use the following policy and/or fiscal instruments to control vehicle intake:

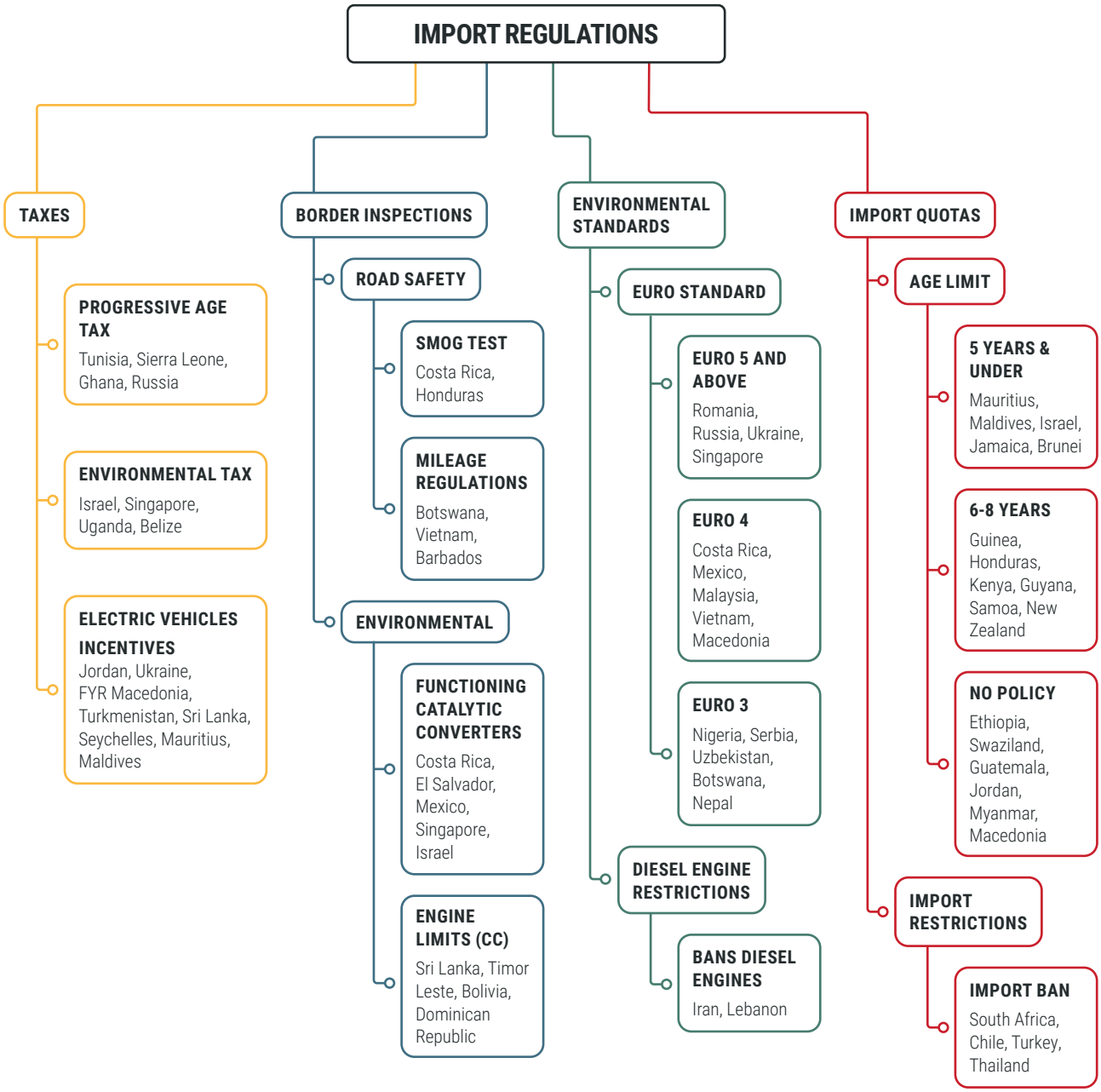
- **Complete ban** on used vehicles entering the country
- **Age limit**, whereby a vehicle's model year must fall below a specified age/year before it can be registered locally
- **Emissions standard**, whereby a vehicle must meet a minimum emissions standard (and by default, age). The most used global emissions-equivalent standard is the Euro standard
- **Fiscal** instruments or (dis)incentives include differential customs and registration tariffs, e.g. based on vehicle age and/or engine size, or based on vehicle emission standards or technology (e.g. VAT exemptions for hybrid and/or electric vehicles)
- **Communication** instruments**,** the most common of which are vehicle labels (for both new and used vehicles) that include emission and/or fuel economy information
- **Selective technology ban**, e.g. a ban on the import of diesel engines
- **Minimum safety standards** that include roadworthiness and crash ratings

Figure 7 below gives an overview of different regulations in use by countries in 2017.

The most effective used vehicle policy regimes combine measures. Measures need to be considered in a wider context that includes the entire vehicle lifecycle, including on-road inspection, enforcement and maintenance as well as scrappage and recycling. Vehicle inspection and maintenance and scrappage programs are necessary complements to entrance barriers because they encourage fleet renewal and the removal of obsolete, older vehicles. In many developing and emerging economies, however, these systems are lacking, or are not harmonized.

FIGURE 7

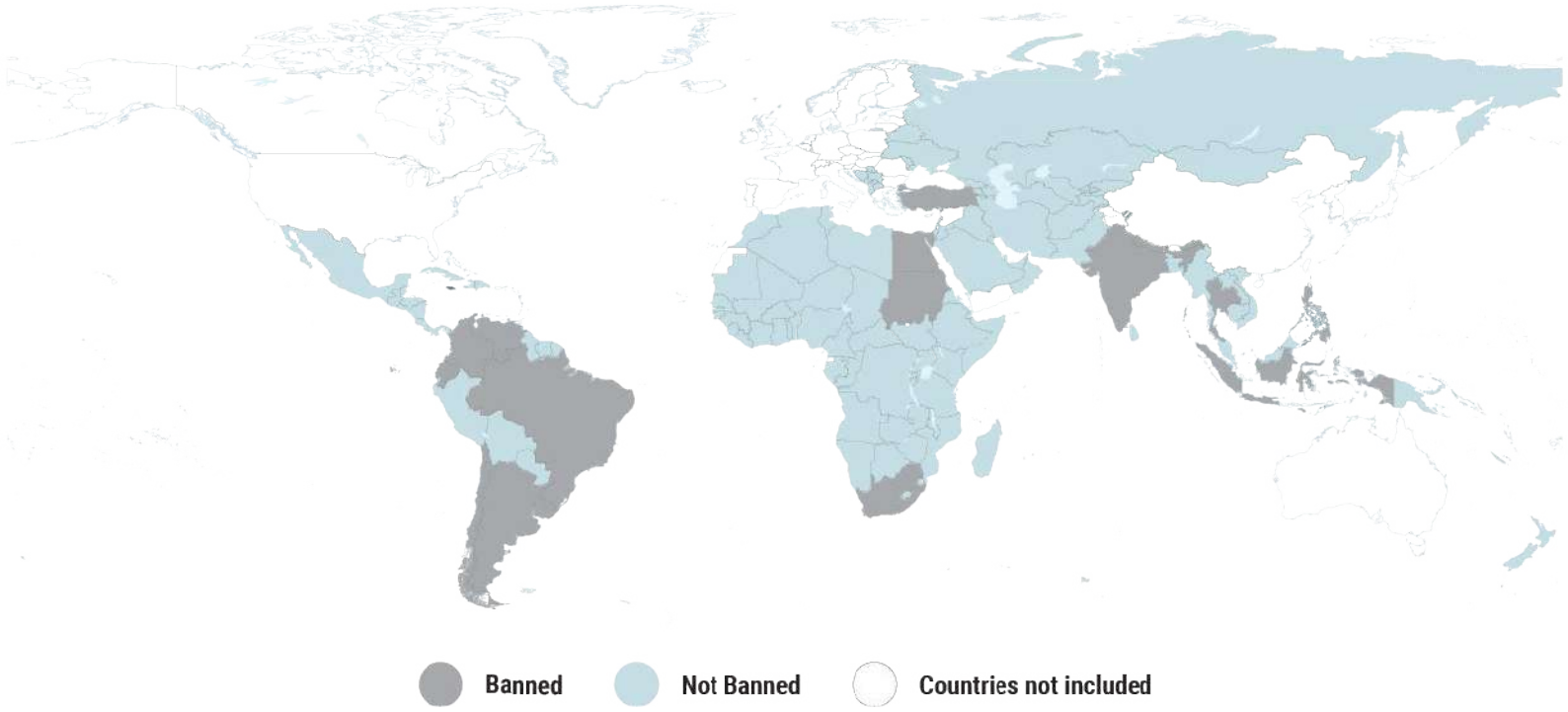
Categorization of Import Regulations Adopted by Countries and analyzed to Regulate the Importation of Used Vehicles in 2017



Source: *Compiled by UNEP, based on data collected from import countries, 2017*

2.1.1 Used Vehicle Import Bans

MAP 2
Used Vehicle Import Bans (July 2020)



Source: *UNEP, based on data collected from the 146 countries analyzed as at July 2020*

Banned	Egypt, South Africa, Seychelles, Sudan, Bhutan, India, Indonesia, Nepal, Philippines, Thailand, Turkey, Argentina, Brazil, Chile, Colombia, Ecuador, Uruguay, Venezuela	**Total:18** Africa (4) Asia-Pacific (6) EECCA (1) LAC (7)

Out of the 146 countries surveyed, 18 have adopted a complete ban on the import of used vehicles. This does not mean that they do not import used vehicles, some import used vehicles but then re-export them to other countries in the region.

Countries prohibit imports of used vehicles for several reasons: environment, health, and safety concerns. But they also do so to support and/or protect a domestic vehicle manufacturing industry. Sometimes, domestic newly manufactured vehicles may be produced under weak vehicle standards and policies. This means that new vehicles sold in or to developing countries can have less environmental and safety features installed than imported used vehicles[14]. For example, Uruguay, Venezuela and Ecuador all ban the importation of used vehicles. However, they all have very low emission standards for new vehicles (Euro 3, 2, and 1, respectively). In contrast, Argentina complements a used vehicle import ban with Euro 5 vehicle emission standard for newly registered vehicles. In some cases, a used vehicle import ban can

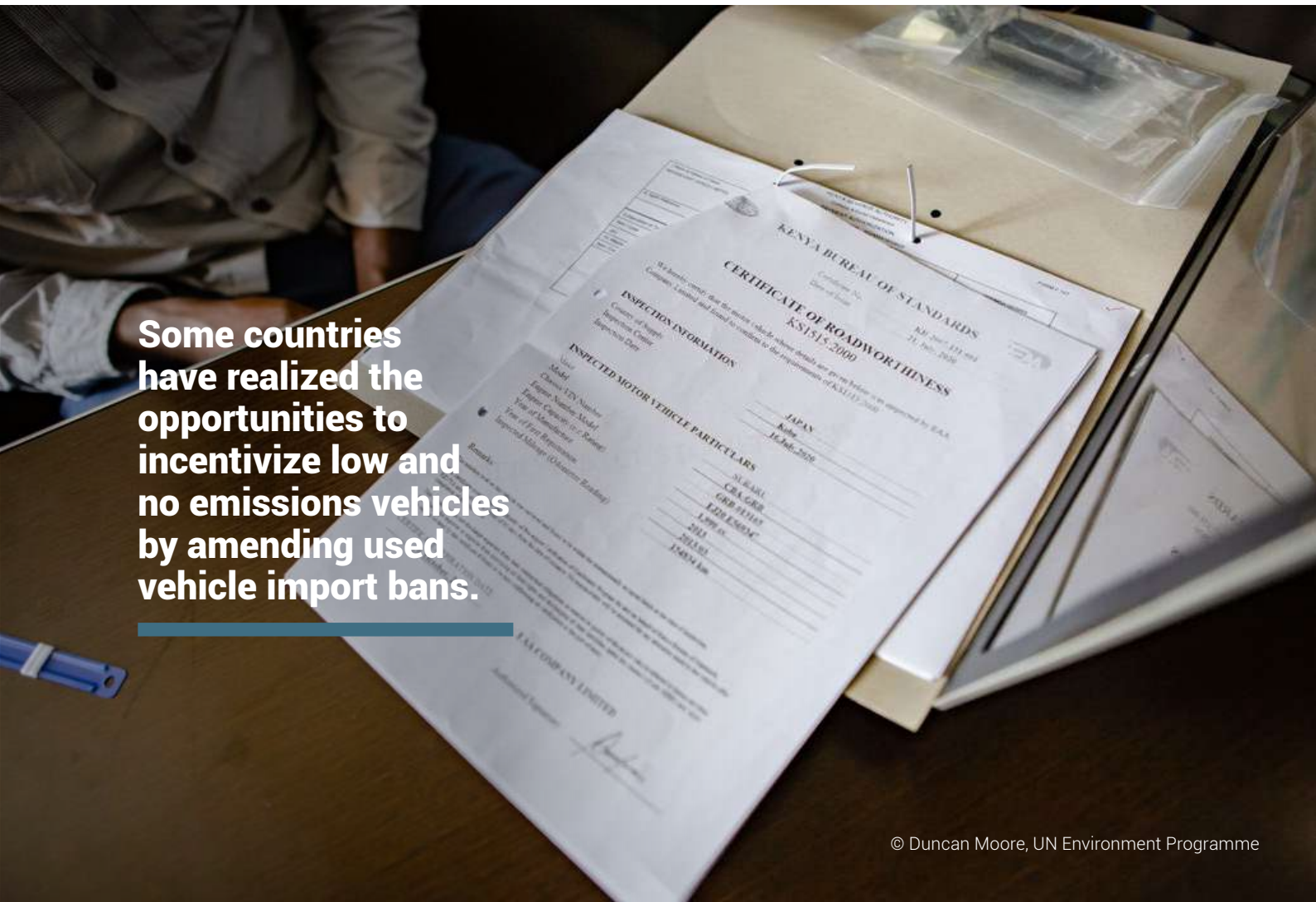
14 See for example: https://www.youtube.com/watch?v=UL_2MdSTM7g, where it is found that a used vehicle imported from Europe has better safety features than a new vehicles of the same make and model sold in Africa

limit access to affordable advanced and efficient vehicles.

In some cases, countries with used vehicle bans in place can be important gateways for used vehicles moving to other countries in their region. This is for example the case for Chile and South Africa. In 2018, Chile was the third largest worldwide importer of Japanese used vehicles – all of which were headed to neighbouring Bolivia, Peru, and Paraguay. South Africa is the largest importer of Japanese used vehicles in Africa, most of which are destined for neighbouring nations.

Some countries have realized the opportunities to incentivize low and no emissions vehicles by amending used vehicle import bans. Egypt and Bhutan have revised their used vehicles import bans to allow for the import of used electric vehicles (EVs). In 2013, Bhutan's government approved the exception of certain vehicles for public use such as ambulances and firefighting trucks; and in 2014 approved the import of used electric Nissan Leafs with mileage less than 30,000 km for commercial taxis. In 2018, Egypt made an exception for used electric vehicles less than 3 years of age. Both countries recognize that used EV's are an affordable opportunity to leapfrog to low and zero emission vehicle fleets.

Most countries that have blanket restrictions on the import of used vehicles have exemptions for diplomats, vintage and racing vehicle collectors, antique and special purpose vehicles including vehicles adapted for the physically disabled and public service vehicles.



Some countries have realized the opportunities to incentivize low and no emissions vehicles by amending used vehicle import bans.

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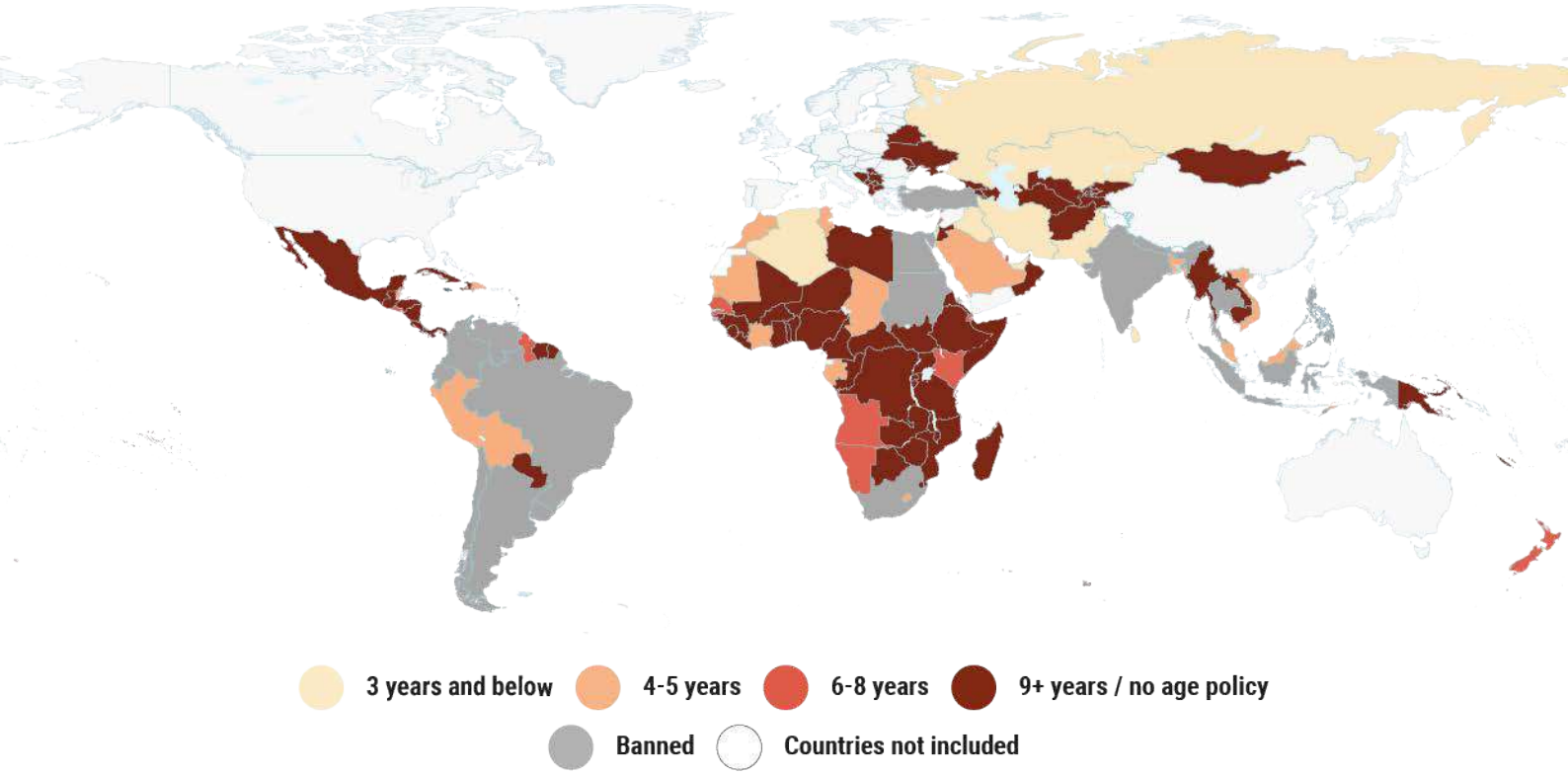
2.1.2 Age Limit

MAP 3
Used Light Duty Vehicle Import Age Limits (July 2020)



Source: *UNEP, based on data collected from the 146 countries analyzed as at July 2020*

Of the 146 countries studied, 67 have an age restriction on the importation of used vehicles. Age restrictions are the most popular policy globally to regulate the import of used vehicles because it is easier to enforce than other regulations. In Africa, 20 countries place a maximum age limit on used vehicle imports, often not very strict, while four countries impose a total ban on used vehicles. In Asia-Pacific, the Caribbean sub-region and Middle East nearly all countries ban imports over five years old. Central America's age limits, however, are generally 10 years or more. In South America, all countries either ban used vehicles or have a five-year-old or below age limit, except for Paraguay that has an age limit of 10 years.

TABLE 7
Used Vehicles Import Age Limit per country

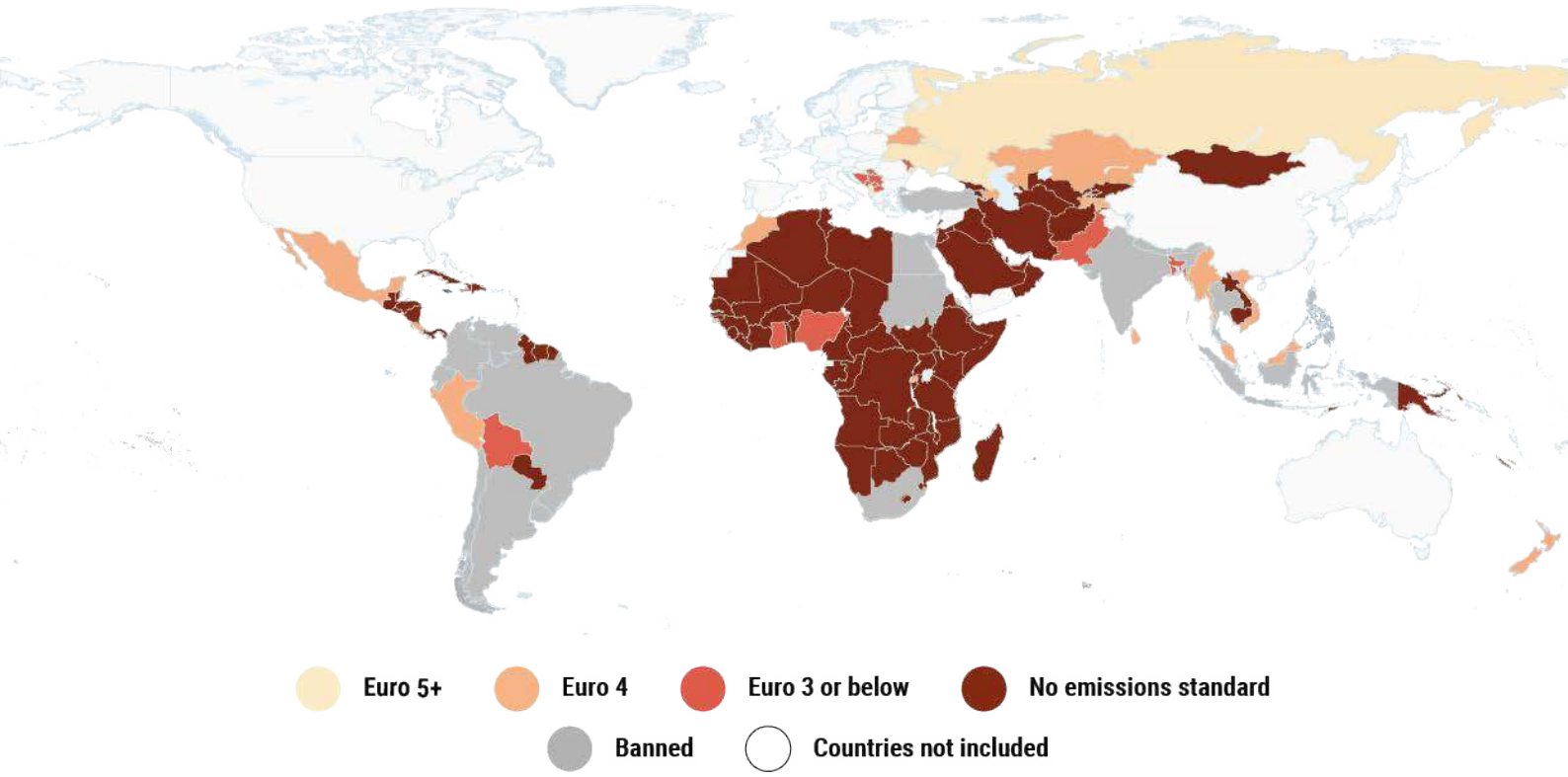
Used Vehicle Import Age Limits		
3 yrs and below	Algeria, Mauritius, Pakistan, Singapore, Sri Lanka, Iran, Iraq, Israel, United Arab Emirates	**Total: 9** Africa (2) Asia-Pacific (3) EECCA (0) LAC (0) ME (4)
4 and 5 yrs	Chad, Cote D'Ivoire, Gabon, Lesotho, Mauritania, Morocco, Tunisia, Bangladesh, Brunei Darussalam, Fiji, Malaysia, Maldives, Timor-Leste, Vietnam, Kazakhstan, Russia, Antigua and Barbuda, Bahamas, Barbados, Belize, Bermuda, Bolivia, Dominican Republic, Jamaica, Peru, Trinidad and Tobago, Bahrain, Kuwait, Saudi Arabia	**Total: 29** Africa (7) Asia-Pacific (7) EECCA (2) LAC (10) ME (3)
6 - 8 yrs	Angola, Djibouti, Kenya, Namibia, Senegal, New Zealand, Samoa, El Salvador, Guyana, Honduras, Lebanon	**Total: 11** Africa (5) Asia-Pacific (2) EECCA (0) LAC (3) ME (1)
9 yrs +	Burundi, Democratic Republic of Congo, Libya, Nigeria, Uganda, Albania, Bosnia and Herzegovina, Macedonia, Republic of Kyrgyz, Montenegro, Tajikistan, Guatemala, Mexico, Nicaragua, Paraguay, Jordan, Qatar	**Total: 18** Africa (6) Asia-Pacific (0) EECCA (6) LAC (4) ME (2)
No age limits	Benin, Botswana, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Comoros, Congo, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gambia, Guinea, Guinea-Bissau, Liberia, Madagascar, Malawi, Mali, Mozambique, Niger, Rwanda, Sao Tome and Principe, Sierra Leone, Somalia, South Sudan, Tanzania, Togo, Zambia, Zimbabwe, Afghanistan, Cambodia, Laos, Mongolia, Myanmar, Nauru, Palau, Papua New Guinea, Armenia, Azerbaijan, Belarus, Georgia, Moldova, Serbia, Turkmenistan, Ukraine, Uzbekistan, Aruba, Costa Rica, Cuba, Dominica, French Guiana, Grenada, Haiti, Panama, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Suriname, Turks and Caicos Islands, Oman	**Total: 61** Africa (30) Asia-Pacific (8) EECCA (9) LAC (13) ME (1)
Banned	Egypt, South Africa, Seychelles, Sudan, Bhutan, India, Indonesia, Nepal, Philippines, Thailand, Turkey, Argentina, Brazil, Chile, Colombia, Ecuador, Uruguay, Venezuela	**Total:18** Africa (4) Asia-Pacific (6) EECCA (1) LAC (7)
		Total: 146

Source: *Compiled by UNEP based on data collected from the 146 countries studied as at July 2020*

2.1.3 Vehicle Emission Standards

MAP 4

Light Duty Vehicle Emission Standards (Euro) (July 2020)



Source: *UNEP, based on data collected from the 146 countries studied as at July 2020*

From the 146 countries studied, 28 have a vehicles emission standard and 100 countries have no vehicles emissions standards. The remainder has banned import of used vehicles (from the 18 countries that ban the importation of used vehicles, 13 have vehicles emission standards for new vehicles)[15].

15 Countries that have introduced vehicles emissions standards apply these to both new and used vehicles – although these countries and their regulations do not always separate explicitly between new and used vehicles.

TABLE 8
Light Duty Vehicles Emission vs Importation of Used Vehicles

Vehicle Emission Standards

Euro 5+	Singapore, Albania, Russia, Ukraine	**Total: 4** Africa (0) Asia-Pacific (1) EECCA (3) LAC (0) ME (0)
Euro 4	Morocco, Rwanda, Brunei Darussalam, Malaysia, New Zealand, Sri Lanka, Vietnam, Azerbaijan, Belarus, Kazakhstan, Tajikistan, Costa Rica, Mexico, Peru	**Total: 14** Africa (2) Asia-Pacific (5) EECCA (4) LAC (3) ME (0)
Euro 3 or below	Ghana, Nigeria, Bangladesh, Pakistan, Bosnia and Herzegovina, Macedonia, Montenegro, Serbia, Uzbekistan, Bolivia	Total: 10 Africa (2) Asia-Pacific (2) EECCA (5) LAC (1) ME (0)
No emissions standards	Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Democratic Republic of Congo, Cote D'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Sao Tome and Principe, Senegal, Sierra Leone, Somalia, South Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe, Afghanistan, Cambodia, Fiji, Laos, Maldives, Mongolia, Myanmar, Nauru, Palau, Papua New Guinea, Samoa, Timor-Leste, Armenia, Georgia, Republic of Kyrgyz, Moldova, Turkmenistan, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Cuba, Dominica, Dominican Republic, El Salvador, French Guiana, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos Islands, Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, United Arab Emirates	**Total: 100** Africa (46) Asia-Pacific (10) EECCA (5) LAC (26) ME (11)
Banned	Egypt, South Africa, Seychelles, Sudan, Bhutan, India, Indonesia, Nepal, Philippines, Thailand, Turkey, Argentina, Brazil, Chile, Colombia, Ecuador, Uruguay, Venezuela	**Total:18** Africa (4) Asia-Pacific (6) EECCA (1) LAC (7) **Total: 146**

Source: *Compiled by UNEP based on data collected from the 146 countries studied as at July 2020*

When vehicles are sold in developed country markets they need to comply to certain emissions standards. These standards have been tightened over the years, from Euro 1 in 1992 to Euro 6 today in Europe and similar standards in Japan, the USA, and other countries. Yet, vehicles 25 years or older, before emissions norms were made mandatory, are still in circulation today in many developing countries. As Chapter 3 will show, there is indication that a large share of used vehicles exported to low- and middle-income countries do not comply to their certified emissions

standard in the country of export. There can be several reasons for this:

- vehicle emissions equipment can be faulty when they are exported. There are indications that vehicles that fail annual inspections, mandatory in many countries, are exported rather than repaired or scrapped. This does not only apply to emission reductions equipment, such as catalytic converters in petrol vehicles and particulate filters in diesel vehicles, but also to safety equipment, such as air bags and anti-brake blocking systems.

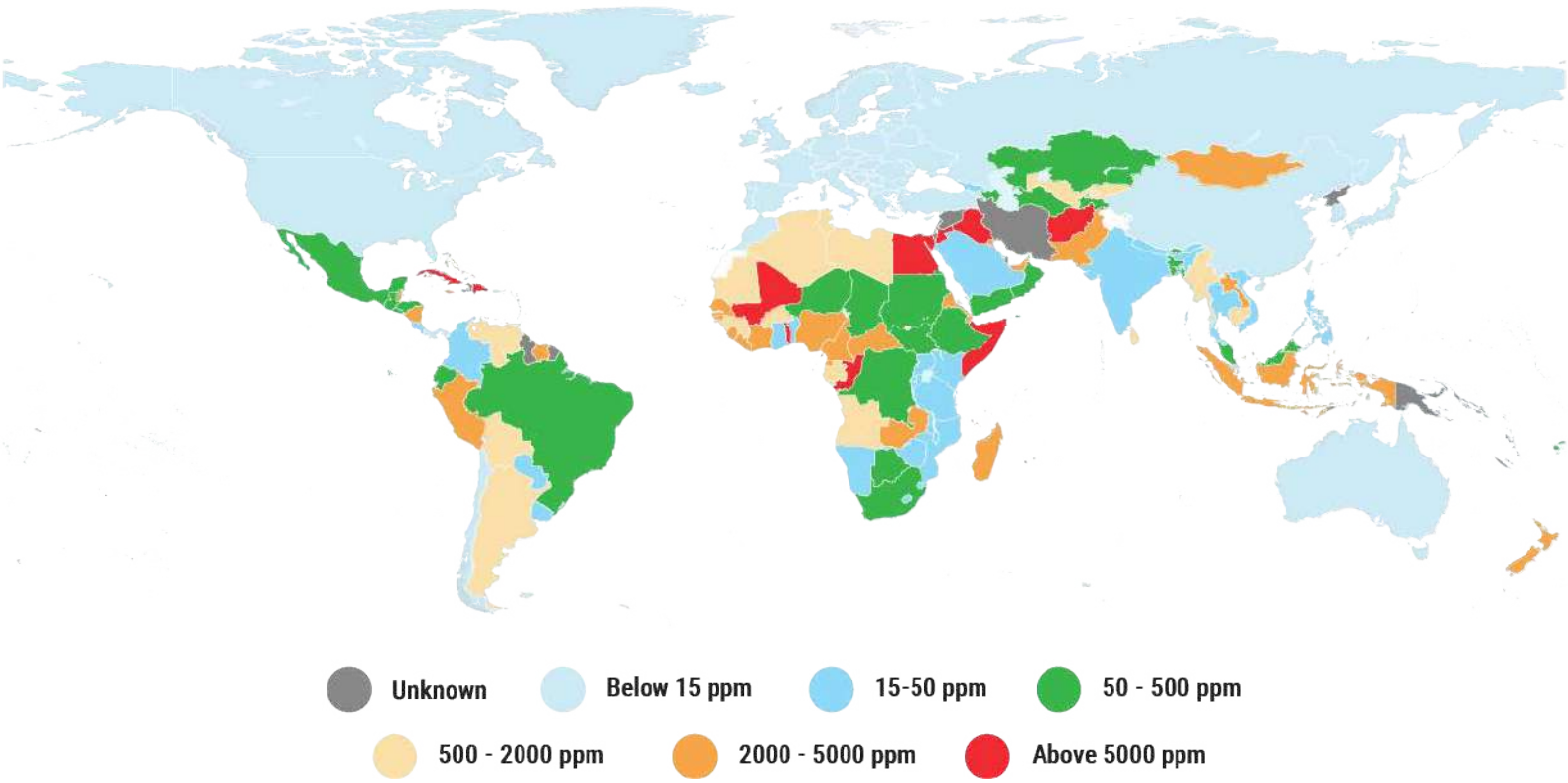
- some vehicles which are exported have this equipment illegally removed, for the value of these parts. For example, catalytic converters, which filter exhaust pollution from petrol vehicles, have a value because they are made with platinum.

- the maintenance of a vehicle also determines how well its environment and safety equipment works.

An important consideration for setting age or vehicle emission standards is the quality of the fuel available in the countries. A lack of adequate fuel quality can prevent the optimal use of advanced emission control technology (which is now standards in developed countries). For example, vehicles that meet Euro 6 emissions requirements need low sulphur fuels to operate (max 50 parts per million (ppm), ideally 15 ppm). So, if countries have low sulphur fuels, they could introduce vehicles emission standards of Euro 6 and/or age restrictions of 5 years or less.

Fuels with higher sulphur content lead to higher PM and NOx emissions which corrode and destroy advanced vehicle control technologies, such as diesel vehicles with particulate filters (Euro 6 diesel vehicles). Diesel particulate filters perform best with sulphur levels of 10 ppm and quickly lose efficacy with higher sulphur levels. Even in countries with an established age limit and/or lower-sulphur fuels (e.g. Kenya or Panama), adopting complementary vehicle emission standards has been a slow process. The United Nations Environment Programme is supporting developing countries to implement low and ultra-sulphur fuel standards and complementary more stringent vehicle emission standards. Since 2012, 32 countries worldwide have transitioned to low or ultra-low sulphur fuels, while most others are in the process of implementing road maps to reduce fuel sulphur levels. Map 5 shows the current situation.

MAP 5
Diesel Fuel Sulphur Levels: Global Status



Source: *UNEP, based on data collected from countries as at June 2020*

In February 2020, 15 West African countries cooperating in ECOWAS (Economic Commission of West African States) adopted harmonized fuels and vehicle standards. They agreed that as of 1 January 2021 all used light duty vehicles would need to meet Euro 4 vehicles emission standards. They also agreed that countries will set a used vehicles age standard of maximum 5 years old, to be implemented within 10 years. This decision will have major impacts on the import of used vehicles in West Africa, as currently most used vehicles being imported do not meet these standards (also see chapter 3). This is the first harmonized used vehicles policy at regional level in Africa. Similar initiatives are being considered in East and Southern Africa.

2.1.4 Fiscal Instruments

Fiscal instruments are an effective measure to rationalize and improve the quality of used vehicle flows. These can include customs duties, surtax, VAT, registration fees, circulation taxes, feebates, etc. The most common fiscal measures adopted in the countries surveyed include incremental and fixed taxes on age, engine size (i.e. higher rates for higher cylindrical capacity) and emissions ratings. Engine size is used as a proxy for CO_2 emissions-based taxation in many countries. Lower duties or exemptions for specific low and no emissions vehicles, especially hybrid and electric vehicles are becoming more popular worldwide, including in developing vehicle markets.

For example, Moldova levies higher taxes for imported vehicles older than three years, while banning the import of vehicles over 10 years old. Moldova incentivizes electric vehicles through exemption from registration and circulation/road tax. (GFEI 2018). Kenya imposes a fixed age-based taxation of

US$1,500 for vehicles less than three years and US$2,000 for vehicles older than three years. Kenya imposes taxes based on the CIF (Cost, Insurance and Freight) of the vehicle. In Myanmar, bigger engines attract higher vehicle registration taxes. Georgia incentivizes the import of older vehicles through lower taxation for ageing imports.

Examples of effective fiscal approaches include:

In **Russia** an age-based taxation system is in place for imported used vehicles: 30 per cent tax increase on imported vehicles older than one year; 35 per cent tax increase for imported vehicles from 3-5 years old; and for vehicles older than five years the tax is within 2.5 and 5.8 Euro per cubic centimetre of engine volume. A yearly road tax/re-registration tax can also be assessed in accordance to vehicle environmental performance.

Ghana has adopted an age-based tax where vehicles from 5-10 years benefit from 50 per cent reduction in CIF values and therefore the dutiable values are always lower. Importers take advantage of this to avoid higher duties. In principle, about 70-80 per cent of the vehicle import falls within this bracket. This, coupled with the import restriction on vehicles older than 10 years, might have incentivized current fleet characteristics.

Mauritius is among the few African countries that have used fiscal measures to influence the quality of new and used vehicles imported into the country. Mauritius imposes various taxation structures to encourage cleaner vehicles. Mauritius has a progressive excise tax that promotes the use of more energy efficient vehicles, based on their engine capacity and CO_2 emissions. The rates favour smaller engines with vehicles up to 550 cc exempt from excise tax. In addition, vehicle owners are required to pay a yearly road tax based on the type of vehicle and the engine displacement (cc or cm3). Mauritius also introduced reduced tax levies for hybrid and electric used vehicles.

Vietnam and **Malaysia** encourage the purchase of new vehicles by levying very high taxes on used vehicles. In Malaysia importing a used vehicle can be up to 300 per cent more expensive than the value of a new vehicle. In Nepal vehicles are taxed so heavily (288 per cent import duty) that they can cost up to three times more than in neighbouring India. High duty on vehicle imports is one of Nepal's major sources of national revenue (Shresta, 2017).

In **Singapore**, a Carbon- Emissions- Based Vehicle Scheme (CEVS) was established in 2015. Under the CEVS all new and imported used cars with carbon emissions of less/ or equal to 135g (CO_2/km) will qualify for a rebate between US$5,000 to US$30,000, and if a car has a high carbon emission equal/ or more than 186g (C02/km) a surcharge between US$5,000-US$30,000 will be levied. From January 2018, the feebate will also cover other pollutants (hydrocarbons (HC), carbon monoxide (C0), Nitrogen oxides (NOX) and particulate matter (PM)) and renamed the Vehicular Emissions Scheme (VES).

The design of fiscal measures is crucial to promote cleaner and more efficient used vehicles. Despite these examples, in many countries older used vehicle imports remain less expensive despite differential taxation or other tax measures. Some countries even have perverse incentives, for example charging less taxes the older the imported used vehicle is. An example of this is Zimbabwe where the Revenue Authority charges a surtax of 35 per cent for imported vehicles above 5 years. Instead of encouraging import of newer vehicles the surtax has led to import of older vehicles that are cheaper, making the surtax charge insignificant.

TABLE 9
Mean Age at New Vehicle Registrations in Zimbabwe (GFEI 2017)

Year	Mean Age at Registration (years)
2005	8.9
2008	8.5
2011	10.9
2013	12.1
2016	13.3

Source: *Zimbabwe vehicle inventory report based on data from the Zimbabwe Central Vehicle Registry (CVR), Global Fuel Economy Initiative, 2017*

Some countries are providing tax incentives to low and no emissions vehicles. Paragraph 2.3 gives examples of countries that use tax incentives for the importation of hybrid and full electric used vehicles.

2.1.5 Selective Bans

In response to congestion, high air pollution levels and public health concerns many city governments have opted to ban certain types of polluting vehicles or restrict access to certain areas within the city. These include bans on diesel vehicles, access restrictions (i.e. low-emission zones), and/or establish local registration and circulation taxes (e.g. congestion charging). In 2018, Germany's highest administrative court ruled that cities have the right to ban diesel vehicles, and Paris, Madrid, Oslo, Amsterdam, Athens and Rome have all proposed outright bans of diesels by 2025. In 2019 Central London implemented an Ultra-Low Emission Zone to restrict heavy emitters.

The European vehicle market has long been favourable to diesel vehicles as a result of various tax breaks and weak emissions legislation. Seven in every 10 global new diesel sales are in Europe, while in the USA less than one per cent of new vehicles sold are diesel. In China, diesel represents less than two per cent of sales (Transport &Environment, 2017). Since the 'Dieselgate'[16] scandal and the more recent Volkswagen scandal, the diesel market share is in steady decline and will fall further with new emissions legislation. According to the European Automobile Manufacturers Association (ACEA), petrol-powered vehicles overtook the sale of diesel vehicles in the first quarter of 2017 for the first time since 2009. In the first half of 2018 in the EU, the market share of diesel vehicles fell further to 36.5 per cent from 42.5 per cent in the first half of 2017 (IEA, 2018). Measures such as bans can further increase the export of used vehicles to low- and middle-income countries. These city bans often apply to older vehicles, especially older diesel vehicles and as such they have an impact on the trade in used vehicles.

At the same time, and responding to the diesel emissions scandals, European countries are introducing stricter emissions compliance testing. Germany and The Netherlands will start measuring particulate emissions of diesel vehicles at their annual inspections starting in 2021. It is expected that significant share of diesel vehicles may not pass this test and could be exported out of the EU.

16 In 2015 the US Environmental Protection Agency found that diesel vehicles emitted significant more pollution than what they were certified for. It was found that vehicle software allowed vehicle makers to reduce emissions during the certification process while increasing these during normal operational use. As a result, some vehicle makers were given major fines and instructed to take back and update consumer vehicles.

As the market for diesel vehicles declines in Western Europe, many of these vehicles are finding their way to countries in Eastern Europe, the Caucasus and Central Asia and West Africa. For instance, in 2017 Bulgaria imported over 100,000 used diesel vehicles from the EU, half of which were more than 10 years old and without the standard diesel particle filters found on all new vehicles after 2011 (Transport & Environment, 2018). In Moldova, diesel imports grew from 25 per cent to 58 per cent in 2017 (GFEI, 2018). The number of diesels leaving Germany in 2018 grew by 20 per cent.

Israel and Bahrain ban diesel vehicles and in Ethiopia diesel vehicles pay a higher tax relative to engine capacity. Sri Lanka's import and taxation scheme works to discourage the import of diesel vehicles and promotes cleaner petrol, hybrid, and electric vehicles. Studies in Sri Lanka have attributed Rs 22-17 billion (about US$120 million) in health costs owing to auto diesel emissions. Nigeria prices diesel fuels higher than petrol. However, Peru and Trinidad and Tobago encourage import of used diesel vehicles by placing a higher age limit as compared to petrol-powered used vehicles.

2.1.6 Communication Instruments: Vehicle Labelling

Consumer education and awareness on the fuel economy and emissions of new and used vehicles coming into a country is essential if consumers are to understand the choices available to them. Energy efficiency labels help consumers compare vehicle choices and can direct consumers to more cost-and energy-efficient vehicles. Most OECD countries have adopted mandatory vehicle labelling; countries without type approval facilities can adopt and use the results from manufacturing markets to label both new and used vehicles imports.

New Zealand is an example of an importing used vehicle market that utilizes the Japanese certification system to label used imported vehicles. New Zealand has also put in place a mandatory vehicle energy efficiency labelling requirement for both new and used imported vehicles, with an exception for electric vehicles. The label design is the same for both new and used imports. However, the used import label only includes a star-based rating and not a fuel economy value. New Zealand has developed an algorithm to translate efficiency ratings from different exporting markets into their own national star rating. The label depicts a 6-star rating, showing the estimated cost of running the vehicle for a year and the vehicle's fuel economy in litres per 100 km. All the information found on the vehicle label can be sourced online; a consumer only must enter the vehicle plate number or chassis number or VIN number for information on the fuel economy of the vehicle. Consequently, New Zealand does not test vehicles directly for fuel economy, but it does audit the documentation provided for new vehicle imports and compares it to international databases. Several dealers are visited every year to ensure labels are properly displayed on vehicles. This demonstrates a practical low-cost solution to fuel economy labelling for countries without the vehicle testing and enforcement infrastructure to introduce a costly domestic test system. It could also be used as a model for countries introducing minimum fuel economy standards and related fiscal measures without developing a new driving cycle and certification system (GFEI, 2017, World Bank, 2018).

FIGURE 8

New Zealand's Used Vehicle Fuel Economy Label

Source: *Energy Efficiency and Conservation Authority (EECA) New Zealand, GFEI, 2017*

2.2 Combining the Different Policies

This report developed a scaled ranking of used vehicles policies for the 146 countries analysed based on policies to restrict the age of vehicles and/or vehicles emissions standards as adopted by the countries.[17] This ranking categorizes national measures from 'very good' to 'very weak'. Countries that ban used vehicles are included but not ranked on this scale; while a total ban on used vehicle imports can be considered by some as a 'very good' approach, this measure can also limit a country to access more advanced vehicle technology.

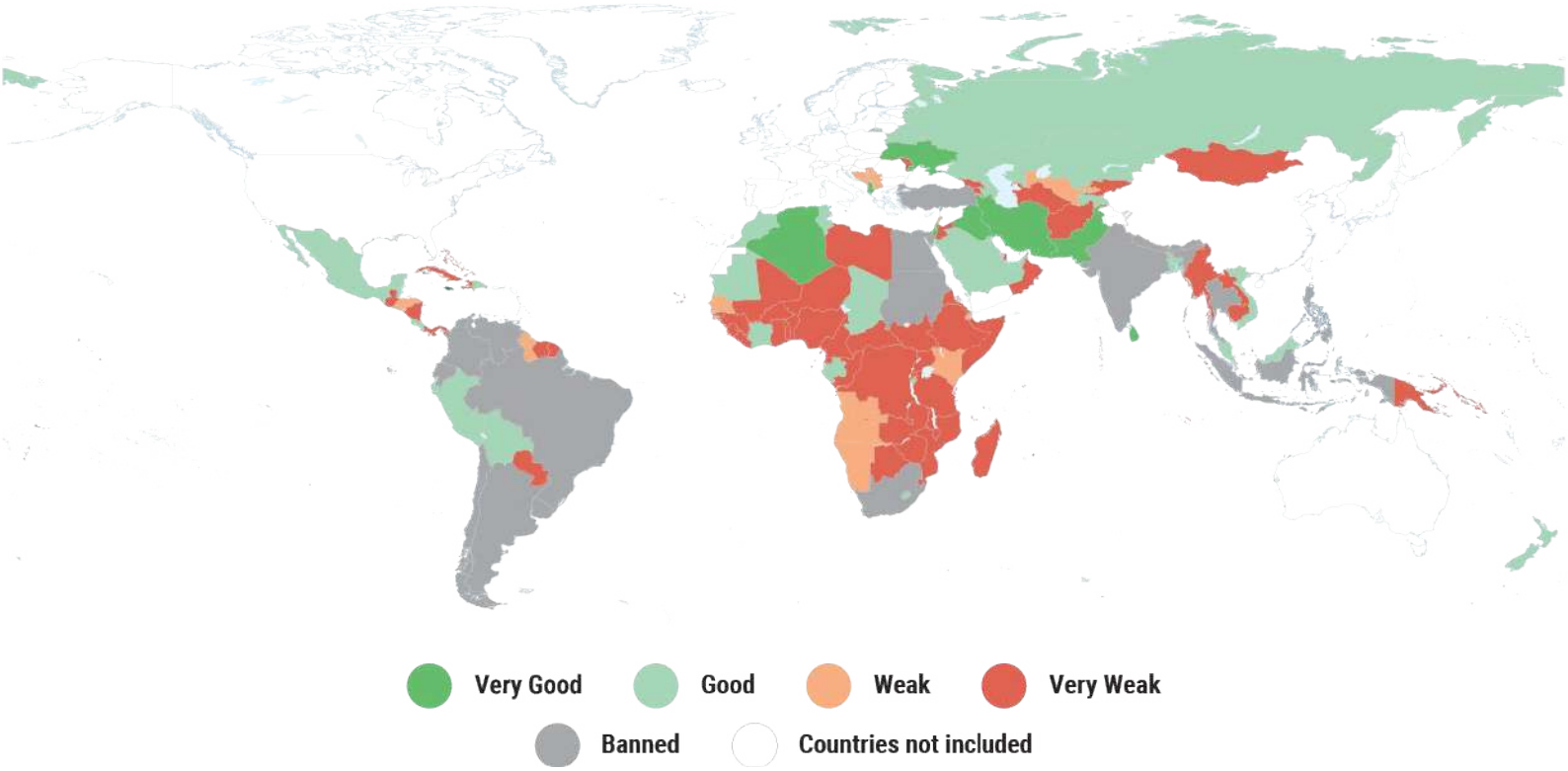
17 This scaling does not include other policies such as communication and fiscal policies as these are difficult to compare and change frequently

TABLE 10
Regulatory Environment Ranking

Regulatory Environment Ranking	
Very Good	Very Good - a used LDV Euro 5 or more emissions standard adopted and/or age limit of 3 years or below
Good	Good - a used LDV Euro 4 emissions standard adopted and/or age limit of 4 or 5 years
Weak	Weak – a used LDV Euro 3 emissions standard adopted and/or age limit of between 6- 8 years
Very weak	Very weak - No used LDV Euro emissions standard adopted and/or age limit of 9 years plus or no age limit
Banned	Banned - represents a complete restriction on used vehicle imports
Countries not included	Countries not included in the analysis

Source: UNEP, based on data collected from the 146 countries studied as at July 2020

MAP 6
Used Light Duty Vehicle Regulatory Environment (July 2020)



Source: *Compiled by UNEP based on data collected from the 146 countries studied as at July 2020*

Out of the 146 countries surveyed, 81 countries, over half, have 'weak' or 'very weak' policies to regulate the import of used vehicles. 47 countries, about one-third, have 'good' or 'very good' policies. Especially in Africa, the biggest market for the import of used vehicles where more than 60 per cent of vehicles added annually are used vehicles, policies are weak – only 10 out of 54 countries have 'good' or 'very good' used vehicles policies.

TABLE 11
Used Vehicle Regulatory Environment Rankings (July 2020)

Regulatory Environment Ranking (UNEP)	Countries	Region
Very Good	Algeria, Mauritius, Pakistan, Singapore, Sri- Lanka, Albania, Ukraine, Iran, Iraq, Israel, United Arab Emirates	Total:11 Africa (2) Asia-Pacific (3) EECCA (2) LAC (0) ME (4)
Good	Chad, Côte d'Ivoire, Gabon, Lesotho, Mauritania, Morocco, Rwanda, Tunisia, Bangladesh, Brunei, Fiji, Malaysia, Maldives, New Zealand, Timor- Leste, Vietnam, Azerbaijan, Belarus, Kazakhstan, Tajikistan, Russia, Antigua & Barbuda, Barbados, Bahamas, Belize, Bermuda, Bolivia, Costa Rica, Dominican Republic, Jamaica, Mexico, Peru, Trinidad & Tobago, Bahrain, Kuwait, Saudi Arabia	Total:36 Africa (8) Asia-Pacific (8) EECCA (5) LAC (12) ME (3)
Weak	Angola, Djibouti, Kenya, Namibia, Senegal, Samoa, Bosnia and Herzegovina, Serbia, Macedonia, Uzbekistan, El Salvador, Guyana, Honduras, Lebanon	Total:14 Africa (5) Asia-Pacific (1) EECCA (4) LAC (3) ME (1)
Very Weak	Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Comoros, Congo, Democratic Republic of Congo, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Libya, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Sao Tome &Principe, Sierra Leone, South Sudan, Somalia, Tanzania, Togo, Uganda, Zambia, Zimbabwe, Afghanistan, Cambodia, Laos, Mongolia, Myanmar, Nauru, Palau, Papua New Guinea, Armenia, Georgia, Kyrgyzstan, Moldova, Montenegro, Turkmenistan, Aruba, Cuba, Dominica, French Guiana, Grenada, Guatemala, Haiti, Nicaragua, Panama, Paraguay, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Turks and Caicos, Jordan, Oman, Qatar	Total:67 Africa (35) Asia-Pacific (8) EECCA (6) LAC (15) ME (3)
Banned	Egypt, South Africa, Seychelles, Sudan, Bhutan, India, Indonesia, Nepal, Philippines, Thailand, Turkey, Argentina, Brazil, Chile, Colombia, Ecuador, Uruguay, Venezuela	Total:18 Africa (4) Asia-Pacific (6) EECCA (1) LAC (7)
		Total: 146

Source: *Compiled by UNEP based on data collected from the 146 countries studied as at July 2020*

An in-depth analysis of country cases and policies adopted per country will be issued in separate regional reports[18]. It shows that the more selective an importing country is on the state of used vehicle technology (e.g. age limits and/or emission standards), then the higher the level of vehicle technology that is brought into the local market.

Country Examples of the Ranking for Used Vehicle Regulatory Environment

VERY GOOD

Albania permits the importation of used vehicles with a 10-year age limit; however, it has a vehicle emission standard of Euro 5. **Pakistan**, on the other hand, has a maximum age limit of three years but a Euro 2 vehicle emission standard. **Sri Lanka** imposes a 3-year age limit on LDVs and has eliminated all duty on electric vehicles. **Ukraine** has no enforced vehicle import age limit -. However, the country places strict emission standards on the import of used vehicles. As of January 2020, Ukraine imposes a EURO 6 vehicle emission standard. Ukraine has witnessed a rapid uptake of EVs, as the parliament has exempted VAT and excise tax on EVs. In 2017, Ukraine was the fastest growing market for electric vehicles in Europe (GFEI, 2018)

GOOD

Costa Rica has no age limit, but a Euro 4 vehicle emission standard for new and used vehicles and incentivizes the import of electric and hybrid vehicles. Additionally, Costa Rica imposes vehicle management measures to attract cleaner vehicles including a selective import duty taxation scheme that varies with the age of vehicle imported. In Africa, there are seven countries and in Asia-Pacific there are eight that are considered 'good'. **Morocco and Vietnam** have a 5-year age limit and Euro 4 emission standard. **Bangladesh** has a 5-year age limit. While only having a Euro 1 emission standard for diesel vehicles and Euro 2 for petrol powered vehicles. **Fiji** limits Euro 4 on the import of new and used vehicles. Fiji has ratified its age limit of five years for gasoline fueled vehicles to eight years for diesel vehicles and imposes no excise duty on EVs. By 2030, Fiji plans to have more hybrid and electric vehicles than ICE vehicles in both the private and public sector vehicle stock.

WEAK

Macedonia has a Euro 3 emission standard and an age limit of 12 years, thus permitting older and polluting vehicles to be imported. **Angola** that has a 6-year age limit and no Euro-equivalent standard. Honduras has a 7-year age limit and no Euro-equivalent standard. **Lebanon** has an 8-year age limit and restricts imports of used diesel vehicles. Recently, the government of Lebanon approved the reduction of road-usage and excise taxes by 20 per cent for hybrid vehicles and 0 per cent for electric vehicles in its 2018 budget.

VERY WEAK

Most countries studied fall in the 'very weak' category, with thirty five from Africa, eight from Asia-Pacific, six from EECCA, 15 from LAC and three from Middle East. NOTE TO EDITORS – COUNTRY OR REGION NAMED IS MISSING HERE

18 In addition to this global report, UNEP will also publish five regional used vehicles reports with detailed country analyses for Africa; Latin America and the Caribbean; Asia-Pacific; and Eastern Europe, the Caucasus and Central Asia. These will contain detailed country analyses and are planned to be published Q1 in 2021 on www.unep.org/transport

Democratic Republic of Congo is one of these and has a 20-year age limit and no Euro-equivalent standards, while **Paraguay** has a 10-year age limit and no Euro emission standard. **Georgia**, aiming to incentivize the import of older cars through lower taxation on older vehicles, chooses to focus on engine size. Georgia has one of the oldest imported auto fleets in the world due to an antiquated taxation scheme that favours older imports with significantly lower taxation; the lowest rates of taxation are for vehicles between six to nine years, so the excise tax stimulates the import of older cars, with limited emission controls due to their lower price

BANNED

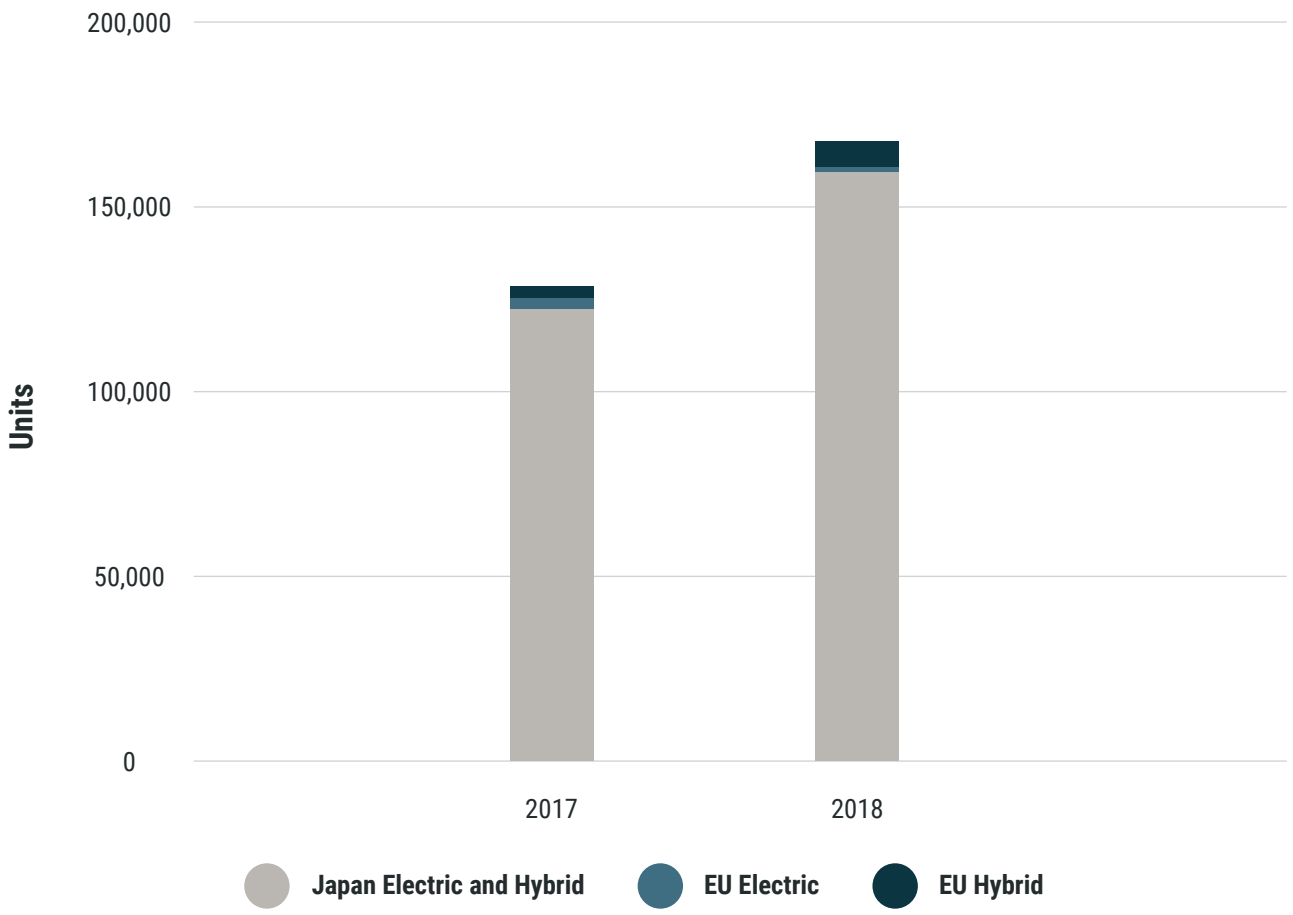
South Africa and **Chile** ban used vehicles for national use, yet have very different vehicle emission standards, with South Africa at Euro 2 and Chile at Euro 5. Despite the bans for national use, both countries are major entry points for used vehicles imported into their regions and for sale to neighbouring countries that do permit their importation. South Africa requires used vehicles destined for other countries to be transported on trucks. In 2018, Chile imported 91,827 used vehicles from the EU, the USA and Japan. The highest amount came from Japan (84,319) and Chile was their 3rd highest global importer of used vehicles. In the same year, South Africa imported 78,871 used vehicles, (77,777 from Japan and 1,094 from the EU).

2.3 Global Trade in Hybrid Electric and Electric Vehicles

Some countries have been providing incentives for the import of used hybrid electric (HEV) and electric (EV) vehicles. While still modest in absolute numbers, the export of these used vehicles has been growing rapidly.

FIGURE 9

Used Electric and Hybrid Vehicle Exports from the EU and Japan, 2017-2018



Source: *UNEP, based on data from the Japanese International Auto Trade Association (iATA), the United States Department of Commerce, Bureau of the Census, Foreign Trade Division & the European Commission- Eurostat Comext Database, 2019*

While new hybrid electric and electric vehicles are still relatively expensive to buy, the price differential can be much reduced with used hybrid and electric vehicles. For example, Japanese used vehicle traders offer used electric vehicles, like the Nissan Leaf, on their websites. These vehicles are close to price parity with similar types of petrol vehicles.

FIGURE 10

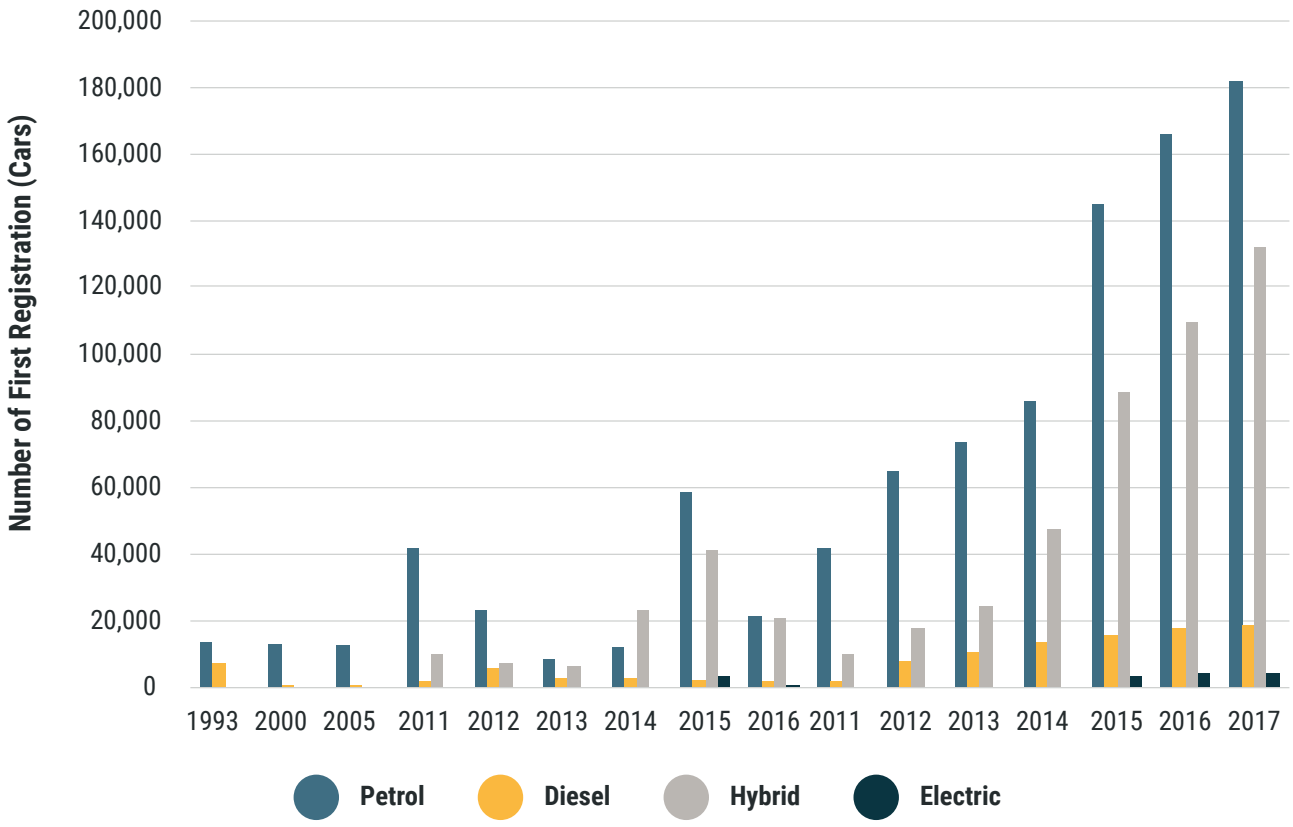
Example of Used Electric Nissan Leaf for Sale Online in Japan

Sri Lanka has the highest amount of hybrid and electric vehicles per capita of any country in the world. It is the second biggest import market for used hybrid and electric vehicles

from Japan (Figure 9). The country adopted a substantial tax reduction for hybrid electric vehicles and in 2015 extended this tax reduction to include full electric vehicles. The country applies higher taxes for diesel cars; hybrid, petrol, and diesel vehicles attract 58 per cent, 253 per cent, and 345 per cent in excise taxes, respectively. Sri Lanka's taxation scheme has resulted in more than 100,000 hybrid vehicles and about 6,000 full electric vehicles by end of 2017 – the vast majority imported as used vehicles. Fuel economy of passenger cars in Sri Lanka improved from 6.4 1/100km in 2012 to 5.31/100km in 2014 (Sugthapala, 2015; 2018). Sri Lanka requires mandatory emission testing and roadworthiness inspection, ensuring that obsolete and outdated vehicles are not allowed on their roads. Figure 11 shows the emergence of hybrid vehicles into the market. While there was a significant increase of full electric vehicles between 2015-2017, this trend was not continued, due to lack of charging infrastructure, concerns in battery life and recycling. Therefore, hybrid vehicles continue to dominate the market, with close to half of the imported LDVs being hybrids. The country is now shifting its attention from importing hybrid vehicles to full electric vehicles and will provide more incentives for electric vehicles.

FIGURE 11

First Registration of Vehicles by Fuel Type from 2008 – 2018 in Sri Lanka



Source: *Thusitha Sugathapala, University of Moratuwa, 2019*

Many countries that have banned or severely restricted the import of used vehicles are now considering allowing the import of used electric vehicles. Egypt and Bhutan initially had complete bans for used vehicles, but over the past years have modified their bans on used vehicles to allow for the import of used electric vehicles. In 2013, Bhutan's government approved the exception of certain vehicles for public use such as ambulances

and firefighting trucks, and in 2014 approved the import of used electric Nissan Leafs with mileage of less than 30,000 km for commercial taxis. In 2018, Egypt made an exception for used electric vehicles less than three years of age and imported 144 used hybrid and electric vehicles that year. Both countries recognize that used EVs are a more affordable opportunity to leapfrog to zero emission vehicle fleets. Mauritius has also seen a rapid increase in the import of hybrid and electric vehicles after the introduction of policies to promote the import of these vehicles. Used hybrid vehicle sales increased from 43 in 2009 to 14,754 by May 2020[19].

19 Mauritius` National Land Transport Authority (NLTA) data base as of May 2020

TABLE 12
Exports of Used Hybrids and EVs from the EU

	2017				2018			
	Hybrid		Electric		Hybrid		Electric	
1	ISRAEL	848	JORDAN	1122	THAILAND	1800	UKRAINE	1020
2	UNITED ARAB EMIRATES	714	BARBADOS	800	SOUTH AFRICA	1658	MOLDOVA	186
3	IRAN	430	MOLDOVA	288	ISRAEL	1316	JORDAN	70
4	MOLDOVA	320	UKRAINE	288	MOLDOVA	426	NEW ZEALAND	36
5	UKRAINE	208	KAZAKHSTAN	74	UKRAINE	260	BELARUS	22
6	JORDAN	134	GHANA	70	IRAN	242	RUSSIAN FEDERATION	20
7	SERBIA	116	ISRAEL	68	UNITED ARAB EMIRATES	218	EGYPT	16
8	ALGERIA	114	RUSSIAN FEDERATION	42	JORDAN	186	SERBIA	14
9	ALBANIA	58	NEW ZEALAND	20	COMOROS	106	ALBANIA	10
10	MALAYSIA	50	SRI LANKA	20	TOGO	72	COMOROS	8

Source: *EUROSTAT (EU), https://ec.europa.eu/eurostat/data/database*

TABLE 13
Exports of Used Hybrids and EVs (together) from Japan

	2017		2018	
1	MONGOLIA	29467	MONGOLIA	37136
2	PAKISTAN	20250	SRI LANKA	29160
3	SRI LANKA	19860	RUSSIAN FEDERATION	21074
4	RUSSIAN FEDERATION	14608	PAKISTAN	16245
5	NEW ZEALAND	7807	NEW ZEALAND	14075
6	SINGAPORE	7201	SINGAPORE	8568
7	MYANMAR	4134	BANGLADESH	7004
8	TRINIDAD AND TOBAGO	3964	FIJI	6450
9	FIJI	3766	GEORGIA	5210
10	GEORGIA	3401	TRINIDAD AND TOBAGO	4197

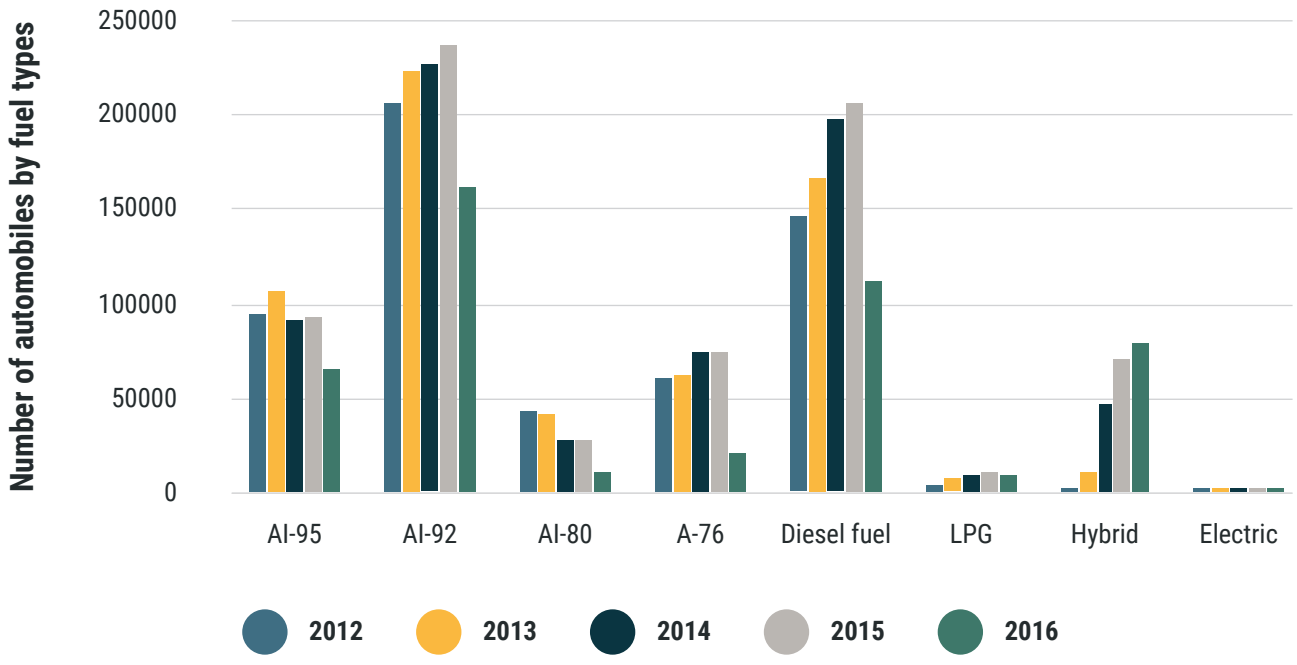
Source: *Japanese Vehicles Export Inspection Center (JEVIC), www.jevic.com*

Mongolia is the prime destination for used hybrid vehicles exported from Japan. It is estimated that more used Toyota Prius vehicles are imported than any other model. Over 99 per

cent of the Priuses in Mongolia are purchased second hand, imported from Japan[20] and more than half of all used vehicles imported in Mongolia are Toyota Prius. Importation of hybrid vehicles tripled from 2012 to 2016, while diesel vehicles imports reduced by a similar share (figure 12). The main reason for the high uptake of used hybrid vehicles is that the Mongolian government does not charge excise tax or air pollution tax on used hybrids.

FIGURE 12

Newly Registered Vehicles in Mongolia by Fuel Type, 2012-2016



Source: *Promoting Cleaner and Efficient Fuels and Vehicles for Mongolia, Developing a Roadmap for Vehicles Emissions Standards and Fuel Quality (2018), Eco Asia Environmental University, Ulaanbaatar, Mongolia*

Ukraine's on-road automobile transport system accounts for more than 9.2 million vehicles, with 6.9 million Light Duty Vehicle (LDVs). It is an old vehicle fleet in need of modernization and imported used vehicles account for the largest part of new annual vehicle registrations (over 60 per cent). In January-February 2020 alone Ukrainians registered 61,000 imported used vehicles, which is almost 4.4 times higher than new vehicle sales (14,000 cars). Ukraine is also a good example how a medium income country can play a meaningful role in the EV revolution. Ukraine imported more used electric vehicles from the EU than any other country (table 12). With Ukraine's electric car ownership increasing steadily, making it one of the fastest-growing EV markets in Europe. Registrations of EVs have steadily increased and by end of 2019, about 11,000 EVs and more than 20,000 hybrid vehicles have been imported to the Ukraine. Over half of EVs on Ukraine's roads are imported used Nissan Leaf vehicles, which cost between US$10,000-15,000. To further promote the import of (used) electric vehicles, the country and the UN Environment Programme (UNEP) are now developing a new programme to improve the public charging infrastructure for EVs. The programme, supported by the Global Environment Facility (GEF), will develop supportive policies, incentives, and strategies to build capacity to scale up the electric

20 See for example: https://www.economist.com/asia/2018/12/22/everyone-in-mongolia-drives-a-prius

mobility market in Ukraine and is due to launch in January 2021.

2.4 Safety Standards

Poor quality used vehicles do not only impact climate change and air quality but also compromise road safety, particularly in low- and middle-income countries which often have "weak" or "very weak" used vehicle regulatory rankings. Road crashes kill an estimated 1.25 million people each year and injure between 20-50 million more. It is the leading cause of death for young people aged 15-29 and the eighth leading cause of death globally (WHO,2018). Ninety per cent of these deaths occur in low and middle-income countries, despite these countries having just 54 per cent of the global vehicle fleet. Africa has the highest road traffic fatality rates with 246,000 deaths occurring each year and this number is projected to increase by 112 per cent, to 514,000 in 2030 (WHO, 2015). This contrasts with the projected reduction in fatalities in Asia-Pacific, Europe, and Central Asia (World Bank, 2014).

Road crashes impose a huge economic toll worldwide, totalling a loss of up to three per cent of the global GDP and up to five per cent of GDP for low and middle-income countries (WHO, 2015). Road traffic injuries are estimated to cost the global economy US$1.85 trillion each year (IRAP, 2015). Road injuries and losses in many countries are not mitigated by adequate insurance coverage or social safety nets, and families can be left with crippling health care costs and the loss of primary income earners. The highest burden of death and long-term disability is on adults in their prime working age. An estimated 12-70 million people are kept in poverty each year due to road traffic injuries and fatalities (iRAP, 2015).

Used vehicles often have compromised roadworthiness and crashworthiness in direct relation to their age, degree of wear and tear and technical design (Cosciug, Ciobanu & Benedek, 2017). The informal character of the used vehicle trade further perpetuates the import of vehicles with mechanical and safety defects. Although there are several factors that influence road safety and reliable data on road traffic injuries is scarce, there is increasing evidence on the links between road safety and used vehicles (Alloweg, Hayshi and Hirokazu 2011).

Studies have shown that passengers of older vehicles with greater wear (e.g. higher mileage, undisclosed crash damages) have an increased risk of injury compared to passengers of younger vehicles. A study by the Monash University Accident Research Centre based on data from New Zealand found that there was an overall increase in vehicle crash risk with increasing vehicle age. The increase in risk with each added year of vehicle age was estimated to be 7.8 per cent (Keall, et al., 2012). Many countries with "very weak" or "weak" used vehicle regulatory rankings such as Malawi, Nigeria, Zimbabwe, and Burundi also have a very high road traffic death rate. Liberia, which has the highest rate of road traffic deaths in the world (35.9/100 000), imports vehicles from the Monrovia port that are up to 10 years old.[21] By contrast, Chad, which is one of the few African countries with a 'good' ranking has a 27.6/100 000 road traffic death rate and does not accept vehicles more than five years old.

There is an opportunity in the near-term to reform national policies around the standardization of vehicle safety. This is particularly true in low-and middle-income countries where vehicle growth is largely comprised of used imports from countries that already mandate UN vehicle safety performance standards. Compliance with globally harmonized vehicle safety performance standards provides demonstrable evidence that it significantly lowers the risk

21 Administrative Regulation PG/NO.002/82997 indicates that "no used vehicle imported into the commerce of Liberia shall be older than 10 years." http://mot.gov.lr/doc/ADMINISTRATIVE%20REGULATION%20%20AA%20June%2017,%202016%20-%20Copy.pdf

of road crash deaths and serious injuries for vehicle occupants. It also reduces serious injuries for non-motorized crash victims particularly in Africa where cyclists and pedestrians make up to 44 per cent of road deaths (WHO, 2018). Vehicle importing countries like New Zealand have demonstrated the effectiveness of performance-based policy interventions on vehicle imports and on the overall improvement in road injury performance of imported vehicles. Vehicle safety related performance standards can be broadly categorized into two parts, vehicle crashworthiness and vehicle roadworthiness.

Roadworthiness safety standards address the ability of a vehicle to avoid or mitigate the severity of a crash (either with timely driver intervention or automated). Roadworthiness is conventionally facilitated by the braking system, lighting and visibility, tyres, and the steering system. These features are standard in modern vehicles, but they still need to be periodically inspected and maintained. Most countries around the world have systems to maintain roadworthiness safety standards, but not all have crashworthiness standards. While comprehensive data is not available, there are indications that a large share of used vehicles being exported to low- and middle-income countries do not have valid road worthiness certificates when they are exported (see next chapter).

The roadworthiness performance standards are intended to ensure that all (used) vehicles entering a country adhere to a minimum standard of safety performance. The testing protocol may be combined with exhaust emission and noise pollution along with compliance to safety performance standards. Normally vehicles are tested annually and provided with a road worthiness certificate when they pass the test[22].

Crashworthiness test standards are mainly based on crash-testing of a vehicle during the preproduction phase to determine the crashworthiness performance or ability to mitigate the severity of injury for an occupant or outside road-user during a crash. In addition to crash test performance, certain safety features such as seat-belt system, airbags, and electronic stability control may also be included.

Wrong- vehicle configuration is a large contributing factor to accident risk. Large blind spots occur, especially when overtaking or changing lanes. Regulation varies substantially across countries, ranging from total bans to no limitations. Japan Right-Hand-Drive (RHD) vehicles are imported to countries with Left-Hand-Drive (LHD) systems and vice-versa. For example, Chile bans used vehicles for national sales, but it is one of the major importers of Japanese vehicles. This apparent discrepancy arises because Chile allows used vehicles to be imported if they are then re-exported to neighbouring countries without a ban. Yet, these countries such as Paraguay are LHD. Some LHD countries, such as Brazil, Poland, and Slovakia, ban the import of RHD used vehicles. Similarly, Myanmar, Kenya, New Zealand, and Singapore ban LHD imports. In 2009, Samoa switched to driving RHD to make it more economical to buy Japanese used vehicles. Wrong-hand drive vehicles are a major road-safety issues in the former Soviet Union. These countries have right-hand traffic but experienced an import of cheap Japanese RHD imports. In 2015, around one of four registered vehicles in Georgia was RHD. Similar trends apply to Kyrgyzstan and Russia.

New Zealand does not have a major vehicle manufacturing industry and thus relies heavily on the import of used vehicles primarily from Japan, Australia, and the United Kingdom.

22 Roadworthiness standards normally cover: Tyres; Brakes; Structural conditions (corrosion and rusting); Loading and towing requirements; Lighting; Glazing condition; Door and locking mechanisms; Safety belts, Airbag operations (if fitted); Speedometer and odometer; Steering and suspension; Fuel system integrity

New Zealand is a good case study as it has one of the safest fleet ratings regarding crashworthiness. The New Zealand Transport Agency has highly rigorous measures to ensure that imported used vehicles are safe for both occupants and other road users and has established import standards for all categories of new and used vehicles.

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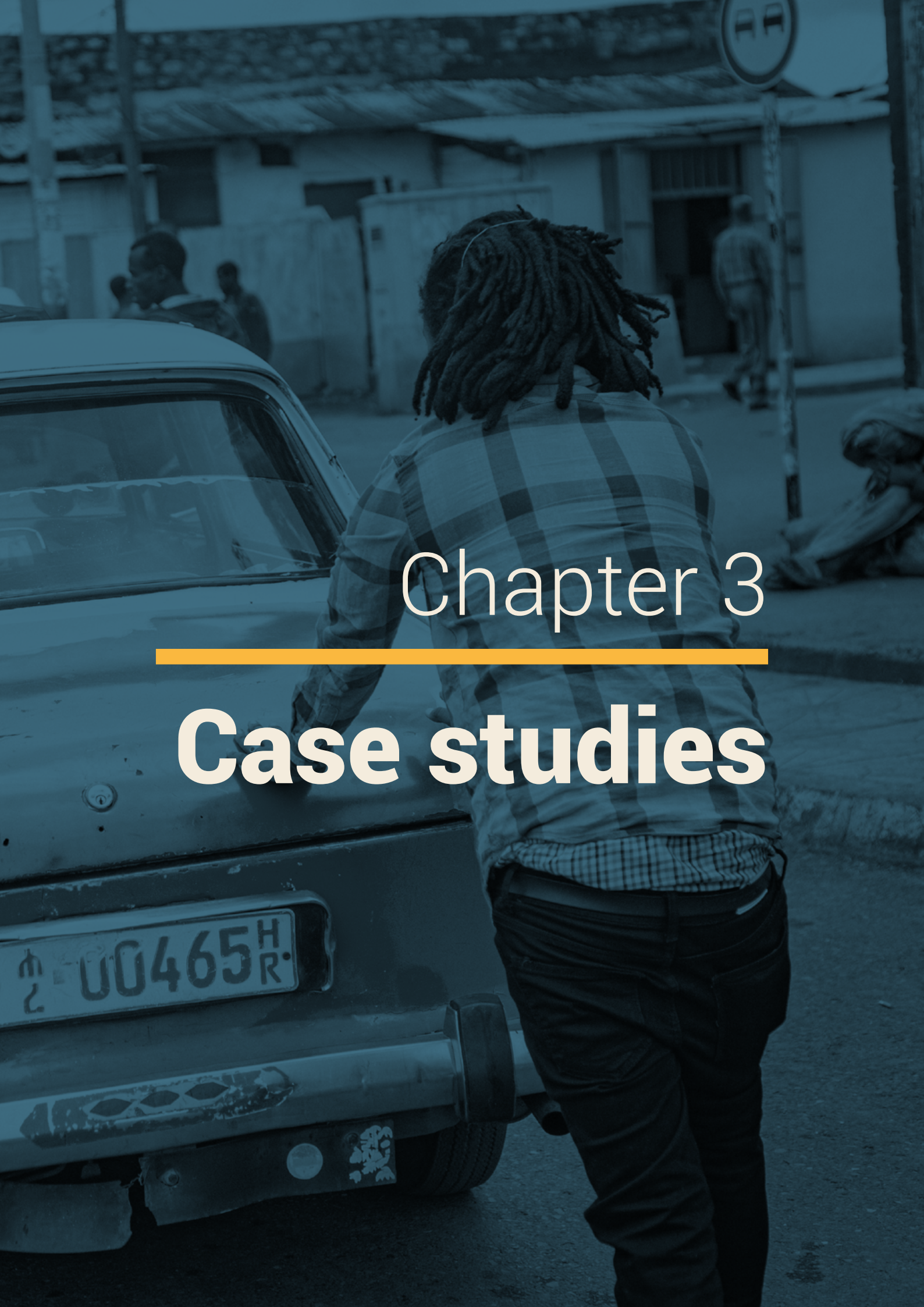

Chapter 3

Case studies

This chapter will provide three case studies. One, an importing, developing country – Kenya; the other a major exporter in the EU - the Netherlands; and Mauritius to show how an importing country can regulate the quality of used vehicles with 'strong' policies.

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3.1 Import Case study: Kenya

3.1.1 Characteristics of Kenya's Vehicle Imports

Since the liberalization of the automotive industry in Kenya in the 1990's, Kenya largely relies on used vehicles to meet vehicle demand. In fact, over 95 per cent of all light duty vehicles imported in Kenya are used vehicles. These vehicles come from Japan, United Kingdom, United Arab Emirates, Singapore, Thailand and South Africa. The largest source being Japan where vehicles are right hand drive (RHD).

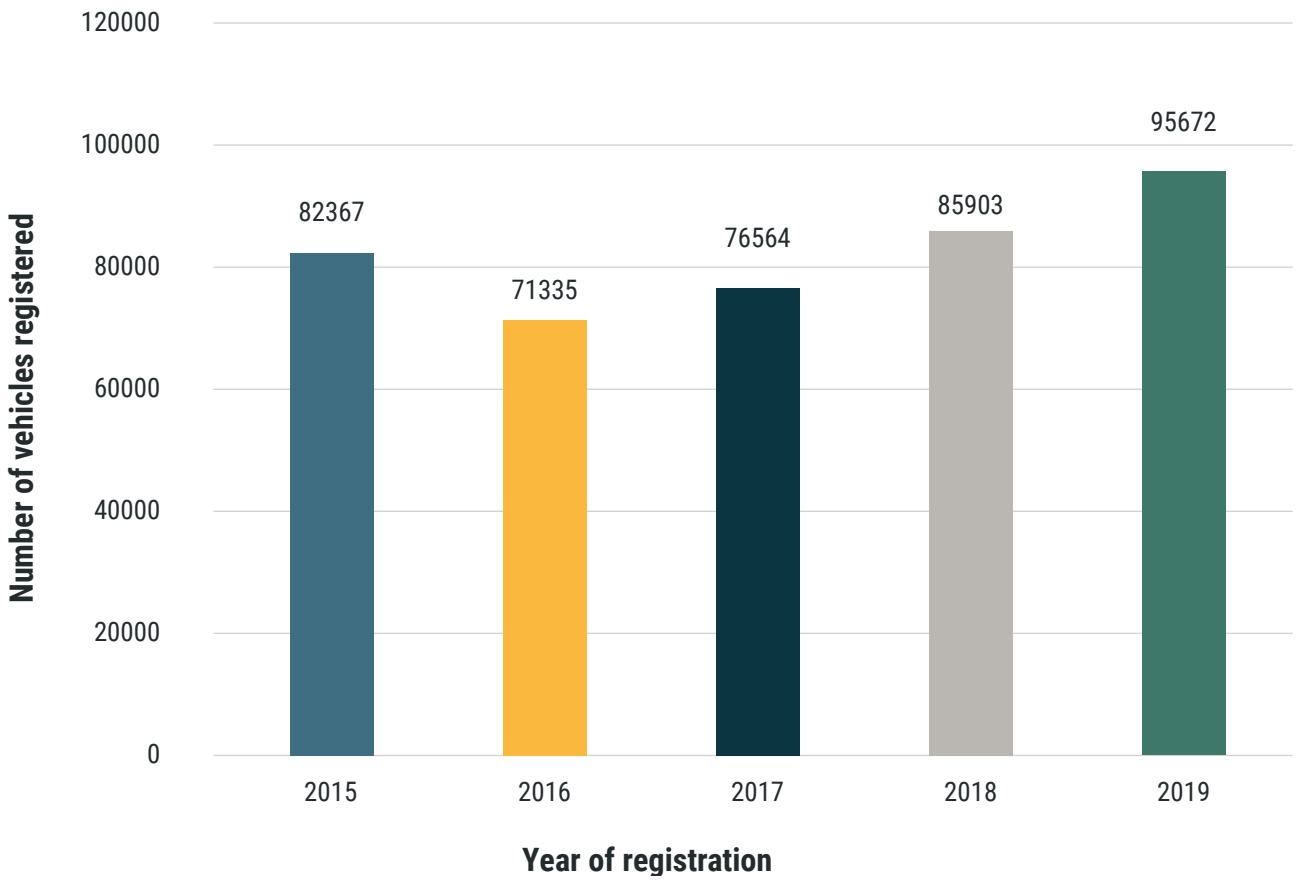
Most used vehicles are imported through vehicle dealers. However, increasingly vehicles are being imported by individual citizens through the internet. There is significant year-on-year growth in the automotive industry with the number of newly registered motor vehicles increasing by more than 10 per cent since 2017 (KNBS, 2020. Economic Survey 2020, Nairobi Kenya: Kenya National Bureau of Statistics)

TABLE 14
Total Light Duty Vehicle Registrations

Type of Vehicle	2015	2016	2017	2018	2019
Saloon Cars	14369	12490	11376	10504	9971
Station Wagons	54120	46123	55322	64179	75512
Panel vans , pickups etc	13878	12722	9866	11220	10189
Total Registrations	82367	71335	76564	85903	95672

Source: *Kenya National Bureau of Statistics, Economy Survey 2020*

FIGURE 13
Annual LDV Registrations in Kenya

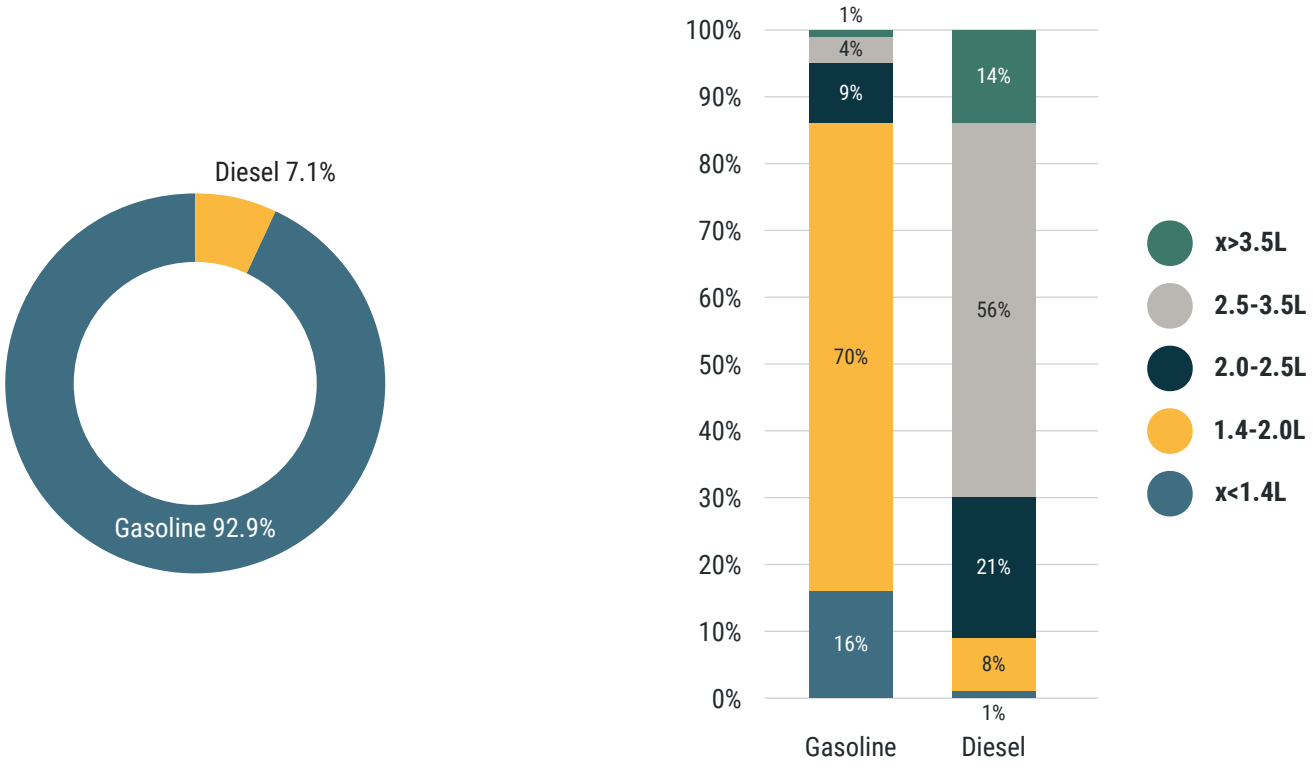


Source: *Kenya National Bureau of Statistics, Economy Survey 2020*

More than 90 per cent of all imports are petrol vehicles (figure 14) with most of the vehicles having an engine capacity of between 1400- 2000 cc.

FIGURE 14

Split of Vehicles by Powertrain and Split of Vehicles by Engine Size (2016)



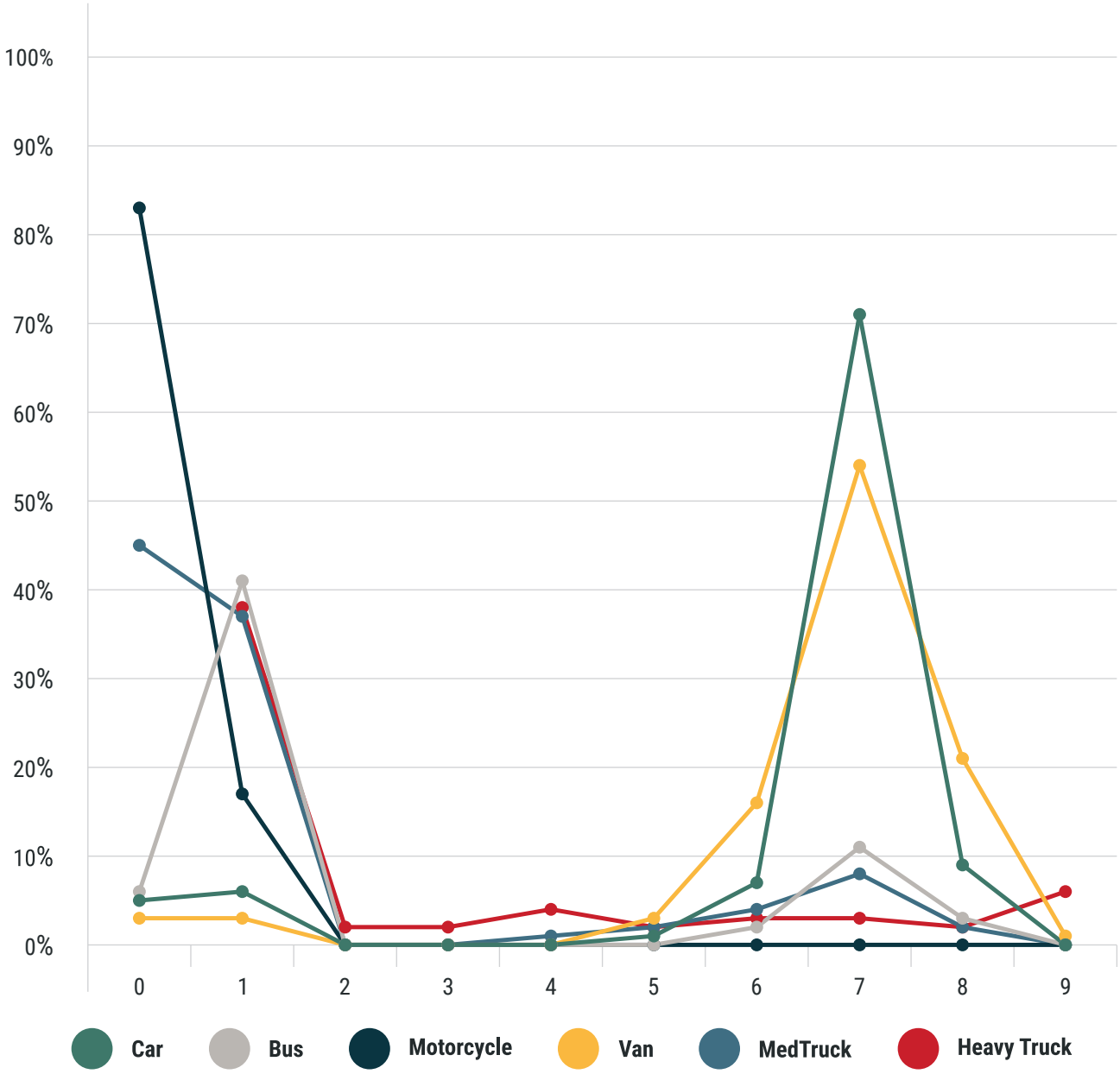
Source: *Kenya Energy Regulatory Commission, 2018*

Age profile of vehicles

Kenya has adopted an age restriction of eight years. About 80 per cent of all vehicles imported are between seven and eight years old from date of manufacture (figure 15). The second largest import group are vehicles (both LDV and HDV) that are one to two years old. As a result, Kenya has a relatively modern and clean fleet, especially compared to other countries in East Africa. To benefit from the import of used vehicles not older than eight years, Kenya introduced clean fuels standards that ensure the correct fuels are available for these vehicles. Kenya introduced low sulphur fuels of max 50 parts per million (ppm) in 2015.

FIGURE 15

Age Profile of Newly Registered Vehicles in 2015



Source: *World Bank, Motorization Management in Kenya, 2017*

The average unit cost of an imported road motor vehicle in 2019 was US$8,382 as compared to US$ 9,080 in 2018 (KNBS, 2020. *Economic Survey 2020,* Nairobi Kenya: Kenya National Bureau of Statistics)

3.1.2 Key Requirements of Used Vehicle Imports

The following are the requirements for the import of used vehicles in Kenya.

- **Age – maximum eight years**

Imports of road vehicles which are more than eight years old from the date of manufacture is not allowed. In addition, the difference between the year of manufacture and the year of first registration has to be no more than one year.

- **Roadworthiness – pre-export verification**

The Kenya Bureau of Standards requires that all vehicles imported to Kenya go through a pre-export verification of conformity to the KS 1515:2000 standards (Kenya Standard Code of Practice for Inspection of Road Vehicles). The Kenya Bureau of Standards has pre-approved several companies/agencies to carry out pre-shipment inspections on all vehicles shipped to Kenya from exporting countries. The safety checks cover steering control, tyre condition, electrical wiring, equipment and lighting system, braking systems and components, suspension system, windscreen glass and the general condition of the vehicle structure. It is worth noting that there is no requirement that vehicles meet crashworthiness criteria. Even though there is the requirement that vehicles have functional seat belts, presence of airbags is for example not a requirement. A Certificate of Road Worthiness, valid for six months, is issued once a vehicle has been confirmed to be compliant.

However, while there is issuance of certificate of roadworthiness from the exporters side, there is no mechanism from the importing side to confirm that all vehicles indeed comply to the requirements.

- **Emissions standards**

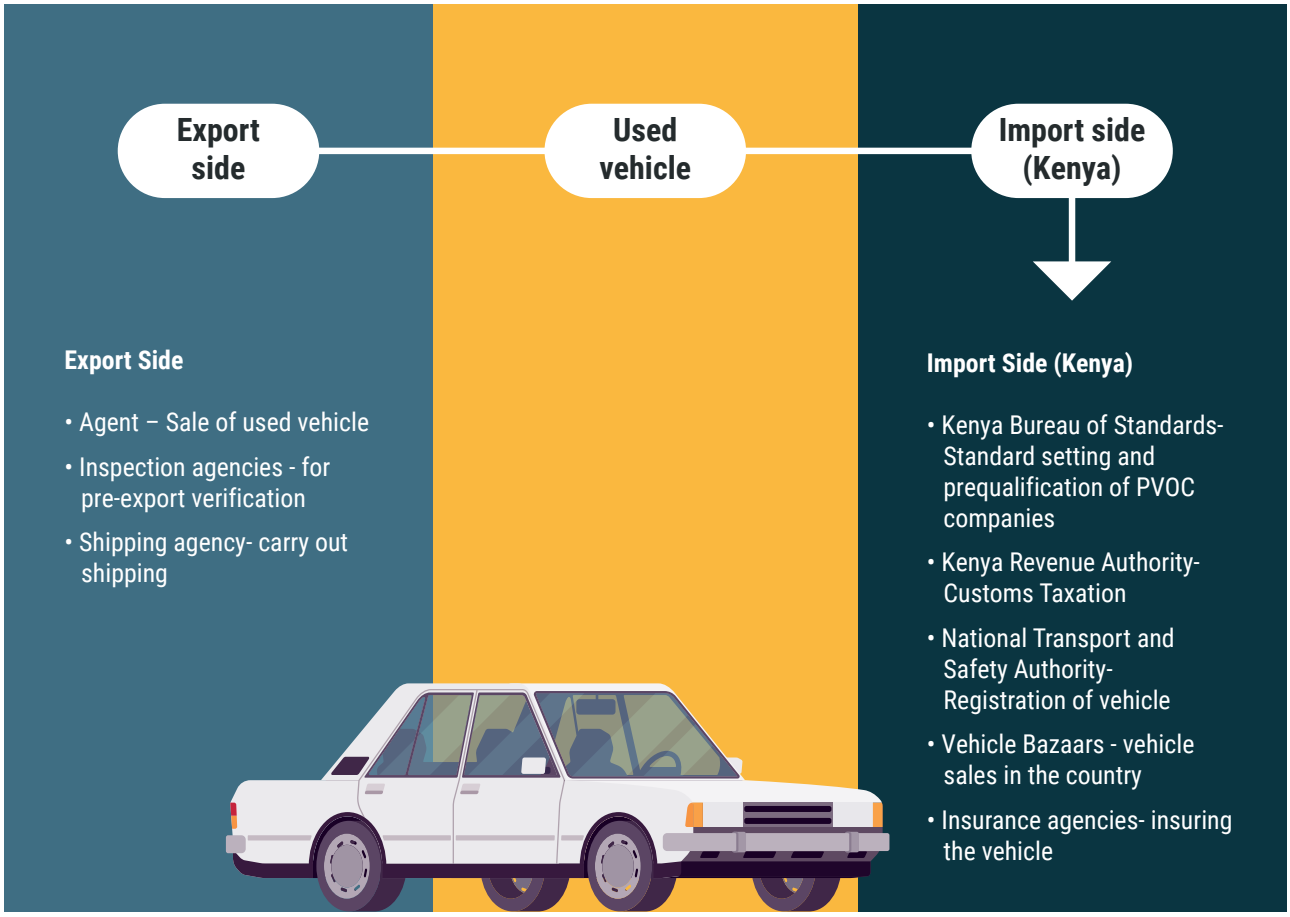
In 2019, Kenya adopted EURO 4/IV vehicle emission standards that will apply to all vehicles, new and used, imported, and locally produced. However, the implementation modalities are still being worked out by a multi-stakeholder team. Under discussion is the 2-year waiver requested by local vehicle producers to meet these regulations. Age limit could play a key role in facilitating a shift to stricter vehicle emission standards. As a result of the Kenyan used vehicles age limit, all used petrol cars imported in 2015/16 period were Euro 4 and 5, with the far majority, 115,000 out of 120,000 imported LDVs being Euro 4. For diesel vehicles 85% percent were Euro IV, V, and VI (28,000 out of a total imported 33,000).

- **Taxation – no specific arrangements for used vehicles**

All vehicles owners in Kenya are required to pay several taxes as a percentage of the vehicles customs value before the vehicles can be registered. These are: import duty (25 per cent), Excise Duty (between 20-30 per cent) depending on vehicle engine capacity), Value Added Tax (16 per cent), Import Declaration Fees (two per cent), and Railway Development levy (1.5 per cent). Electric vehicles have a reduced Excise Duty (10 per cent).

There are no restrictions on imports based on vehicle mileage.

FIGURE 16
Stakeholders in the Used Vehicle Market Kenya



Source: *Compiled by UNEP, July 2020*

3.1.3 Comparison Kenya, Uganda, and Rwanda

The East African sub-region has no harmonized approach to regulate the import of used vehicles (largely from Japan). Most used vehicles are imported through Mombasa in Kenya and, to a lesser extent, the Dar es Salaam in Tanzania before they are transported to landlocked countries of Uganda, Burundi and Rwanda.

While Kenya has a maximum used vehicle import age limit of eight years, other countries in East Africa do not. In 2018, the average age of imported used vehicles in Rwanda and Uganda was above 15 years; while the average age of imported used vehicles in Kenya's was 7.2 years. Over the years the average age of used vehicles imported in Uganda has increased from 8.1 to 15.4 years (table 12). In 2018 Uganda adopted a 15-year age limit for used light duty vehicles and in 2019 Rwanda adopted Euro 4/IV vehicle emission standards.

TABLE 15
Average Used Vehicle Import Age by Fuel Type and Engine Capacity in Uganda

	Diesel				Petrol			
Engine CC	**2005**	**2008**	**2011**	**2014**	**2005**	**2008**	**2011**	**2014**
500-1200	14.0		6.4	16.1	13.5	11.9	14.3	16.3
1201-1500	12.0	8.0	5.0	14.8	10.8	12.4	13.1	15.8
1501-2000	8.8	13.5	17.1	18.5	10.4	11.9	13.1	15.7
2001-2500	9.3	6.5	3.9	8.6	7.3	8.6	11.3	13.6
2501-3000	5.8	9.3	11.1	16.6	9.2	9.9	12.5	14.7
3001-3500	4.1	5.4	6.3	15.8	4.5	9.5	11.6	13.5
3501-4000	14.2	17.9	20.5	22.7	11.0	8.5	7.0	11.2
4001-5000	7.7	8.1	8.9	16.2	4.8	7.8	10.4	12.3
>5000	9.6	12.8	12.0	15.9	4.0	8.8	8.6	6.3
Average Age	8.1	10.3	10.6	16.4	10.4	11.7	12.8	15.4

Source: *Mutenyo, J. et al., 2015, Uganda Fuel Economy Baseline*

UNEP has completed a study on the emissions of these fleets. It shows that there is a strong correlation: the high age of used vehicles imports has resulted in a relative old fleet in these countries and these older vehicles are less fuel efficient and have higher emissions. The average efficiency/ CO_2 emissions of vehicles in Kenya is up to 25 per cent better compared to the two other countries.

The following are estimations of average vehicle fuel consumption and CO_2 in the three countries, based on measurements and estimations.

TABLE 16
Estimated Fuel Consumption and CO_2 Emissions of Vehicles in Three East African Countries

Country	Fuel Economy L\100km	CO_2 Emissions gCO_2/Km
Kenya	7.4 L 100Km	177.4 gCO_2/Km
Rwanda	9.2 L/100Km	220 gCO_2/km
Uganda	9.5L/100Km	313.9 gCO_2/Km

Source: *UNEP GFEI country data bases (2015, 2017, 2019)*

Regional Initiatives towards harmonization of vehicle emission standards

In 2015, the East Africa Community (EAC) adopted low sulphur diesel fuel standards (of 50 parts per million or less). In 2019 the region also adopted low sulphur petrol fuels (also 50ppm)[23]. The availability of high-quality fuels has influenced a discussion towards the adoption of regionally harmonized vehicle emission standards to maximize the benefits of better fuel. The EAC has developed draft vehicle emission standards which require all new vehicle registrations (both new and used vehicles) meet a minimum of Euro 4/IV equivalent standards. At the publishing of this report, the draft vehicle emission standards are being reviewed by the East Africa countries after which they be will adopted regionally.

3.2 Export Case Study: the Netherlands

The government of the Netherlands has been reviewing its export of used vehicles to Africa and will be issuing a report with its findings[24]. In December 2019, the Human Environment and Transport Inspectorate (ILT) of the Dutch Ministry of Infrastructure and Water Management studied the export data for 2017 and 2018 and tested over a hundred vehicles onsite in the port of Amsterdam, prior to export.

The Netherlands is an important exporter of used vehicles. These are not only Dutch vehicles, but also vehicles from other EU countries being exported through Amsterdam and Rotterdam. In 2018 the Netherlands exported 345,000 used light and heavy-duty vehicles. Most of these vehicles are exported to other EU countries. More used vehicles are exported than are being scrapped and dismantled (in 2018: 256,000 vehicles).

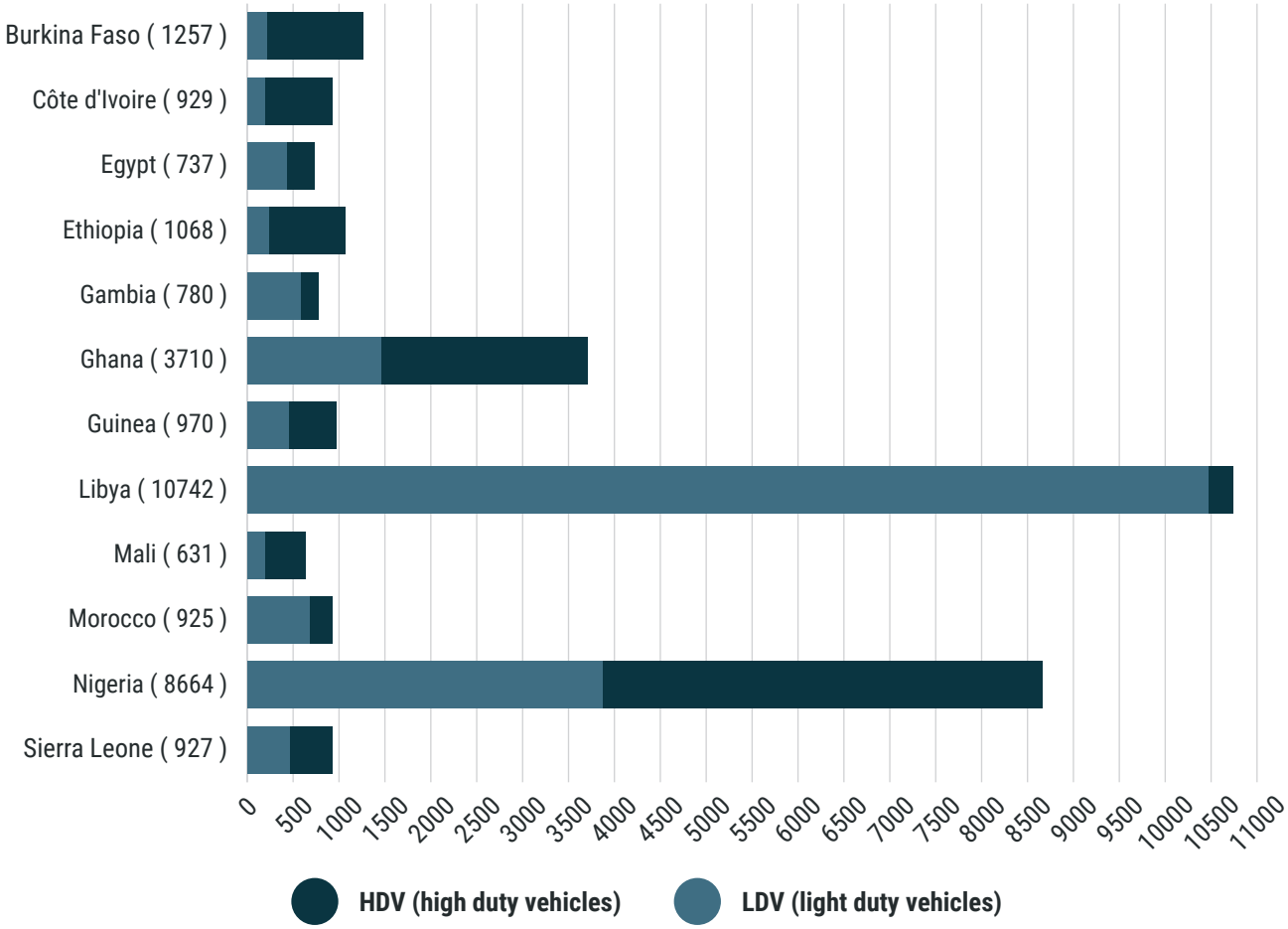
3.2.1 Characteristics of Netherlands Export to Africa

Customs data shows that in 2017 and 2018, a total of 83,000 vehicles were exported from the Netherlands to countries outside of the EU: of these, close to 35,000 used vehicles were exported to Africa; 21,533 to West Africa; 13,148 to North Africa. Figure 17 shows the main destinations, with Libya, Nigeria and Ghana being the top three. Some countries are also gateways for re-export of used vehicles within their (sub)region. For example, Libya seems to function as an important gateway for used vehicles moving to other countries in the region, like Sudan, Chad, Niger, and possibly up to West African countries, like Nigeria and Mali.

23 Data from Kenya Pipeline Corporation shows that since the introduction of the 50ppm standard the region has actually been receiving 15 or 10 ppm sulfur fuels

24 Used Vehicles Exported to Africa, Netherlands Human Environment and Transport Inspectorate, Ministry of Infrastructure and Water Management, Dutch Government, 2020

FIGURE 17
African Destinations of Dutch Used Vehicles Exports



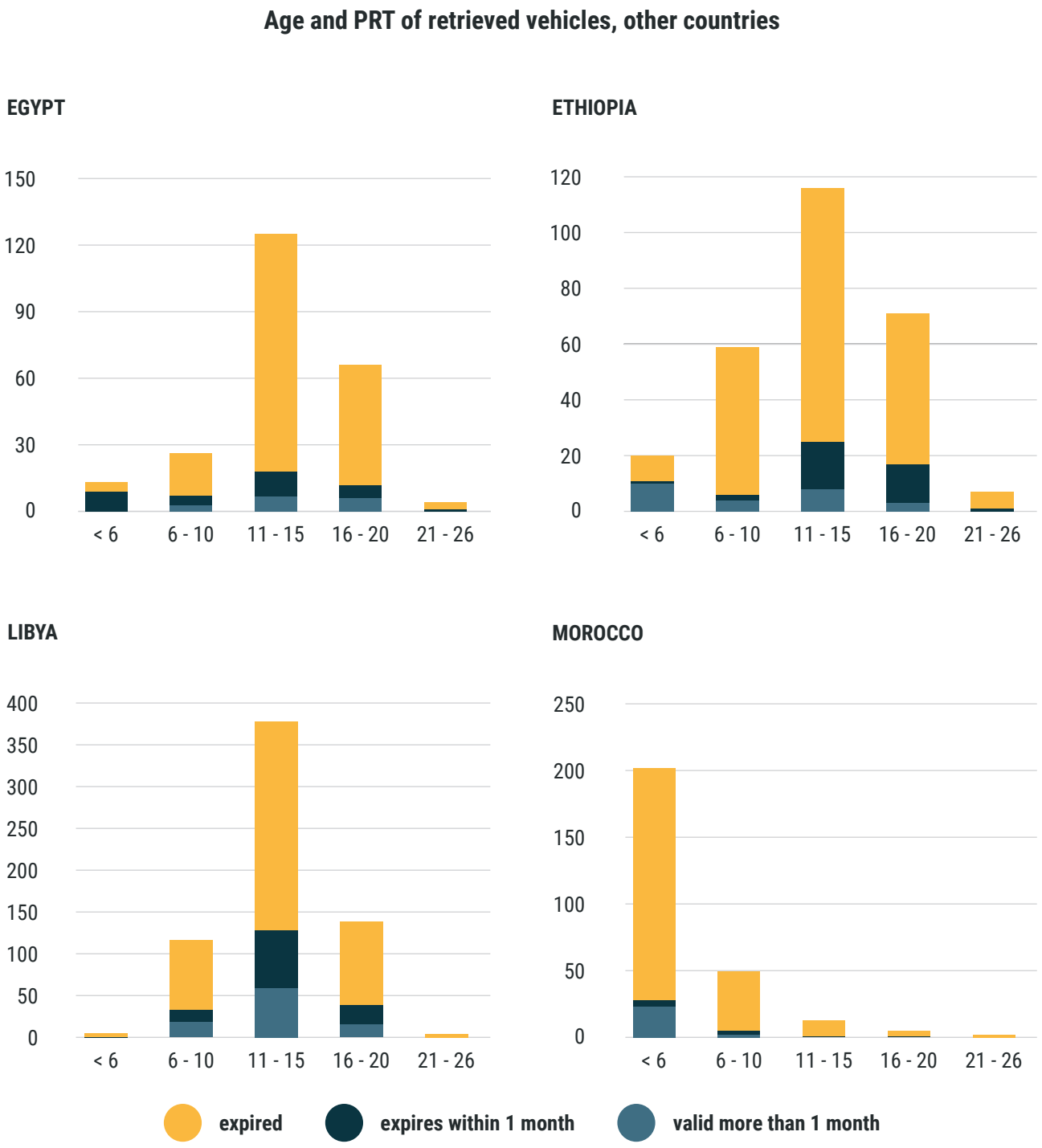
Source: *Used Vehicles Exported to Africa, Netherlands Human Environment and Transport Inspectorate, Ministry of Infrastructure and Water Management, Dutch Government, 2020*

3.2.2 Key Findings of Used Exports Review

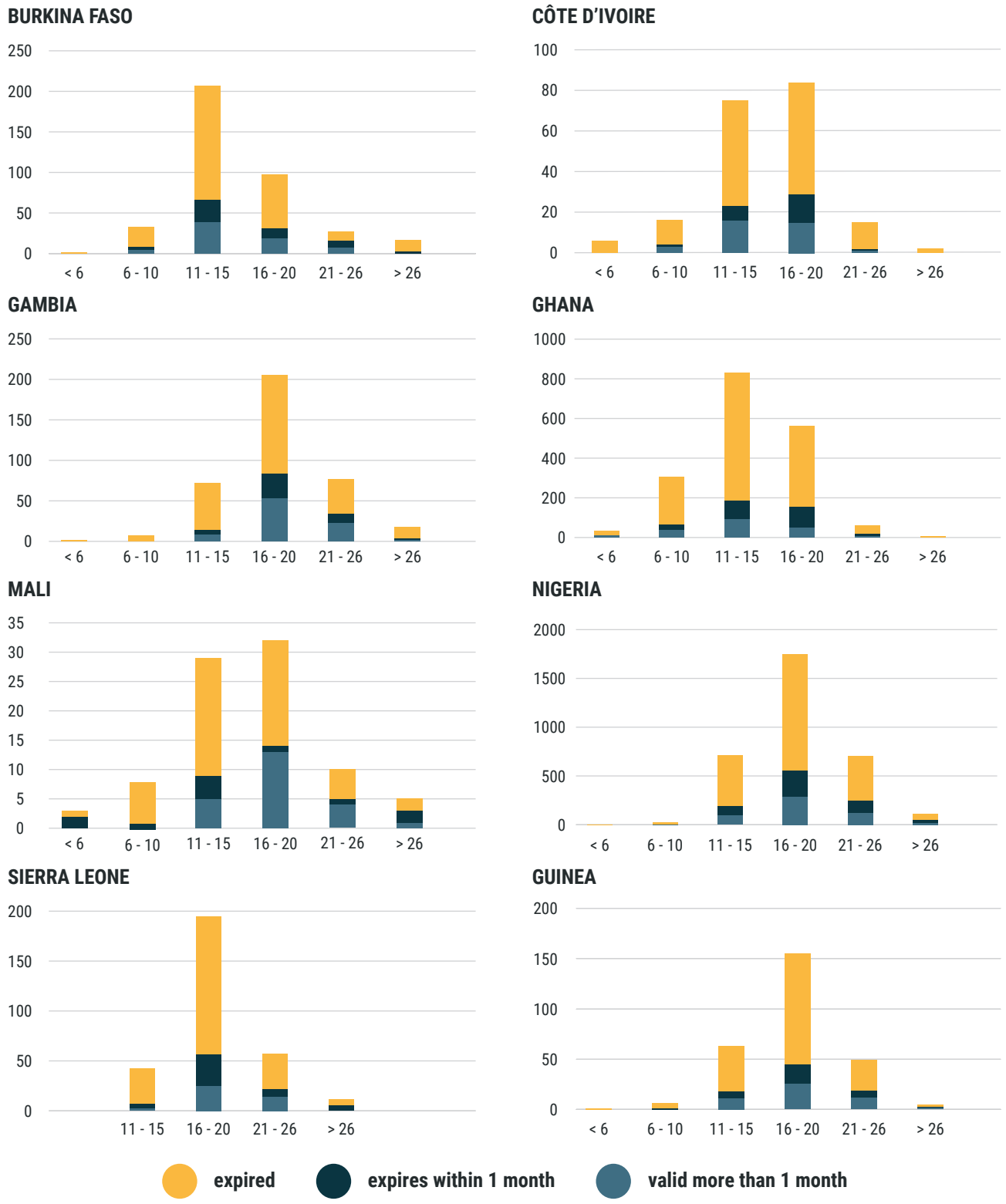
The following is a summary of the key findings of the analyses of the 2017-2018 export of used vehicles from the Netherlands to Africa.

FIGURE 18

Age and Roadworthiness Status of Used Vehicles Exported from The Netherlands 2017-2018



Age and PRT of Retrieved Vehicles, West Africa



Source: *Used Vehicles Exported to Africa, Netherlands Human Environment and Transport Inspectorate, Ministry of Infrastructure and Water Management, Dutch Government, 2020*

Roadworthiness

- Most used vehicles exported to Africa do not have a valid roadworthiness certificate[25]. Figure 18 shows the share of used exported vehicles that have a valid roadworthy certificate (PRT = periodic roadworthiness tests).

Age

- The oldest light duty vehicles – with an average age of 18.8 years - are exported to The Gambia.
- Other countries also see large numbers of old vehicles; for example a quarter of vehicles exported to Nigeria are 19.6 years and older.
- The youngest vehicles go to Morocco; the average age of vehicles exported to Morocco is just over 4 years. As a result, these vehicles comply to Euro 5 & 6 standards.
- Used vehicles exported to Ghana, Ethiopia and Egypt are around 12-13 years old.
- In some cases, age restrictions are not complied with.

Mileage

- Most vehicles exported to the top African destinations have mileages of over 200,000 kilometres
- There are indicators that some odometers of vehicles have been tampered with and reversed.

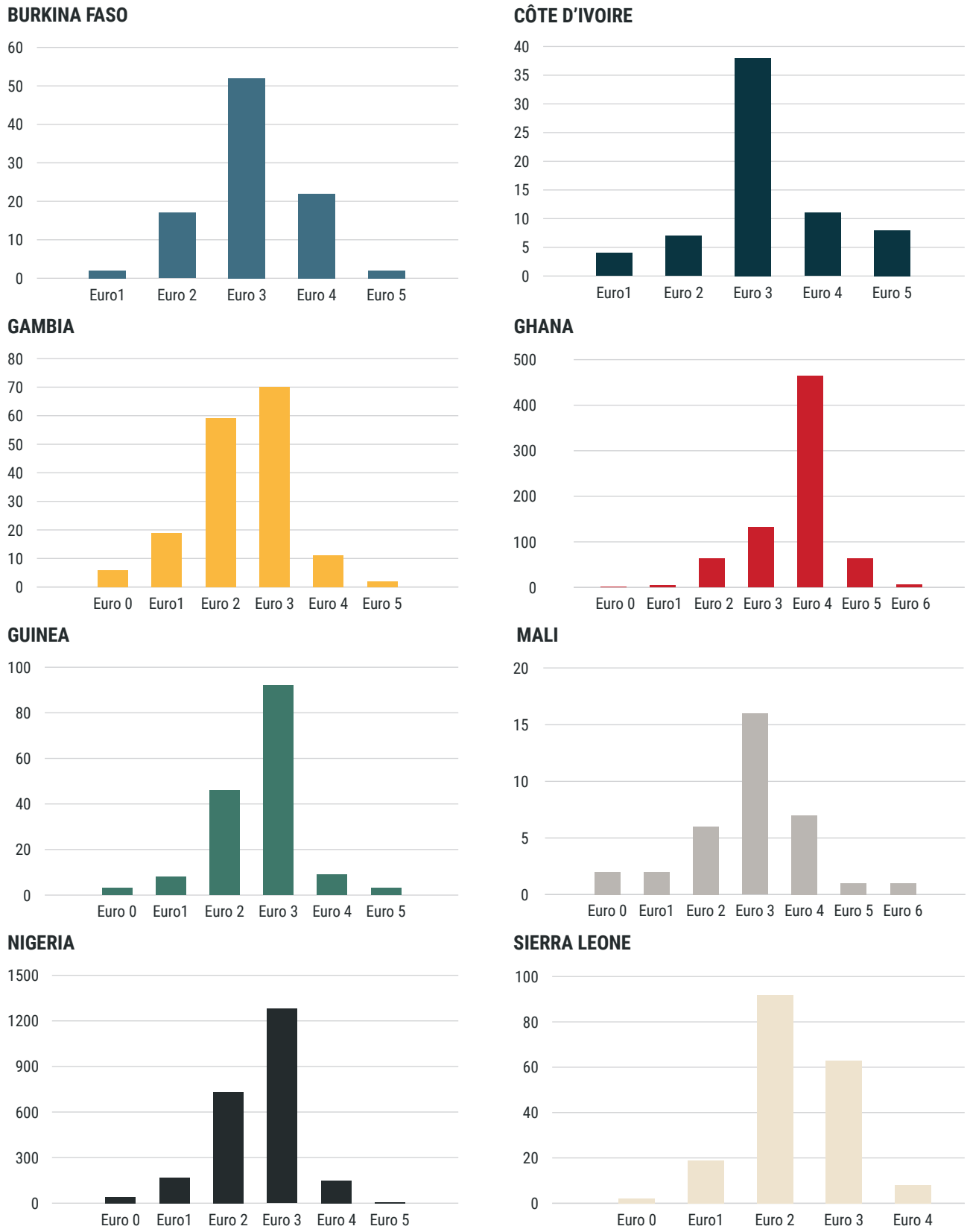
Vehicle Emissions Standards

Most of the vehicles exported from the Netherlands to African countries meet Euro 1, 2 or 3 standards. Ghana and Morocco are exceptions that have policies in place that attract better quality used vehicles. Most vehicles exported to Ghana meet Euro 4 standards and most vehicles to Morocco are Euro 5. Ghana has a graduated tax that restricts vehicles over 10 years and introduced Euro 2 vehicle emission standards in 2019; and Morocco has an age restriction of five years and Euro 4 vehicle emission standards, which was introduced in 2011.

25 In the Netherlands, and similarly in other European countries, vehicles need to undergo regular inspections that determine the safety and environment emissions. If a vehicle fails the inspection it is deemed unroadworthy and not allowed to be driven on the roads until the problems have been fixed and the vehicles are re-tested and certified as road worthy.

FIGURE 19

Vehicle Emissions Standards of Used Petrol Vehicles Exported from the Netherlands to West Africa in 2017-2018



Source: *Used Vehicles Exported to Africa, Netherlands Human Environment and Transport Inspectorate, Ministry of Infrastructure and Water Management, Dutch Government, 2020*

The Dutch government compared used vehicles being exported to Africa with the vehicles being scrapped in the country. It was found that the two groups of vehicles were very similar. It was also found that a group of vehicles that was deregistered for dismantling was exported to African countries.

The West African regional block (Economic Community of West African States – ECOWAS) recently approved Euro 4/IV minimum vehicle emission standards with a recommended 5-year age limit for LDVs and 10-year age limit for HDVs. Countries in the region will have a 10-year period to reach this recommended age restriction. These standards are expected to come into force 1 January 2021. Most vehicles exported to ECOWAS countries from the Netherlands currently do not meet these minimum standards.

3.2.3 Findings of Field Inspection

In addition to a desk study of used vehicles being exported to Africa in 2017 and 2018, the Human Environment and Transport Inspectorate (ILT) in cooperation with the Netherlands Vehicle Authority (RDW) also inspected a sample of vehicles being exported to Africa.

In December 2019 they tested 160 vehicles in Amsterdam that were ready for export to Africa. The inspection focused on emissions and proper functioning of emissions control technologies. It also checked the technical state of the vehicles, including some of the safety features, for example the presence and operation of ABS and airbags systems. Sixty-one per cent of the vehicles inspected came from the Netherlands, 30 per cent from Germany and the rest from other European countries.

While general conclusions cannot be drawn from a limited sample of some 160 vehicle inspections, some key findings complement the 2017 and 2018 desk study:

- One fifth of the vehicles were completely worn out, often too dirty to enter, and some were found to be wrecks. Many vehicles would not start, overall, only 88 petrol vehicles, out of 122, were able to be tested.
- Two-thirds of the vehicles did not have a valid road worthiness certificate.
- The average age of all vehicles tested is 18.2 years.
- Of the vehicles tested, 93 per cent of the petrol vehicles were Euro 3 or below. Only seven per cent had a Euro 4 or higher standard.
- Of the petrol vehicles tested, about 20 per cent had a problem with the emissions control system.
- Nine petrol vehicles had their catalytic converters removed.

Above photos: *Used Vehicles Exported to Africa, Netherlands Human Environment and Transport Inspectorate, Ministry of Infrastructure and Water Management, Dutch Government, 2020*

Observations were also made on road safety. It was found that from 96 inspected petrol vehicles, 44 per cent did not have clear deficiencies. Deficiencies included antilock braking systems (ABS) missing or not working, corrosion to critical parts, and missing or faulty airbags (one out of 8 vehicles had missing or faulty airbags).

3.3 Impact of Used Vehicles Policies Case study: Mauritius

Mauritius is an interesting case in the sense that it reflects many of the transport challenges faced by other African countries, such as worsening congestion, air pollution and traffic accidents. The country registered a total of 587,141 vehicles in May 2020[26].

Mauritius' ambition is to improve the quality of its fleet through enforcement of strict vehicle and fuel standards. Mauritius has adopted diverse strategies to regulate vehicle imports, including age limit, and emissions-based and engine size-based taxation. The country allows used vehicles not older than three years to be imported. This has enabled the country to maintain a younger fleet of vehicles with the majority being below five years old. Furthermore, in July 2011, Mauritius introduced a CO_2 levy/rebate scheme, which was suspended in 2016 due to the controversy of comparing Mauritius CO_2 emission with the international CO_2 standards (Khadun[27], 2016). As an alternative, the country is now levying taxes according to the engine size (i.e. the bigger the engine the higher the tax as engine size is correlated to fuel consumption).

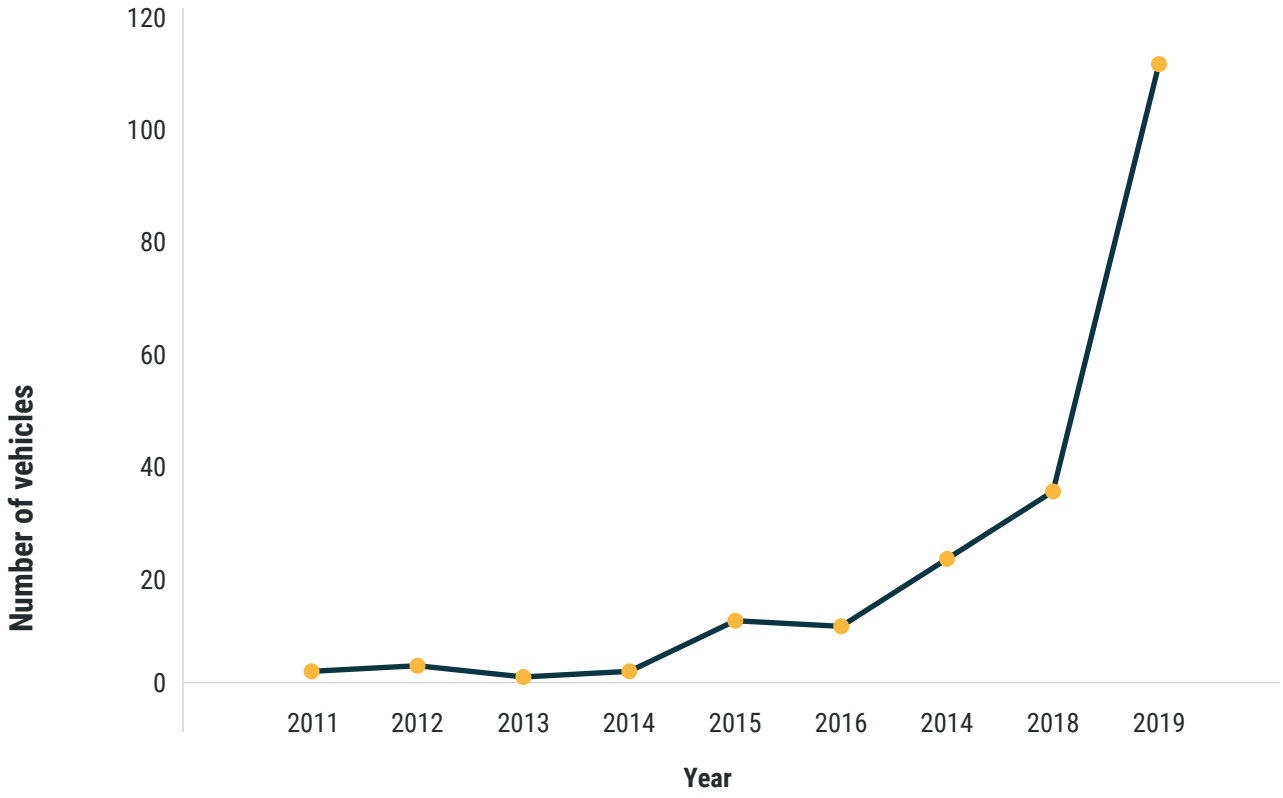
Mauritius has also set up a verification system for imported vehicles. This process demands for multiple documents including: an import permit; an inspection certificate from a competent authority to certify that the vehicle has been inspected not earlier than two months prior to shipment; roadworthiness and usability of the vehicle; an auction grade indicating where the vehicle is imported from; proof by the exporting country that the vehicle is not a product of theft; an export certificate issued by the official designated authority; and a certified copy of the original sale document for second-hand vehicles to protect consumers.

Generally, the various policies of the government have provided incentives for compliance. The policies have also led to significant increases in the number of hybrid and electric vehicles being imported and helped with the promotion of energy efficient vehicles. Consequently, the country has witnessed a rapid increase in new and used hybrid vehicle sales from a mere 43 in 2009 to 14,754 by May 2020[28].

According to the National Land Transport Authority (NLTA), 26,786 new and second-hand imported vehicles were registered from January to November 2019. Overall, the country has recorded a significant shift in the number of vehicles registered, with 351,409 registered in 2008 and 574,772 in September 2019 – representing an increase of 63.6 per cent. The lowering or waiver of excise duty on hybrid and electric vehicles has successfully cleaned up the motor vehicle fleet by increasing the number of hybrid and electric vehicles on the road. As of January 2020, there were 14,060 hybrid vehicles and 206 electric vehicles.

26 Statistic 2020-Mauritius National Land Transport Authority
27 former acting road transport commissioner of Mauritius's National Transport Authority.
28 Mauritius National Land Transport Authority 2020

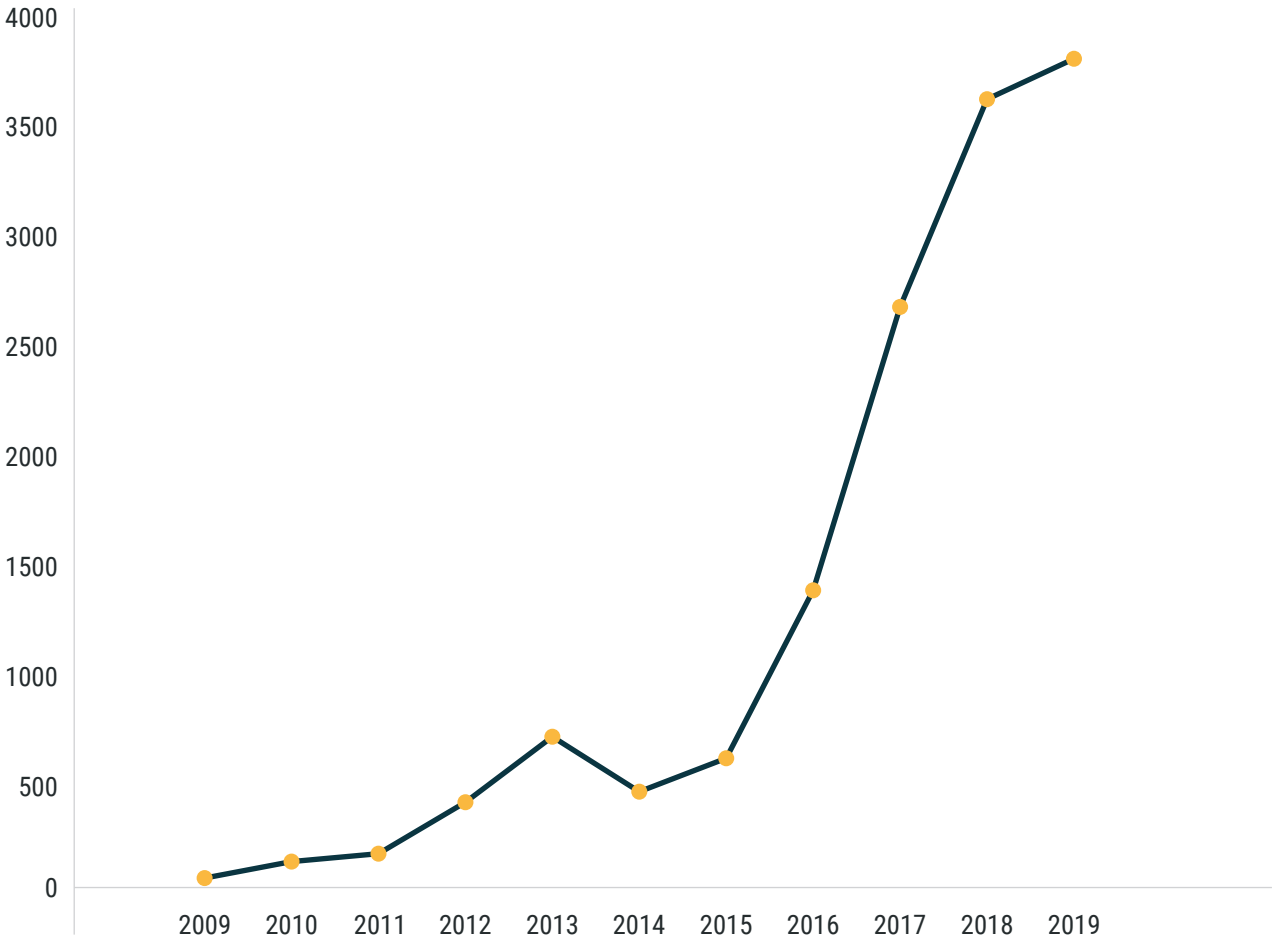
FIGURE 20
Number of Electric Vehicles in Mauritius



Source: *National Land Transport Authority of Mauritius` data base as of January 2020*

Mauritius has a 50 per cent levy reduction for hybrid vehicles. Excise duty on electric vehicles up to 180 KV was also abolished in 2016; while other vehicles attract excise duty based on the engine size, starting from 50 per cent for vehicles up to 1600cc. As such, larger engines pay a higher percentage of excise tax. The establishment of this scheme resulted in an improvement in average vehicle fuel efficiency from 7L/100km in 2005 to 6.6L/100km in 2013, and 5.8L/100km in 2014 respectively (Ministry of Environment and Sustainable Development, 2014).

FIGURE 21
Number of Hybrid Vehicles in Mauritius



Source: *National Land Transport Authority of Mauritius` data base as of January 2020*

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Annexes

ANNEX 1

Information Used in this Report

A Global Overview of Used Light Duty Vehicles: Flow, Scale and Regulatory Environment, is an inaugural report surveying and analyzing the global flow of used light duty vehicles from the three major global used vehicle exporters – Japan, the EU and the USA. It also gives an overview of existing national and regional regulatory environments, as well as policy measures that seek to incentivize cleaner, more energy-efficient and safer used vehicles.

UNEP's Sustainable Mobility Unit developed this report with the aim of providing a comprehensive overview of the used vehicles[29] market and the regulatory instruments used to control the flow of used vehicles. The demand for this type of information was realized in the UNECE/ITC-UNEP conference on "Ensuring Better Air Quality and Reduced Climate Emissions through Cleaner Used Vehicles" held in Geneva in February 2017[30.] It was found that such data was not available, despite used vehicles role in supporting a global shift to safer, low and no emissions mobility, and thus in addressing pollution and climate change globally. In addition, the development of regional or global agreements that harmonize and govern the flow of used vehicles would require a solid understanding of the scale of the used vehicle markets, the flow of these vehicles and regulations affecting import and export of vehicles.

This report is therefore a first step in supporting policy makers to identify key issues and to develop instruments that contribute to better road safety, air quality, reduced climate emissions and fuel and repair cost savings.

Data used in this report has been collected from many sources. Used vehicles export data has been collected from available international data sources including Eurostat, the United States Department of Commerce, and the Japanese International Auto Trade Association. The report covers 146 used vehicles importing countries in five regions - Africa, Asia-Pacific, Eastern Europe, the Caucasus and Central Asia, Latin America and the Caribbean, and the Middle East. Most of the data in the report comes from reviewing national importations /vehicle registration data and through consultations with government and industry partners in these countries. To prepare this report UNEP has developed a database of country used vehicles import data, based on available in-country data. Some of the data was collected by the Global Fuel Economy Initiative (GFEI)[31] which has developed over 60 country vehicle fleet baselines. The baselines analyse the vehicles being added to the fleets of these countries and their associated emissions.

This report has been able to link in-country registration data with export data (from the EU, USA and Japanese databases), and globally available data (such as data on vehicles stocks from the International Energy Agency). The data surveyed is limited to the period 2015-2018.

The report also investigates the regulatory environment of the importing countries. Among the regulations considered are total bans on used vehicle imports, compliance to vehicle emissions standards, vehicle age limitations, and fiscal instruments. This policy data comes from UNEP reviews of national

29 A used vehicle is a vehicle that has been previously registered. Sometimes the term *second-hand* vehicles is used instead of *used vehicles*. This report uses *used vehicles* in the understanding that both are the same

30 https://www.unece.org/trans/events/2017/itc-70th-anniversary/itc_unep_conference.html

31 The Global Fuel Economy Initiative is promotes fuel efficiency in 2and 3 wheelers, cars and light duty vans, and heavy duty vehicles through the adoption of the cost effective fuel efficiency technologies www.globalfueleconomy.org

used vehicles regulations and policies through consultations with national governments. The report combines different existing policies into a ranking of country regulatory environments from strong to very weak. This ranking has been by UNEP specifically for this report.

By providing a comprehensive overview, the ultimate aim of this report is to promote and support the development of harmonized action to regulate the trade in used vehicles to improve the quality of used vehicles being shipped from developed to low- and middle-income countries.

Limitations of the report

This report is a first global overview. While due diligence has been done to ensure that the information therein is factual, the following limitations and challenges are acknowledged:

- **Scope**: The report predominantly analyses the flow, scale, and regulatory environment of used light duty vehicles (LDVs). Albeit limited, data for used heavy-duty vehicles (HDV) and used 2-and 3-wheelers has been included where available. Comparatively, little is known about the international trade of used heavy- duty trucks and busses and two-wheelers, despite these two categories being responsible for a disproportionate amount of fine particle and black carbon pollution. There is a need to further explore this trade and UNEP is preparing to develop a report on the trade in used HDVs[32].

- **Data availability and disaggregation:** Many vehicle importing countries do not disaggregate used vehicles from overall vehicle imports, sales and registrations in their trade statistics. In addition to making analysis a challenge, this also impedes the development and application of policy and fiscal instruments that could serve to improve the quality of vehicles entering importing markets.

- **Discrepancies in trade statistics:** Export and import data reported at the national level are not harmonized across markets. For example, data from Japan shows that total used vehicle exports 2015 to Kenya were 65,230 vehicles whereas the data acquired from the Kenyan government for the same period showed that the used vehicles imported from Japan, which account for close to 97.5 per cent of total Kenyan vehicle imports, were 83,711 units (ERC, 2018).

- **Lack of harmonization in customs procedures and vehicle standards:** Disparate import procedures encourage grey markets for used vehicles; countries with fewer restrictions tend to import older vehicles with questionable environmental and safety standards. In addition, this allows for the trade in end-of-life vehicles that should be scrapped in their markets of origin. The grey markets and extent of end of life vehicles trade was not investigated. Similarly, there are indications, included in this report, that a significant share of used vehicles has been illegally tampered with, for example the removal of critical road safety and environment equipment such as exhaust filters and air bags. The extent to which this is taking place would require further study.

32 Recently the Climate and Clean Air Coalition (CCAC) has provided a grant to UNEP to also study the trade in used HDVs. This work will take place in late 2020 and early 2021

ANNEX 2

Vehicle Emissions, the Environment and Human Health

Vehicles are among the most rapidly growing sources of pollution and present a major public health risk particularly in regions where growing motorization is not coupled with effective vehicle emission regulations. Vehicles, both gasoline and diesel, emit significant quantities of nitrogen oxides, sulphur oxides, particles, carbon monoxide and hydrocarbon. This cocktail of pollutants and particles are responsible for strokes, chronic respiratory diseases, lung cancer, ischemic heart disease, diabetes, and other non-communicable diseases (HEI,2018). In 2012, the World Health Organization International Agency for Research on Cancer classified diesel exhaust Particulate Matter (PM) as a Group 1 carcinogen (= causing cancer).

Reducing pollutants emissions from vehicles requires the use of clean vehicles technologies, especially exhaust after treatment technology. Catalytic converters that filter exhaust gasses from petrol vehicles can reduce pollutants by 90 per cent or more. And diesel particulate filters can filter more than 99 per cent of small particulates emitted by diesel vehicles.

Rising levels of carbon dioxide (CO_2) in the atmosphere are causing global warming. The global vehicle fleet CO_2 emissions are increasing faster than any other sector. Today CO_2 emissions from the global fleet are responsible for about one quarter of all energy related CO_2 emissions. This is set to go to one-third by 2050. Governments are now introducing strict regulations for the CO_2 emissions of vehicles. Further, black carbon (BC), which comprises a substantial portion of small particulates is an important climate forcer, contributing significantly to short-term global warming.

To control and reduce emissions from vehicles, countries put in place vehicle emission standards which define the quality of the mixture of exhaust gases at the tailpipe of vehicles. Automobile manufacturers are obliged to adhere to these standards in the territories where they are enforced as it forms part of a vehicle type approval process.

Vehicle emission standards have been implemented since the early 90s. Many countries use the EU model of vehicle emission standards called the EURO standards. However, other countries have developed equivalent standards with varying implementation dates i.e. the US, China, Japan, and India have their own vehicles emissions standards comparable with the EURO standards. Standards for light duty vehicles are designated by Arabic numerals (1-6) while those for heavy duty vehicles are designated by Roman numerals (I-VI). The standards have evolved from Euro 1/I (1992) through Euro 6/VI (2015). Each of the emission standard is matched by a specified fuel quality that progressively improves with every standard for both diesel and gasoline.

FIGURE 22

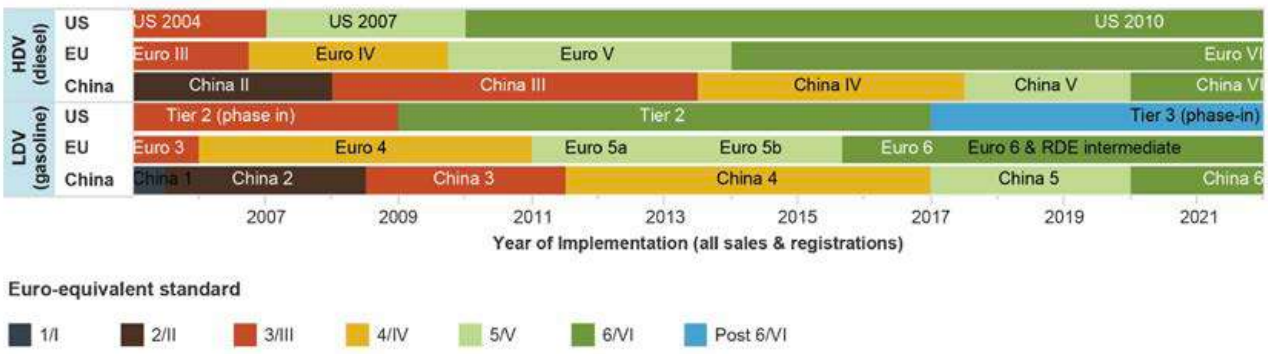
European Vehicle Emissions Standards

Euro standard	Introduction date		Emission limits		
	New approvals	All new registrations	Petrol NOx	Diesel NOx	Diesel PM
Euro-1	1 July 1992	31 December 1992	0.97g/km*	0.97g/km*	0.14g/km
Euro-2	1 January 1996	1 January 1997	0.5/km*	0.9g/km* (direct injection)	0.1g/km
Euro-3	1 January 2000	1 January 2001	0.15g/km	0.5g/km	0.05g/km
Euro-4	1 January 2005	1 January 2006	0.08g/km	0.25g/km	0.025g/km
Euro-5	1 September 2009	1 January 2011	0.06g/km	0.18g/km	0.005g/km
Euro-6	1 September 2014	1 September 2015	0.06g/km	0.08g/km	0.0045g/km

Source: *https://www.smmt.co.uk/industry-topics/emissions/testing/*

FIGURE 23

Timelines for Vehicles Emissions Standards Implementation in the US, EU, and China



Source: *International Council for Clean Transportation (ICCT) (2016), https://theicct.org/blogs/staff/latest-step-forward-on-china-vehicle-emissions-regulation*

The used vehicles imported in low- and middle-income countries often do not meet advanced vehicles emissions standards. This can be because countries import older vehicles that date back from before the introduction of vehicles emissions standards or only meet the earlier, older, standards such Euro 1 to 3. In addition, some used vehicles have damaged or failing emission-control systems. There is a market for old vehicles filters (to recycle precious metals used in these filters) and as a result some of the used vehicles have their filters removed, often illegally, before export. Repair or replacement of vehicle emissions filters can be costly and when these filters are found to be faulty exporters may opt to export the vehicles rather than to invest in fixing the filter. So, there is a share of used vehicles that do not have emissions controls technologies installed, in some cases these systems have failed, in others they have been illegally removed.

Figure 22 above shows the emissions of some of the most harmful local air pollutants namely particulate matter (PM) and nitrous oxide (NOx) with different EURO vehicles standards. Going from Euro 1 to Euro 6 the allowable PM and NOx emissions have reduced majorly.

ANNEX 3
Country Lists

Africa = 54 countries included

Country	Vehicle EURO Emission Standards	Used Vehicles Banned	LDV Age Limit	Ranking
Algeria		No	3	Very Good
Angola		No	6	Weak
Benin		No		Very Weak
Botswana		No		Very Weak
Burkina Faso		No		Very Weak
Burundi		No	10	Very Weak
Cameroon		No		Very Weak
Cape Verde		No		Very Weak
Central African Republic		No		Very Weak
Chad		No	5	Good
Comoros		No		Very Weak
Congo		No		Very Weak
Congo, Democratic Republic		No	20	Very Weak
Cote D'Ivoire		No	5	Good
Djibouti		No	8	Weak
Egypt		Yes		Banned
Equatorial Guinea		No		Very Weak
Eritrea		No		Very Weak
Eswatini		No		Very Weak
Ethiopia		No		Very Weak
Gabon		No	5	Good
Gambia		No		Very Weak
Ghana	Euro 2	No	10	Very Weak
Guinea		No		Very Weak
Guinea-Bissau		No		Very Weak
Kenya		No	8	Weak
Lesotho		No	5	Good
Liberia		No		Very Weak
Libyan Arab Jamahiriya		No	10	Very Weak
Madagascar		No		Very Weak
Malawi		No		Very Weak
Mali		No		Very Weak
Mauritania		No	5	Good
Mauritius		No	3	Very Good

Africa = 54 countries included

Country	Vehicle EURO Emission Standards	Used Vehicles Banned	LDV Age Limit	Ranking
Morocco	Euro 4	No	5	Good
Mozambique		No		Very Weak
Namibia		No	8	Weak
Niger		No		Very Weak
Nigeria	Euro 2	No	15	Very Weak
Rwanda	Euro 4	No		Good
Sao Tome and Principe		No		Very Weak
Senegal		No	8	Weak
Seychelles		Yes		Banned
Sierra Leone		No		Very Weak
Somalia		No		Very Weak
South Africa	Euro 2 *	Yes		Banned
South Sudan		No		Very Weak
Sudan		Yes		Banned
Tanzania		No		Very Weak
Togo		No		Very Weak
Tunisia		No	5	Good
Uganda		No	15	Very Weak
Zambia		No		Very Weak
Zimbabwe		No		Very Weak

* Only new vehicles as used vehicles are banned

Latin America and the Caribbean = 37 countries included

Country	Vehicle EURO Emission Standards	Used Vehicles Banned	LDV Age Limit	Ranking
Antigua And Barbuda		No	5	Good
Argentina	Euro 5 *	Yes		Banned
Aruba		No		Very Weak
Bahamas		No	4	Good
Barbados		No	5	Good
Belize		No	5	Good
Bermuda		No	5	Good
Bolivia	Euro 2	No	5	Good
Brazil	Euro 5	Yes		Banned
Chile	Euro 5*	Yes		Banned
Colombia	Euro 2*	Yes		Banned

Latin America and the Caribbean = 37 countries included

Country	Vehicle EURO Emission Standards	Used Vehicles Banned	LDV Age Limit	Ranking
Costa Rica	Euro 4	No		Good
Cuba		No		Very Weak
Dominica		No		Very Weak
Dominican Republic		No	5	Good
Ecuador	Euro 2 *	Yes		Banned
El Salvador		No	8	Weak
French Guiana		No		Very Weak
Grenada		No		Very Weak
Guatemala		No	10	Very Weak
Guyana		No	8	Weak
Haiti		No		Very Weak
Honduras		No	7	Weak
Jamaica		No	5	Good
Mexico	Euro 4	No	10	Good
Nicaragua		No	10	Very Weak
Panama		No		Very Weak
Paraguay		No	10	Very Weak
Peru	Euro 4	No	5	Good
St Kitts And Nevis		No		Very Weak
St Lucia		No		Very Weak
St Vincent and the Grenadines		No		Very Weak
Suriname		No		Very Weak
Trinidad and Tobago		No	4	Good
Turks And Caicos Islands		No		Very Weak
Uruguay	Euro 3 *	Yes		Banned
Venezuela		Yes		Very Weak

* Only new vehicles as used vehicles are banned

Asia Pacific = 26 countries included

Country	Vehicle EURO Emission Standards	Used Vehicles Banned	LDV Age Limit	Ranking
Afghanistan		No		Very Weak
Bangladesh	Euro 2	No	5	Good
Bhutan	Euro 4 *	Yes		Banned
Brunei Darussalam	Euro 4	No	4	Good

Asia Pacific = 26 countries included

Country	Vehicle EURO Emission Standards	Used Vehicles Banned	LDV Age Limit	Ranking
Cambodia		No		Very Weak
Fiji		No	5	Good
India	Euro 6 *	Yes		Banned
Indonesia	Euro 4 *	Yes		Banned
Lao People's Democratic Republic		No		Very Weak
Malaysia	Euro 4	No	5	Good
Maldives		No	5	Good
Mongolia	Euro 2	No		Very Weak
Myanmar		No		Very Weak
Nauru		No		Very Weak
Nepal	Euro 4*	Yes		Banned
New Zealand	Euro 4	No	8	Good
Pakistan	Euro 2	No	3	Very Good
Palau		No		Very Weak
Papua New Guinea		No		Very Weak
Philippines	Euro 4 *	Yes		Banned
Samoa		No	8	Weak
Singapore	Euro 6	No	3	Very Good
Sri Lanka	Euro 4	No	3	Very Good
Thailand	Euro 4 *	Yes		Banned
Timor-Leste		No	5	Good
Vietnam	Euro 4	No	5	Good

* Only new vehicles as used vehicles are banned

Eastern Europe, the Caucasus, and Central Asia = 18 countries

Country	Vehicle EURO Emission Standards	Used Vehicles Banned	LDV Age Limit	Ranking
Albania	Euro 5	No	10	Very Good
Armenia		No		Very Weak
Azerbaijan	Euro 4	No		Good
Belarus	Euro 4	No		Good
Bosnia and Herzegovina	Euro 3	No	10	Weak
Macedonia	Euro 3	No	12	Weak
Georgia		No		Very Weak
Kazakhstan	Euro 4	No	5	Good
Kyrgyz, Republic		No	10	Very Weak
Moldova, Republic Of		No		Very Weak

Eastern Europe, the Caucasus, and Central Asia = 18 countries

Country	Vehicle EURO Emission Standards	Used Vehicles Banned	LDV Age Limit	Ranking
Montenegro	Euro 3	No	10	Very Weak
Russian Federation	Euro 5	No	5	Good
Serbia	Euro 3	No		Weak
Tajikistan	Euro 4	No	10	Good
Turkey		Yes		Banned
Turkmenistan		No		Very Weak
Ukraine	Euro 5	No		Very Good
Uzbekistan	Euro 3	No		Weak

Middle East = 11 countries

Country	Vehicle EURO Emission Standards	Used Vehicles Banned	LDV Age Limit	Ranking
Bahrain		No	5	Good
Iran		No	3	Very Good
Iraq		No	2	Very Good
Israel		No	2	Very Good
Jordan		No	10	Very Weak
Kuwait		No	5	Good
Lebanon		No	8	Weak
Oman		No		Very Weak
Qatar		No	10	Very Weak
Saudi Arabia		No	5	Good
United Arab Emirates		No	2	Very Good

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