

POLICY BRIEF

VEHICLE SCRAPPAGE POLICY IN INDIA



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TABLE OF CONTENTS

1. Introduction	4
1.1 Resource efficiency from ELVs	5
1.2 Extended producers' responsibility (EPR)	5
1.3 Disposal process for end-of-life vehicle.....	6
2. Policy Landscape of Vehicle Scrappage	8
2.1 Central government policies	8
2.2 State-wise policies	9
2.3 Global practices on vehicle scrappage.....	10
3. Challenges for Scrappage Policy in India	11
4. Way forward	12
4.1 Role of central government	12
4.2 Role of state governments	12
4.3 Role of OEMs	13
4.4 Role of RVSFs	13
5. Conclusion	14
6. References	15



1. Introduction

Globally, the automobile industry has one of the highest rates of raw material consumption during manufacturing, as well as highest rates of environmental impact during operation and post operation stages (Nunes and Bennett, 2008). This resource demand and consumption has increased substantially with rise in automobile ownership. In India, the transport sector has emerged as third-highest emitting sector. The percentage share of total carbon emissions is likely to increase from the current level of 13.5% to 19% by 2050 (TERI, 2021) and road transport contributes to 90% of the transport emissions (CSE, 2021).

Increasing vehicle ownership and usage, presence of end-of-life vehicles (ELVs), and inadequate maintenance of vehicles—leading to fuel inefficiency of these ELVs—has led to rising air pollution in Indian cities (Kebede *et al*, 2022). Fuel efficiency norms and tailpipe emission regulations have been regularly tightened to limit vehicular emissions, but these operate on new vehicles. Various studies indicate older vehicles comprise many inefficiencies associated with safety and pollution (Arora *et al*, 2021). A study stated that a 15-year-old diesel car emitted 7.6 times higher particulate matter and 3.4 times higher nitrogen oxides than a BS-IV car (Chowdhury and Chattopadhyaya, 2020). Thus, dealing with ELVs should be a part of the strategy to limit the emissions of on-road vehicles.

An end-of-life vehicle in India is defined as a vehicle which is no longer validly registered, after having been declared unfit through automated testing stations, or self-declared by the owner as a waste vehicle.¹ In 2021, the Ministry of Environment, Forest and Climate Change (MoEF&CC) indicated that about 21.4 million vehicles existed in India that were older than 20 years. Nevertheless, age-based identification is not a scientific

approach and vehicles should be adjudged as ELVs based on fitness tests.

Currently, for testing of vehicles, no automated testing station (ATS) is functional as prescribed by the Central Motor Vehicles (Twenty-first Amendment) Rules, 2021.² However, the nodal agency, Ministry of Road Transport and Highways (MoRTH) has set-up one model inspection and certification (I&C) centres in each of the 27 states/UTs. Twelve Registered Vehicle Scrapping Facilities (RVSF)—five in Delhi-NCR, three in Gujarat, and one each in Assam, Chandigarh, Madhya Pradesh, and Rajasthan are functional.³ More RVSFs are in process for approval for establishment.²

Traditionally, automobile scrapping has been mostly managed by the informal sector. While the informal sector uses methods to recover materials that are not always efficient, they are organized amongst themselves and other stakeholders of the ELV value chain (Sharma and Pandey, 2020). Nonetheless, they pose many challenges such as low technology, low adherence to environmental and legal norms, lack of infrastructure, improper handling of hazardous waste, downcycling of material, etc.

The objective of this policy brief is to look at the current scenario, policy landscape, and associated challenges in India to suggest a way forward based on international experiences, learnings from stakeholder consultations, and feedbacks from ELV scrapping units in Delhi NCR. The attempt is to achieve better on-road emissions and safety profiles of vehicles, while improving value-realisation and minimizing the environmental impact of ELVs through successful implementation of the vehicle scrapping policy.

1 Details available at https://morth.nic.in/sites/default/files/notifications_document/GSR%20653.pdf

2 Details available at <https://rajyasabha.nic.in/Questions/QuestionTypeWiseSearch>

3 Details available at <https://pqars.nic.in/annex/259/AS61.pdf>

1.1 Resource efficiency from ELVs

The main sources of solid waste—in terms of both volume and growth rate—after municipal solid waste, are ELVs and waste electrical and electronic equipment (Sharma and Pandey, 2020). An average passenger car (Figure 1) constitutes about 69% of steel by the weight of the vehicle, 16% aluminium, 5% plastic, 4% rubber, and rest is foam, copper, glass, etc. (TERI, 2017).

These materials that can be salvaged and, if effectively recycled, can be fed back into the supply chain. This will not only reduce the environmental impacts and associated costs of mining of primary materials, but will also reduce the vehicle's life cycle emissions (Buberger *et al*, 2022). Currently, the scrapping methods of ELVs are not efficient to recover materials for sustainable

resource circulation. Estimates, though, suggest that ELVs can generate INR 115 billion worth of steel scrap every year (Arora *et al*, 2018). To mitigate the emissions and recover valuable materials, regulated scrapping of ELVs is necessary.

1.2 Extended producers' responsibility (EPR)

Extended producers' responsibility is defined as the principle by which the upstream actors, i.e., manufacturers are made responsible for waste generated even in the downstream activities; with focus on recycling of the product (Bhadra and Mishra, 2020). The maximum benefits of EPR can be achieved with both downstream improvements—by promotion of

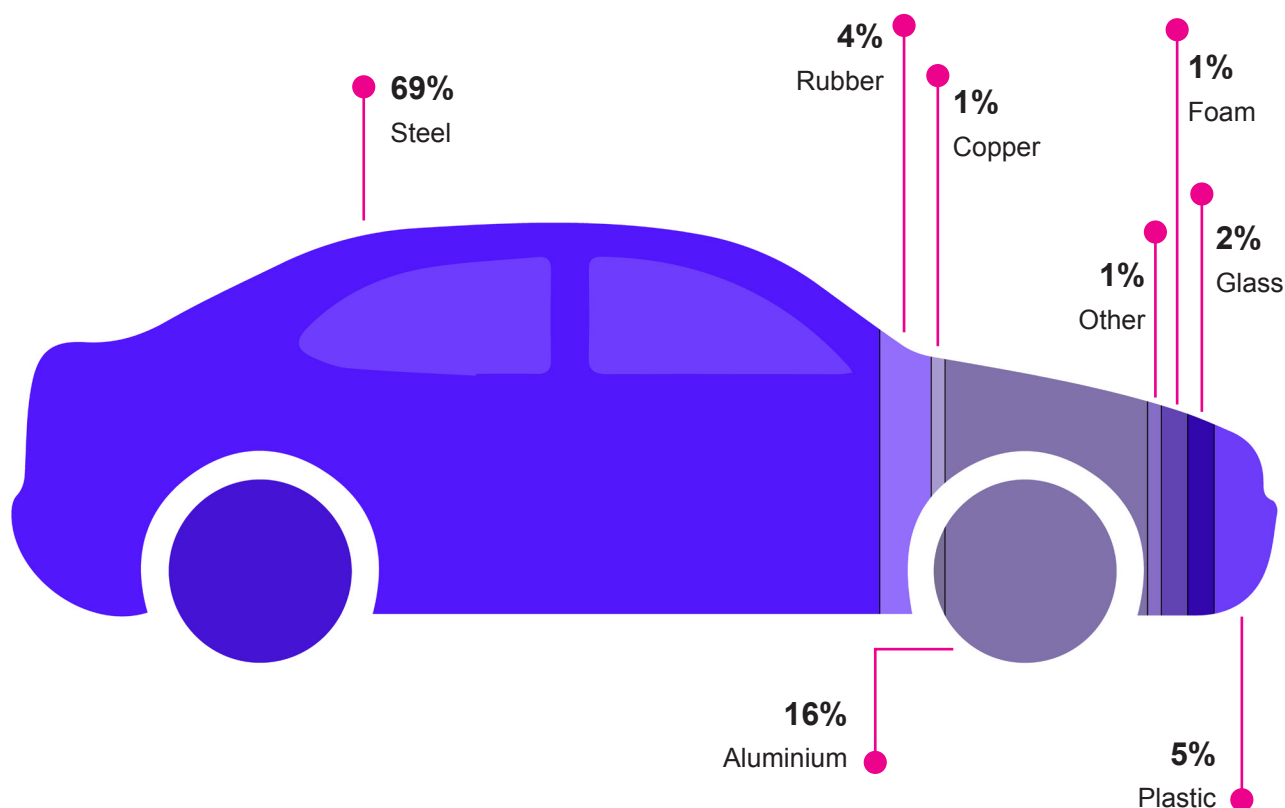


Figure 1: Percentage of materials used in a passenger car

Source: TERI, 2017

separate collection and recycling, as well as upstream improvements—through material efficiency and cleaner technologies (Compagnoni, 2022). The development of a formal collection process by OEMs will have cascading results:

- ◆ increase in collection rate of ELVs, which translates to better recovery and recycling,
- ◆ reduced externalities generated by improper disposal and dumping of ELVs, and
- ◆ increased recovery rate that would lead to growth of the secondary raw materials market.

In the European Union, recycling of ELVs is organized under EPR legislation and manufacturers are responsible for take-back of ELVs, increasing recyclability of vehicles, and disseminating information on dismantling procedures.

1.3 Disposal process for end-of-life vehicle

In this section, we explore the general scrapping process adopted by most dismantling and recycling units as shown in Figure 3.

Deregistration of ELVs: The process involves the last owner handing over the ELV to a vehicle scrapping facility, with proper documentation of ownership. After the deregistration process through the VAHAN portal set up by MoRTH, in collaboration with National Crime Records Bureau (NCRB), the records for ELV scrapping are cleared.

Depollution: The scrapping centre starts with depollution, that is, removing the hazardous materials such as radiator coolant, engine and transmission oils, and AC gas that are used in the vehicles, which is important for further ELV processing.

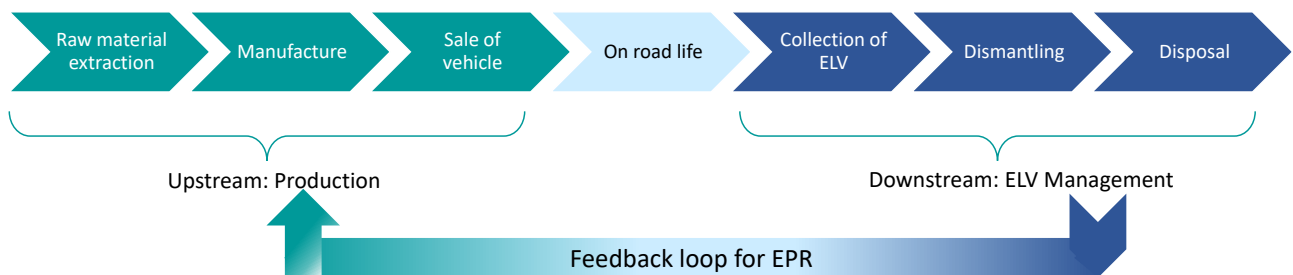


Figure 2: Lifecycle of a vehicle

Source: Compagnoni, 2022

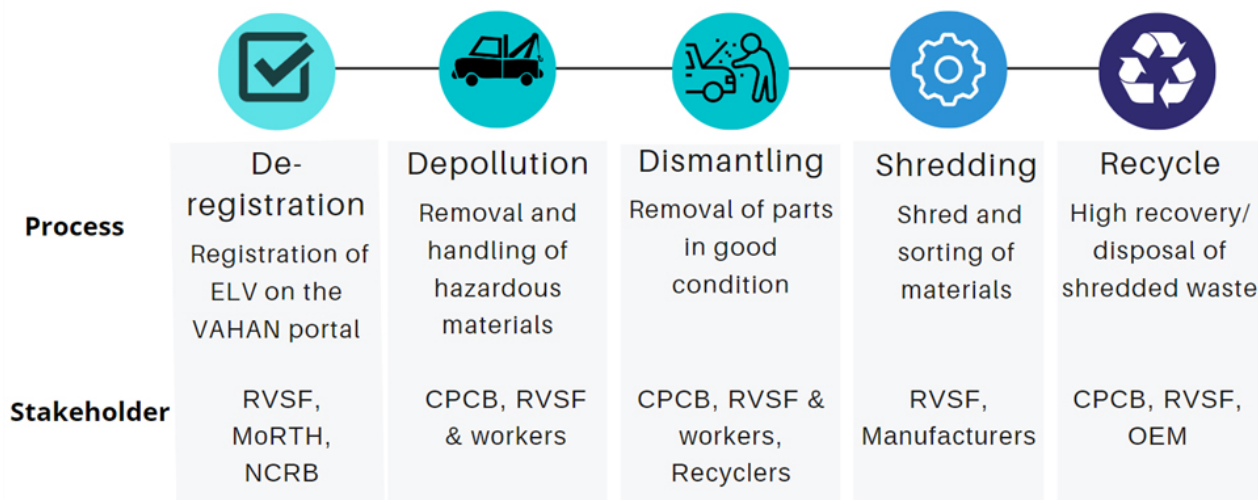


Figure 3: Common processes followed for an ELV

Source: TERI's compilation based on processes followed globally

Dismantling: Once the vehicle is depolluted, the exterior and interior parts are dismantled, with engine chassis kept secure for records, then segregated components are sent to recycling agents. Considering Indian conditions with cheap labour, extensive dismantling is done instead of shredding.

Shredding: Commonly, shredding of the remaining body is carried out for further processing. However, the process is capital and energy intensive and suitable for large volumes of ELV. The resultant automotive shredder

residue (ASR) is a highly heterogeneous mixture of ferrous and non-ferrous metals (5–23%), plastics (20–49%), rubber (3–38%), textile and fibre material (4–45%), and glass (2–18%) (Yi and Park, 2015), depending upon the level of dismantling before shredding.

After dismantling and recovering of components, the remaining part, car hulk, is compressed and flattened and/or sent to a shredder, as per the recyclers' requirement. The vehicle body frame is processed into a bale and sent to recyclers.

2. Policy Landscape of Vehicle Scrappage

2.1 Central government policies

Automotive Industry Standard-129 on End-of-Life Vehicles: AIS-129,⁴ 2015 defined steps towards organizing the automobile recycling sector, requirements for collection and dismantling centres, and reusability, recyclability, and recoverability (RRR) calculations for vehicle manufacturers. The standard requires vehicles to be reusable and/or recyclable to a minimum of 80% by mass and reusable and/or recoverable to a minimum of 85% by mass. It prohibits trading of second-hand parts of five functional assemblies, i.e., the engine, power transmission box, steering, axle, and chassis of the ELV.

Guidelines for Environmentally Sound Facilities for Handling, Processing, and Recycling of End-of-Life Vehicles (ELV), 2019: The Guidelines⁵ issued by CPCB compile environmentally sound strategies for

handling, storage, transportation, and depollution of ELVs. They further mention procedures for removal of common hazardous substances, environmentally sound dismantling and segregation and shredding, separation, and processing of residues of ELVs. There are remarks on ELV recycling technologies and facility set-up requirements, as well as waste management during depollution or dismantling of ELVs.

Motor Vehicles (Registration and Functions of Vehicle Scrapping Facility) Rules, 2021: MoRTH came up with the Rules⁶ on September 25, 2021 for setting up, authorization, and operating of a registered vehicle scrapping facility (RVSF) for promoting legally compliant vehicle dismantling and scrapping industry. The Central Motor Vehicles (Twenty-Third Amendment) Rules incorporate an upward revision of registration, fitness testing, and fitness certification fee for vehicles. Moreover, the Twenty-fourth Amendment provides

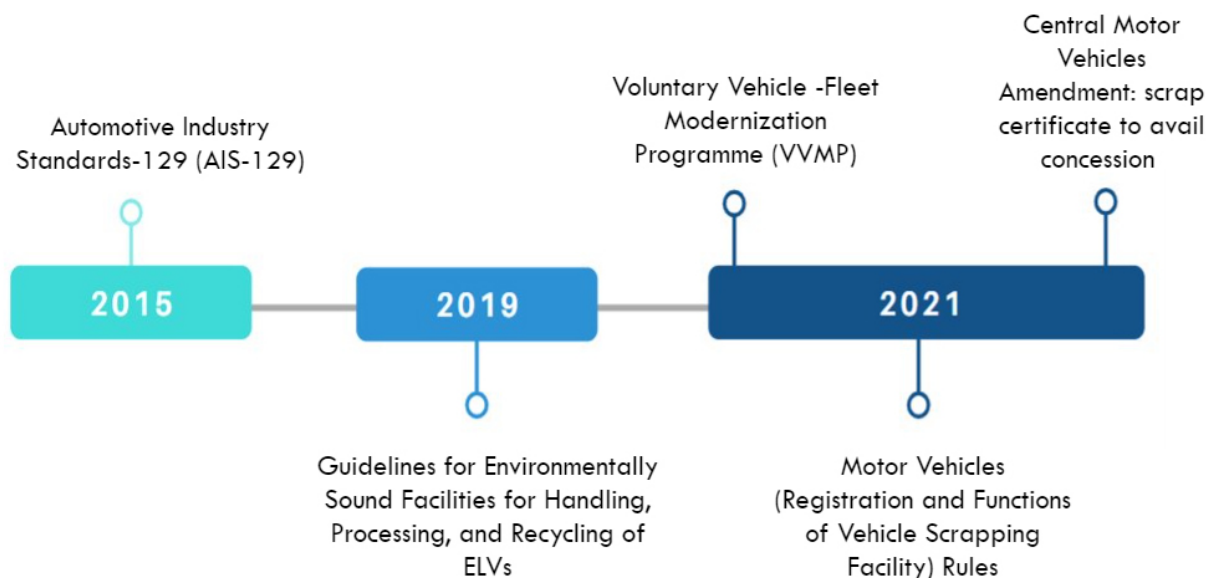


Figure 4: Timeline of policies in India

Source: TERI's compilation

⁴ Details available at https://hmr.araiindia.com/Control/AIS/35201550654PMAIS-129_F.pdf

⁵ Details available at https://cpcb.nic.in/uploads/hwmd/Guidelines_Handling_Processing_and_Recycling_ELV_11.03.2019.pdf

⁶ Details available at https://morth.nic.in/sites/default/files/notifications_document/GSR%20653.pdf

for a certificate of deposit of vehicle scrapping to avail concession up to 25% for non-transport vehicles and 15% for transport vehicles.

Recognition, Regulation, and Control of Automated Testing Stations Rules: Automated testing stations⁷ (ATS) are authorized by state governments to conduct vehicle fitness tests. The vehicle that fails any, or all of the required tests can apply for retest after rectification of the defects from initial inspection; on clearing the tests a certificate of fitness is issued. In case the vehicle is not issued the fitness certificate in two attempts, the vehicle needs to be scrapped.

2.2 State-wise policies

In Delhi, in line with the Supreme Court and National Green Tribunal (NGT) rulings, the National Capital Territory government introduced Delhi Scrapage Policy in 2018, the first among states and union territories to introduce a scrappage policy (Table 1). With other NGT rulings and the air pollution control action plan, few cities in India have implemented the provisions of scrappage.

Table 1: Scrappage policies and air pollution action plans in the Indian cities/states

Timeline	State	Aim	Measures taken
August 2018	Delhi ⁸	Scrap 10-year-old diesel vehicles and 15-year-old petrol vehicles	Up to 25% rebate on road tax with vehicle scrapping certificate
December 2018	Kolkata, West Bengal ⁹	Air pollution control	<ul style="list-style-type: none"> Phasing out/scrapping of >15 years old commercial vehicles based on the Eastern Bench of NGT Only 4-Stroke LPG 3-wheelers allowed
February 2019	Kohima, Nagaland ¹⁰	Air quality monitoring	<ul style="list-style-type: none"> Phasing out 15-year-old commercial diesel vehicles
September 2019	Mumbai, Maharashtra ¹¹	Action Plan for Control of Air Pollution	<ul style="list-style-type: none"> BS-II and BS-III bus scrapping policy developed Restrict age of taxies to 20 years and 16 years for auto-rickshaws
2021	Madhya Pradesh	Vehicle Scrappage Policy	<ul style="list-style-type: none"> Incentives on new vehicle purchase Waiver of pending dues / liabilities
July 2022	Assam	Vehicle Scrappage Policy of Assam, 2022	<ul style="list-style-type: none"> Incentivize voluntary scrappage of old and unfit vehicles Support to RVSF
December 2022	Odisha ¹²	Improve air quality, regularize informal facilities, and promote circular economy	<ul style="list-style-type: none"> Vehicles >15-year-old banned in low emission zones Incentives to customers Land incentives, capital investment subsidy, SGST reimbursement to RVSFs

Source: TERI's compilation

7 Details available at https://morth.nic.in/sites/default/files/notifications_document/GSR%20652.pdf

8 Details available at <https://transport.delhi.gov.in/sites/default/files/All-PDF/Guidelines%2Bfor%2Bscrapping%2Bof%2Bvehicles.pdf>

9 Details available at <https://cpcb.nic.in/Actionplan/West%20Bengal.pdf>

10 Details available at <https://cpcb.nic.in/Actionplan/Kohima.pdf>

11 Details available at <https://cpcb.nic.in/Actionplan/Mumbai.pdf>

12 Details available at http://odishatransport.gov.in/Application/uploadDocuments/Notification/document_0_1669978252.pdf

13 Details available at <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2000L0053:20050701:EN:PDF>

2.3 Global practices on vehicle scrappage

In the 1990s, increasing fleet age and higher emissions forced the authorities to regulate and implement new mandates, such as the Clean Air Act Amendments. Additionally, civil society and non-government organisations advocated a market-based approach to control air pollution (Dill, 2004). These factors accelerated a voluntary vehicle retirement programme with fiscal incentives for scrapping the vehicles and the overall aim of air pollution reduction—by removal of older and polluting vehicles earlier than normal.

In 2000, European Union issued the EU-Directive 2000/53/EC¹³ on ELVs, which stated that by 2015 EU members should attain a reuse or recovery rate of 95% and reuse or recycling rates of 85%. The Directive covered ELVs, including components, materials, and spare and replacement parts.

Some of the other salient features of the Directive were:

- ◆ Continuous improvement in recycling of all plastics from ELVs
- ◆ Dismantling, reusing, and recycling requirements of ELVs integrated into design and manufacturing of new vehicles
- ◆ Encouragement for development of markets for recycled materials
- ◆ Setting up appropriate collection systems for discarded ELVs without degrading the environment

Most vehicle scrappage policies introduced around the world in 2009 provided support to automotive industry for a limited period and were designed as cash for replacement of an ELV, which provided a conditional bonus on a new and more fuel-efficient model.

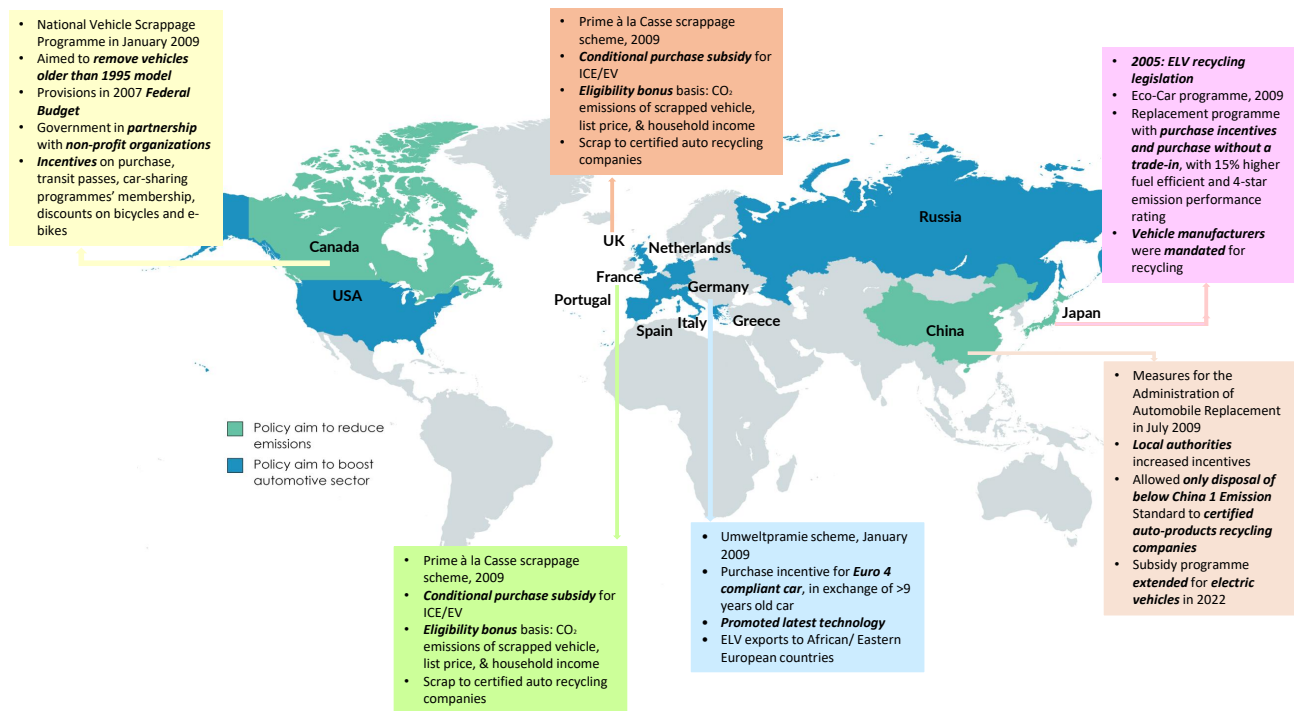


Figure 5: Global policies in select countries (2009)

Source: TERI Analysis based on global policies

13 Details available at <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2000L0053:20050701:EN:PDF>

3. Challenges for Scrapage Policy in India

The vehicle scrapping policy was introduced to create an ecosystem for phasing out of unfit and polluting vehicles; however, currently in India, most vehicle scrapping units are informal, which raises numerous environmental concerns.

Current infrastructure facilities and financial mechanisms for vehicle scrapping not adequate for large-scale scrapping of ELVs

- ◆ There are inadequate numbers of registered vehicle scrapping facilities and no automated testing station is functional as per the Central Motor Vehicle Rules, 2021.
- ◆ The question of providing incentives to owners for ELV scrapping has been left to the discretion of the state governments and OEMs.
- ◆ There is lack of awareness and clarity among the citizens on procedures to avail incentives, if any, provided in a few states.
- ◆ On-road inspections of vehicular emissions are part of efficient inspection and maintenance (I/M) testing. Currently, vehicles are intercepted on-road which is time-consuming and inconvenient to citizens and there is no availability of automated devices for inspection.
- ◆ Economic endowment effect comes into play when owners value their possessions, i.e., the owners consider their ELV at a higher level than the residual value. Therefore, to convince private owners to scrap, a greater compensation than its second-hand value is required.
- ◆ The monitoring of the testing certification is limited due to the lack of a centralized database linking vehicle registration with the testing facilities.

Viability for original equipment manufacturers (OEMs) to set up ELV scrapping units

- ◆ The business viability for setting up a dismantling unit can be justified only with large volumes of ELVs coming for scrapping.

- ◆ The entire chain from fitness testing centres to vehicle collection centres, as well dismantling to recycling units, should be designed for maximum economic benefits and minimum environmental degradation.
- ◆ There is a prevalence of non-original equipment parts of vehicles from the replacement market, as there is no existing regulation controlling the after-market parts.
- ◆ Extended producers' responsibility (EPR) for OEMs to handle the ELVs is absent.

Dismantling and disposal of hazardous materials in vehicles

- ◆ The dominance of informal sector which works without modern equipment prevails in the vehicle scrapping industry, leading to environmental contamination and human health hazards.
- ◆ If refrigerants such as Freon (R-22) and tetrafluoroethane (R-134a) are allowed to escape from air conditioning units, as is the case in informal sector, it damages the ozone layer.
- ◆ Currently, the Freon gas is getting accumulated at the depollution stage at RVSFs and there is a requirement for an authorized vendor for collection.
- ◆ The circular economy framework to integrate the usage of recycled materials and secondary components is missing.
- ◆ The most challenging stage in plastic recycling is segregation. Plastic is usually difficult to differentiate solely based on the type of product, but is identified by unique codes. Different grades of plastics mixed in the recycling process can result in total breakdown, or different properties of the new product.

4. Way forward

To reduce the on-road emissions, the policies are focused on upgrading the tail-pipe emissions regulations for new vehicles and promotion of electric vehicles (EV) which require high capital investments. However, removal and scrapping of ELVs is more cost-effective to reduce the GHG emissions from the total stock of vehicles on road. Therefore, a stringent regulatory framework which explains the role of each stakeholder and will overcome the challenges associated with the current ELV management is required.

4.1 Role of central government

Regulatory environment

- ◆ The government should indicate clear targets and activities in the policy for extended producers' responsibility (EPR) that need to be undertaken by OEMs to ensure better recovery and recycling of the ELVs. Currently, few manufacturers have set up ELV facilities for dismantling and recycling, however, the government should bring all manufacturers under the purview.
- ◆ For manufacturers to meet the design standards of vehicles, Automotive Industry Standard-129 should be mandated immediately.
- ◆ A list of the vehicle parts that are non-critical that can be reused, such as wiper motor, should be clearly mentioned. Standards for secondary parts should be developed to ensure market acceptance.

Phased Implementation

- ◆ Immediate announcement and implementation of guidelines provided by MoRTH should be carried out by all states. However, the states with the highest vehicle population should be in focus for infrastructure creation of RVSFs, namely Maharashtra, Uttar Pradesh, Tamil Nadu, Gujarat, and Karnataka.

- ◆ The Centre's support can be channelized in coordination with these state governments to set up the infrastructure.

4.2 Role of state governments

Inspection and Maintenance (I&M)

- ◆ To implement an I&M system, state governments should provide adequate land for setting up automated test stations (ATS) that allows for frequent upgradation. The government can explore public-private partnerships for setting up ATS.
- ◆ To ensure compliance with the fitness tests, a centralized database of vehicles needs to be updated regularly. Notices must be sent to the registered owners for fitness tests and non-compliance should attract a penalty.

Improve customer awareness

- ◆ Public awareness is one of the main factors in determining the success of the vehicle scrapping policy (Shao *et al*, 2016), which should be tailored towards potential participants at a regional level by the state governments.
- ◆ A conditional purchase incentive for electric/hybrid/fuel-efficient vehicles for buyers with a vehicle scrapping certificate can push their adoption among users while promoting scrapping.
- ◆ To ensure participation of the customers in the recycling process, a refundable advance recycling fee can be levied at the time of purchase.

Support to RVSF

- ◆ One of the major investments for RVSF is land acquisition. The state governments should assist in the establishment of RVSFs because of the resource-intensive nature.

- ◆ The recycling industry/RVSFs should be eligible for incentives and benefits given to industries.

Dispute resolution of ELVs

- ◆ Dispute resolution in accident vehicles takes a long time and leads to the deterioration of vehicle parts. Faster resolution and deregistration, with the help of the local police, can fast-track the scrapping of vehicles.

Inclusion of informal sector

- ◆ ELV depollution centres can be promoted within proximity to major informal ELV markets with essential procedural requirements and regular audits to ensure adherence to guidelines with penalties for any irregularity. The skill level of dismantlers in the informal sector can be adopted with capacity building for effective dismantling.

4.3 Role of OEMs

Extended Producers' Responsibility (EPR)

- ◆ EPR activities for ELVs should include reverse logistics for take back, recycling, recovery, and disposal of ELVs by OEMs, besides feedback into design and choice of materials for new vehicles. To calculate the recyclability/recoverability rates, OEMs should provide detailed information regarding the nature and mass of all materials used in manufacturing of the vehicles.

3Rs— recycle, reuse, reduce—from the design stage for new vehicles

OEMs should create vehicles beginning from the design phase that can easily be recycled. To achieve recoverability and recyclability levels at par with EU

standard (EU 2000/53), vehicles manufactured should be reusable and/or recyclable to a minimum of 85% by mass and reusable and/or recoverable to a minimum of 95% by mass.

- ◆ **Recycling of gases:** Collection of refrigerant gases is mandatory; however, no recycling rate has been determined for these gases. There is requirement of an authorized vendor for the collection of Freon gas accumulated at depollution stage. A replacement gas with a global warming potential of less than 150 (EU 2006/40) can be a safer alternative.
- ◆ **Recycling plastics:** To facilitate identification of plastic components vehicle manufacturers should use components and material coding standards with a clear indication of the type.
- ◆ **Management of electric ELVs:** The end-of-life of electric vehicles and batteries must not be an afterthought, but must be built into the electric vehicle policies from the beginning.

4.4 Role of RVSFs

- ◆ The RVSFs should create **environmental and safety standard compliant infrastructure**. They must ensure that an indicative scrap value of an ELV should be based on the weight of the vehicle and the market value of the materials that are obtained by the customers.
- ◆ A **residue fee** should be levied on RVSFs based on the volume of waste not recovered and sent to the landfill, to encourage appropriate dismantling and reduction in waste.

5. Conclusion

The vehicle scrappage policy is in its nascent stage in India, as it has only been a year and half since the MoRTH notification was passed. The physical infrastructure for registered vehicle scrapping facilities is growing, although at a slower rate than required across the country; mainly near the metropolitan cities.

As the policy aims to scrap vehicles failing a fitness test, a rigorous testing procedure that is up to date with the latest testing norms is required. The channelizing mechanism for ELVs should facilitate the sustainable movement from its source to recycling, treatment, and disposal, which will translate to better recovery and recycling. Reverse logistics for the collection, recycling, and disposal should be a part of EPR operations for ELVs and these activities should be legally supported by clear policy targets.

The vehicle design should promote reuse, disassembly, and recycling by OEMs by creating recycling-oriented vehicles. The government should assist in the establishment of RVSFs and provide continuous customer awareness about the vehicle scrappage policy and various other incentives. Cluster-based pilots can also be established by the government in collaboration with the OEMs, to showcase ELV management as a successful business model under an appropriate scientific and conducive environment.

The vehicle scrappage policy aims to reduce air pollution by removing unfit and polluting vehicles, accomplish resource efficiency by serving as a potential secondary resource stream that can minimize the trade-off between development and environmental welfare, and establish an environmentally sound vehicle scrappage ecosystem in the country. Early implementation of a sound and robust scrappage policy is important to achieve these objectives.



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