International Journal of Mechanical and Industrial Technology ISSN 2348-7593 (Online)
Vol. 11, Issue 1, pp: (7-17), Month: April 2023 - September 2023, Available at: www.researchpublish.com

Automobiles Disposal: A Case of Pakistan

M. Owais Yunus[1], Sarah Ahmad[2]

[1,2]School of Foreign Studies
Zhongnan University of Economics and Law, Wuhan, China

DOI: https://doi.org/10.5281/zenodo.7900038

Published Date: 05-May-2023

Abstract: **This study examines the retirement/disposal of outdated vehicles with a specific focus on the Pakistani perspective. The study investigates current trends and environmental standards in Pakistan for automobile safety and disposal and identifies the criteria being followed to categorize vehicles as retirement-worthy. The research also discusses the policies in place to control vehicle emissions and the advantages of retiring old vehicles in terms of pollution and economy. Qualitative data was gathered through interviews with 14 individuals from the automobile sector, regulatory authorities, and automobile users. The analysis reveals that there are no government criteria for the disposal of old vehicles in Pakistan and that the decision to dispose of a vehicle is often based on the owner's financial circumstances and availability of new models. The research suggests that early vehicle retirement programs, mandatory testing of vehicle emissions, and fitness inspection centers for all road-going vehicles are necessary to improve the disposal practices. The article recommends that the government launch awareness campaigns to educate the public about the harmful effects of using high-emission vehicles and mandate better-quality fuel to allow for higher emission standards. The import of older cars up to 7-8 years, provided they meet the Euro II standard, should be allowed, and duty-free import of "Kei" cars should be permitted to increase competition in the market and promote vehicle performance improvement.**

Keywords: **Automobiles Disposal; Battered Vehicles; Vehicle safety and emissions standards; Vehicle Replacement; Obsolete Automobiles; Developing Countries.**

1. INTRODUCTION

Over the years, owing to the advancement in technology, the vehicles as we know them have improved from being a mere chassis with wheels and an engine to run them, to something that is packed with safety and luxury features alike. The cars of today are much safer than they used to be with the use of the most modern technology that aids in designing features that not only protect the passengers of the vehicle or other entities involved, but also the environment in which the emissions of the vehicles are exhausted, which is also the environment that us humans coexist in, making it a very vital consideration when building a vehicle (Weber, 2009).

Special attention is given to the retirement / disposal of vehicles that have completed their lives based on certain criteria. A criterion is set for the vehicles for safety and environmental friendliness and a stage in each vehicle's life span comes where the vehicle no longer fulfills that criteria. Such vehicles are disposed of and replaced by newer, more efficient vehicles (Greenspan & Cohen, 1999).

The advancement in technology has helped in greatly reducing the emissions of the vehicles, making them much greener and less damaging to the environment and at the same time, it has reduced the consumption of fuel, making the cars very efficient through the use of the most sophisticated technology (Kahn, 1996). Also, the way the cars of today are designed, they are much safer than they used to be and the auxiliary safety features available in them, add to the safety of the occupants (M Jameson Wetmore, 2004).

There are laws around the world that prevent excessively obsolete vehicles from operating on the road. These laws limit the use of vehicles based on how much pollution they produce and how safe it is to use them based on the structural integrity of the vehicles, mechanical fitness and the safety features available in them (H. Gibbons, 1992). In addition to these laws, incentives are given by the governments to the vehicle owners through which they can scrap their vehicles earlier than their retirement age in order to make way for newer and more efficient vehicles (Alberini, Harrington, & McConnel, 1995).

The study is conducted to understand the same concept in the perspective of Pakistan, where vehicle disposal is currently not a well-known concept. It highlights the current trends being followed for vehicle replacement in Pakistan and the environmental standards set by the government for the automobile manufacturers to follow. The study gives an insight into how old and battered vehicles are a hazard, not only for the road users and the vehicle occupants, but also the environment. It helps understand how the practice of retiring obsolete vehicles can be beneficial and at the same time, how it may have a negative role.

The issue of disposal of obsolete vehicles in Pakistan is viewed from two different perspectives which are, the environmental perspective and safety perspective. While focusing on these two aspects, challenges associated with the disposal of vehicles in Pakistan, which limit the allowing of acceptance of such a concept in Pakistan were uncovered and are shared in the further portions of the report.

The research helps understand the disposal of obsolete automobiles in the perspective of Pakistan. It is conducted to determine the legislation for disposal of obsolete and battered vehicles in the country, to document practices being followed for the disposal of such vehicles and to identify the criteria followed to categorize the vehicles as retirement worthy.

2. LITERATURE REVIEW

Technology has mechanized operations including the manufacturing, maintenance, disposal and replacement of automobiles. As more automobiles are introduced on the road, the carbon footprint increases, for which certain policies have been put in place, to declare high emission vehicles unfit for the road. The Clean Air Act 1970 is among these policies which contains the clause for the control of vehicle emissions which regulate the quality of fuel used, vehicle fitness inspection programs and the scrappage of unfit vehicles (Beaton et al., 1995; Toor & Havlick, 2004).

As more vehicles are manufactured, the total number of vehicles increases unless they are scrapped or disposed of to make space for the newer vehicles (Nash, 1976). With technological advancement, the carbon footprint of newer vehicles has decreased both in terms of production of each vehicle and the emission that each vehicle produces. Older generation cars tend to have a higher contribution to the more damaging emissions as compared to the newer cars which, owing to more sophisticated technologies have a lesser impact on the environment (Davis & Kahn, 2010).

Since the 1980s to the early 90s, due to the advancement of technology in the automobile sector, vehicles emissions decreased to nearly half of what they used to be, whereas the distance travelled in the same amount of fuel increased twofold which points to the fact that newer vehicles have a lot lower emissions and are a lot more efficient in fuel consumption and are improving even further in a similar proportion, underlining the fact that newer cars have lower emissions and are lighter on fuel, and replacing the old vehicles with newer ones would be beneficial both in terms of pollution and economy (Kahn, 1996). The retiring of vehicles would have a constructive impact on vehicle emissions because these emissions contain Carbon Monoxide CO, NOx which are much greater than the vehicles produced today, which in turn are huge contributors to human health issues, specifically the respiratory disorders (H. Gibbons, 1992).

In addition to the emissions that such vehicles produce, since they are based on old technology, there are also safety hazards that these vehicles pose. Recently, all over the world, people have become more conscious about what they buy, which is also true for the automobiles. People are willing to pay extra for their safety in the cars for features like airbags, abs etc. which were not available in earlier generation cars (D. Gershoff & J. Koehler, 2011)

There are three components a vehicle; the car, the road and the driver. For the commute to be safe, all three need to function properly to vouche for a safe drive. For the travel to be safe, the vehicle has to provide appropriate steering and braking devices and not have any faults which could render the driver incapable of controlling the vehicle, hence resulting in a crash (M Jameson Wetmore, 2004). Earlier, automobile manufactures worked towards designing cars that would not have mechanical failures but the focus of automobile companies shifted from making cars that wouldn't crash, to cars that would save the occupants in case of a crash, thus introducing the concept of active and passive safety in cars (M Jameson Wetmore, 2004).

Active Safety is the concept which prevents the vehicles from crashing, whereas, Passive Safety is the one which prevents the occupants in the vehicle from injuries or fatalities in case of a crash. Active safety typically includes features such as Anti-Lock Brake System (ABS), Traction Control, Electronic Brake Distribution (EBD) and Electronic Stability Control (ESC). These features aid the driver in controlling the vehicle to avoid any formidable situations. Passive Safety typically includes, Airbags, Seatbelts, Rollover bars and Headrests.

The older the car, the more the chances of fatalities. Over the last few decades, the number of traffic deaths has decreased considerably, while the use of seatbelts and the availability of air bags in cars has greatly contributed to the decrease in fatalities (D. Levitt & Porter, 2001). In the United States, the installation of Airbags in cars was mandated in 1998, although they were being provided by certain auto manufacturers from the early 90s (Cummings, D. Koepsell, P. Rivara, McKnight, & Mack, 2002). All over the world, cars that are not equipped with such equipment, are mostly scrapped and such cars are also subject to higher insurance rates or they are not provided insurance at all, so as to discourage the use of such cars. This, in turn, promotes the shifting of automobile users to newer vehicles, which are both safer to drive and cleaner for the environment as well (Davis & Kahn, 2010)

Usually, in high income countries, the disposal of vehicles is carried out a lot sooner than in low income countries. In high income countries, people can afford to replace their vehicles within a certain short time frame compared to countries that have lower income where people tend to use vehicles for longer periods of time without replacing them. In addition to that, often, cars from high income countries are traded to lower income countries, which greatly affects the level of emissions, safety and economy for both countries, reducing the variables in the exporting countries whereas, increasing the same in the importing ones (Davis & Kahn, 2010).

As companies introduce newer generations of automobiles, the older ones start getting obsolete to a point where they are no longer fit for use under the laws implemented in the country. This is the point in the vehicles' life cycle where they must either be scrapped or they are traded in secondary markets (Purohit, 1992).

Analysis suggests the trade of vehicles between countries increases the overall emission levels because the country that acquires used cars normally has a lower retirement rate of vehicles which means that discarded vehicles from other countries remain on the road in these countries whereas, to replace these vehicles, newer vehicles would have been acquired, hence increasing the number of vehicles on the road as a whole and in turn increasing the overall emissions. To overcome this issue, policy makers need to come up with policies in which trade of discarded vehicles is discouraged and the proper scrappage / disposal of such vehicles is encouraged in order to decrease the number of high emission vehicles on the road. This would also encourage the export of new, energy efficient vehicles to other countries which are currently importing used vehicles (Davis & Kahn, 2010).

Deciding when to scrap / dispose of vehicles is partly dependent on the vehicle owners and the benefits that they may reap from replacing the vehicle with a newer one and partly on when the legislation imposing authorities see the car unfit for the road like according to the 1990 Clean Air Act in the U.S. or similar legislations varying in different countries (Alberini et al., 1995). Governments also provide incentives to promote early retirement of vehicles like the 'Cash for Clunkers' program carried out in the U.S in 2009 in which people were given compensation against disposing of their cars which helped in paying for newer and more energy efficient cars and in turn, promoted the disposal of cars that negatively affected the environment (Davis & Kahn, 2010).

Newer models become greener which calls for early vehicle retirement programs. Although these programs have costs for vehicle owners, they provide long term gasoline savings, lower insurance costs and improve vehicle reliability with newer features, with a reduction in carbon footprint (H. Gibbons, 1992). As the vehicle ages, maintenance cost surpasses the value of the vehicle itself due to the depreciation in the value of the car (Nash, 1976). According to Davis & Kahn, in high-income countries, that point reaches earlier (2010).

Early vehicle retirement programs would allow the users to buy newer cars much earlier. However, the gasoline saving, lower insurance costs and improved vehicle reliability may not be enough incentive for people to buy newer cars. For that, the governments offer subsidy on the new vehicle or a contribution in purchase of a new vehicle (H. Gibbons, 1992).

When talking about vehicle disposal, two questions need to be addressed. Where would these cars go? And, what about the people who are employed to work at facilities that fix old cars? The answer to the employment question is simple. The people will get unemployed for a short period of time, but then they would be absorbed by companies that produce new vehicles, companies that recycle the waste from cars and many would also stay at repair and maintenance facilities because new cars would also require maintenance. In Australia, over 500,000 vehicles are scrapped each year, a business that keeps facilities running all year round (Ha, 2011).

In addition to giving incentives to automobile users, there are emission standards that moderate the use of vehicles on the road and owners are taxed depending on their vehicle's age. The older the vehicle, the higher the tax.

3. RESEARCH METHODOLOGY

The exploratory research is conducted to gather firsthand information about the topic in a focused area of interest (G. Jaeger & R. Halliday, 1998). Qualitative technique has been used in this study to answer the cause and effects of the phenomenon and to address the research objectives (Yin, 2013), which have been extracted from the following research questions.

Q. What are the current practices employed in the disposal of obsolete automobiles in Pakistan?

Q. What are the criteria to ascertain that a vehicle has reached its retirement age?

In this study, the Grounded Theory approach is followed by collecting the data first instead of forming a theory and then themes are formed from the data to extract the theory (Urquhart, 2012). In addition to the primary data collected, the literature is also thoroughly studied to extract the factors to be measured in the research which would help collect the appropriate data, following the research objectives. For research direction, literature was consulted for an insight in the topic, then questions were addressed through the use of interviews, to gather information of the said practice in Pakistan, which in turn provided responses for research objectives.

3.1 SAMPLE SELECTION AND SIZE

The purpose of using interviews was to acquire as wide a range of responses from people with different points of view as possible. Purposive sampling is used to ensure that there is a variation in the types of interviewees (Patton, 2002). The twin cities, Islamabad and Rawalpindi were selected as a sample for the research. Given that the goal is to have a variety of opinions, the sample is selected from the following.

1. Automobile Manufacturers
2. Regulatory Authorities
3. Automobile Users

Table: Research Participant Groups

Table 1: Research Participants

Research Participant Groups	Number of Interviews
Automobile Manufacturers	4
Regulatory Authorities	3
Automobile Users	7
Total Interviews	14

The automobile manufacturers included, Nissan Rawalpindi, Toyota Islamabad, Honda Rawalpindi and Suzuki Islamabad. Whereas, the regulatory authorities included, CLEAN (Central Laboratory for Environmental Analysis & Networking), Enercon Islamabad and Environmental Protection Agency Pakistan. Sample consisted of two types of Automobile users, ones that were knowledgeable about automobiles, and ones who were not.

The variance in responses was achieved through a random sample collection, each from a different organization or a different entity in whole. To select the interview participants, purposive sampling was used in which the researcher identifies a certain category of participants which he believes would best assist in the investigation based on their expertise or being informed on the topic at hand to have an appropriate representation of the population (Adler & Clark, 2007).

When using a purposive sampling technique, the interviewees are selected based on them being either the witness of a specific event or having expertise in the certain field or in some way associated with the field of study so that we get responses that are the most appropriate for the scope of our research. When such a practice is followed, the information collected is more reliable and accurate, specifically when the sample is taken from general population with different degrees of knowledge on the topic at hand (Weiss, 1994). When using the purposive sampling technique, it is important to consider people with all the perspectives of the issue under study so that all the sides of the issue are covered (Rubin & Rubin, 2011).

Snowball Sampling was also used with some participants asked to recommend other persons who, in their opinion would be valuable for the research and may be interviewed for their responses. This was mostly followed in interviewing the automobile manufacturing sector and the regulatory authorities as well. In snowball sampling, certain individual(s) are interviewed about the topic and then they are treated as informants who identify other potential interviewees who may qualify to be the part of the sample, and then the advised interviewees are approached to be interviewed (Bailey, 1994).

The questionnaire for the interviews were developed by analyzing the factors measured in the literature that was consulted prior to the collection of data. The gaps in the research were considered so that they may be filled by the data collected. The questions were designed in a way to help gather data in accordance with the research objectives. A pilot test was conducted by sending the questionnaires to automobile sector experts, to test the validity of the questions.

3.2 DATA COLLECTION

Fourteen interviewees were individually interviewed once. The interviews had a number of standardized questions on the topic in-line with the research objectives to collect appropriate data. The purpose of standardized questions is to have a variety of responses on similar questions which can be compared for results (King & Horrocks, 2010).

On average, the interviews lasted about 45 minutes each with the longest one extending to about 80 minutes. The interviews from the automobile sector and the regulatory authorities were held at their work places while the automobile users were interviewed at their residences.

During the interviews, there were notes taken of important points and about half of the interviews were recorded to be transcribed later. The transcripts were then used to extract the important information.

4. DATA ANALYSIS

The automobile industry has a high rate of obsolescence with a constant race to improve the technology used in cars, making them safer, more environment friendly, more comfortable and a lot cheaper to run. These new vehicles result in either sale of old cars in the used car market or scrapping them altogether. To study the current practice being observed in Pakistan, this research is carried out. The analysis of the qualitative survey that was conducted in the twin cities answers questions about the concept of vehicle disposal in the perspective of Pakistan and the limitations that encompass it.

4.1. DISPOSAL OF VEHICLES:

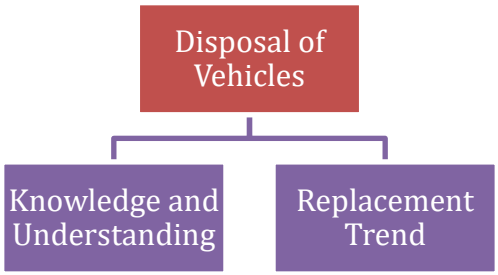

Figure 1: Subdivisions of Disposal of Vehicles

4.1.1. KNOWLEDGE AND UNDERSTANDING:

The knowledge and understanding of the interviewees were determined by asking them three questions:

What do you understand by the term 'vehicle disposal'?

Table 2: Understanding of the term

Responses	Automobile Sector	Regulatory Authorities	Automobile Users	Total	Total %
When a car becomes a liability to keep, it must be trashed	3	2	5	10	71.4
When a vehicle reaches its end life, it must be demolished	2	1	4	7	50.0
Breaking down of a vehicle and recycling the material	3	2	4	9	64.3
Not allowing vehicles to be used.	4	1	5	10	71.4
Excluding the Vehicle from automobile registries.	2	2	1	5	35.7

About 71% of the interviewees believed that when a vehicle becomes a liability in terms of financial upkeep, it is fit to be disposed of and it shall not be allowed on the roads.

Many (64%) believed that when a vehicle reaches that point, it is best to scrap the car, break it down into pieces and then use the material for other purposes, as in recycle the material to be used in the manufacturing of other, more important goods.

The next question was,

In your opinion, is the disposal of vehicles a good idea, in our developing country?

Table 3: Disposal of Vehicles, a good idea?

Responses	Automobile Sector	Regulatory Authorities	Automobile Users	Total	Total %
People don't tend to easily let go of things	1	1	5	7	50
Everything has a useful life, after which it should be disposed of	3	2	6	11	78.6

About 79% of the interviewees believed that every manmade object, should be disposed of, including automobiles. When the cars are no longer useful and are in fact a nuisance, they should be disposed of, making room for their replacements.

About half of the interviewees were of the view that in Pakistan, people do not easily let go of possessions which is true even more so for their cars, which are treated as assets. The concept would need a lot of time in Pakistan to be accepted as people highly value their cars.

The next question that was asked from the interviewees was:

In your knowledge, are there criteria set by the government for the disposal of old automobiles? If so, what criteria are set?

Table 4: Criteria for Disposal

Responses	Automobile Sector	Regulatory Authorities	Automobile Users	Total	Total %
No such criteria	4	3	7	14	100.0
Emission standards	2	0	3	5	35.7

All of the interviewees responded that in their knowledge, there are no criteria set by the government based on which, a vehicle may be categorized as fit to be disposed of or scrapped. In addition to negative responses about the existence of a law for disposal of vehicles, a few interviewees talked about emission standards for vehicles that have been put in place for brand new vehicles only.

Judging from the interview responses, it is clear the interviewees had knowledge about the subject.

4.1.2. REPLACEMENT TREND:

The interviewees were inquired if they have observed a trend vehicle replacement in Pakistan.

What do you believe determines the time for replacement of a vehicle in Pakistan?

Table 5: Time of replacement of vehicles

Responses	Automobile Sector	Regulatory Authorities	Automobile Users	Total	Total %
When parts get too scarce	1	1	5	7	50.0
When damaged too badly after an accident	2	0	3	5	35.7
When the owner has enough money to buy a newer, improved car	4	2	6	12	85.7
The vehicle becomes too expensive to maintain	2	1	5	8	57.1
When new variants / models are introduced	3	1	3	7	50.0
People treat vehicles as assets and don't replace them too often	1	2	4	7	50.0

Most of the interviewees (86%) believed that in Pakistan, people mostly replace their cars when they can afford to buy a newer car. Buying a newer car does not essentially mean that it is a brand-new car. The car maybe newer than the previously owned yet it may still be a used car. They either keep their old one, which rarely happens, or they sell it in the used-car market. In Pakistan, because household income is not high, buyers for used cars are more. So, the cars keep circulating in the market till they are either badly damaged after an accident or stolen and stripped for parts.

More than half of the interviewees were of the opinion that people in Pakistan normally replace their cars when they become too expensive to maintain. People sell their cars only to transfer the burden to the new owner. Automobiles do not depreciate at a high rate in Pakistan.

50% interviewees believed that people buy new cars as soon as newer variants are introduced in the market. These interviewees were mostly automobile manufactures and the automobile users who follow the said pattern as well. This however, may be true for people who replace their cars frequently and who prefer to maintain a social status.

The other 50% of the interviewees said people do not easily let go of their cars. They treat their cars as assets and do not replace them for very long. This is especially true for the middle and the lower class of people where the cars are often transferred between generations. There was disparity in opinions based on responses of the participants but most had similar views about the disposal of obsolete automobiles in Pakistan.

4.2. DETERMINANTS:

The determinants for the disposal of vehicles in Pakistan guides us on what can be used as a basis for deciphering between acceptable vehicles and retirement worthy ones.

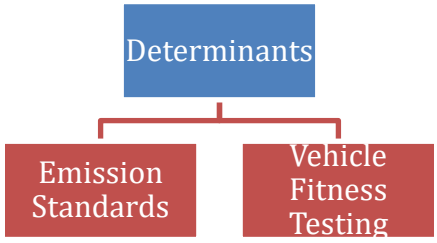

Figure 2: Subdivisions of Determinants

The determinants consist of the following subdivisions; Emission Standards and Vehicle Fitness Testing.

4.2.1. EMISSION STANDARDS:

Emission standards are standards that allow a minimum number of Hydrocarbons, Carbon Monoxide (CO) and Nitrogen Oxides (NOx) to be emitted by the exhaust of a vehicle. A standardized emission format is used the world over, known as the Euro or the European Standard of Emissions. Pakistan[1] operates at the Euro II Emission Standards.

Three questions were asked from the interviewees that concerned the emission standards. The first of which was,

What exactly does the Euro II standard cover?

Table 6: Euro II Standard

Responses	Automobile Sector	Regulatory Authorities	Automobile Users	Total	Total %
Maximum amount of Carbon and NOx contents from the exhausts	2	1	2	5	35.7
Catalytic converter	2	0	2	4	28.6
Better fuel refinement	3	1	3	7	50.0
Emission control	3	2	4	9	64.3

[1] Consumer to bear cost of Euro II – An informational article about Euro II at http://www.pakistantoday.com.pk/2012/07/02/business/consumer-to-bear-cost-of-euro-ii/

According to 64% of the interviewees, the Euro II emission standard revolves around lowering the emissions produced by automobiles. The Euro II standard limits the amount of emissions of a vehicle. In Pakistan however, it is currently being implemented on new vehicles exclusively.

Half of the interviewees said that the Euro II standard is also about the refinement of fuel. For the cars to be able to produce a certain level of emissions, the quality of the fuel used in them also needs to be improved. The Euro II also has set standards for the refinement of fuel by the refineries, under which, the fuel would not be acceptable.

A few individuals went a little into the depth of what the Euro II standard governs for the automobile manufacturers. An automobile that complies with the Euro II standard must have a limited amount of Carbon Monoxide (CO), Hydrocarbons (HC) and Nitrogen Oxide (NOx) present in its exhaust emissions. These limits however were not defined by the interviewees.

The next question on the subject was,

In the Euro II standard, what compulsions are enforced on the automobile production companies?

Table 7: Compulsions of Euro II

Responses	Automobile Sector	Regulatory Authorities	Automobile Users	Total	Total %
Conforming to specific emissions	4	1	3	8	57.1
Outdated emission standards	1	0	2	3	21.4
Catalytic converter	2	0	2	4	28.6
Higher quality of fuel	3	2	3	8	57.1
Low Sulphur Content in Diesel for the oil refineries	2	0	1	3	21.4

57% of the interviewees said that automobile manufacturers need to conform to criteria for emissions of vehicles when producing new vehicles and use all equipment necessary to stay within the prescribed limits, the most prominent of which is the Electronic Fuel Injection and a Catalytic Converter.

Interviewees also spoke of the quality of fuel which is an important factor for meeting the emission standards. The pursuit for cleaner emissions is not just in the hands of the automobile manufacturers but also the fuel refineries that provide the fuel that is used in these vehicles.

The refineries are currently found to be meeting the standards of the quality of fuel allowable when refining the Petrol fuel but the same is not true for Diesel Fuel. The amount of Sulphur allowed by the Euro II standard is 2500ppm but the government has given leverage to the refineries for now and is allowing 10000ppm of Sulphur currently, which does not meet Euro II standards. Although the government is allowing 10000ppm of Sulphur, but the refineries are still working to improve their refinement of the fuel which requires very heavy investment.

A few of the interviewees were also of the view that the Euro II emission standard is a very outdated one. The standard was originally introduced in 1996 and in other parts of the world, Euro 4, Euro 5 and Euro 6 standards are being followed.

The next question asked from the interviewees was,

Do you believe that the Euro II standard is enough or should we be doing more about saving the environment where cars are concerned? Cleaner production maybe?

Table 8: Is Euro II standard enough?

Responses	Automobile Sector	Regulatory Authorities	Automobile Users	Total	Total %
It is a step in the right direction	4	3	2	9	64.3
A lot more needs to be done	1	0	3	4	28.6
Quality of fuel is a major concern	3	1	1	5	35.7
More of a marketing gimmick	0	0	4	4	28.6
Cleaner production facilities are being used	4	1	0	5	35.7

A major portion of the interviewees (64%) agreed that implementing the Euro II standards is a step in the right direction, even with limitations like the quality of fuel, the decision is commendable. It should eventually be applied to all road going vehicles. A few interviewees were also of the opinion that the Euro II standard is not enough and called it a "Marketing Sham" for the automobile manufacturers.

All of the automobile manufacturers expressed that they are doing their best to fight against polluting the environment by adopting practices that have the least impact on it.

4.2.2. VEHICLE FITNESS TESTING:

Vehicle Fitness Testing is the primary method to determine whether a vehicle has reached its end of life and needs to be scrapped. The testing procedures are based on safety and environmental friendliness of the vehicle. Depending on what front it fails, a vehicle may have its registration suspended or it could be scrapped.

To find out if such a practice exists in Pakistan, the following question was asked from the interviewees,

Do we have a vehicle fitness test in Pakistan like the [2]MOT in the UK or the [3]HU in Germany

Table 9: Vehicle fitness testing

Responses	Automobile Sector	Regulatory Authorities	Automobile Users	Total	Total %
Not particularly	2	0	5	7	50.0
There is an organization by the name of NTS	1	1	1	3	21.4
There is an act for Environmental Protection	0	2	0	2	14.3
We have institutions working for the environment like Enercon and EPA	2	2	2	6	42.9

50% interviewees said that there is no such vehicle fitness testing in Pakistan and even if there is one, it is not advertised for people to know.

However, the respondent at Toyota Indus Motors shared that this program was planned by Toyota Motors in 2012 in coordination with Enercon to inspect vehicles before their registrations were renewed every year. Indus Motors had even set up a facility to present to the decision-making entities, but since then no action had been taken.

6 of the interviewees mentioned organizations like Environmental Protection Agency (EPA), Enercon and CLEAN – Central Laboratory for Environmental Analysis and Networking, which is governed by the EPA, that are working for the environment and there are certain automobile related environmental functions that are covered in their purview. Enercon currently has specified facilities where automobiles are tested for emissions and then tuned accordingly, to lower their emissions. These facilities are called VETS (Vehicle Emission Testing Stations). These facilities are equipped with the most modern Emission System Analyzers which analyze the emissions of the vehicles.

The respondent at CLEAN provided information about a vehicle emission pilot project conducted in KPK with the German intervention in 1999. The project, although successful, was not sanctioned later because of conflicts of interest in the government.

One of the interviewees also informed about the presence of a CNG cylinder testing facility in H-11 which is a part of The Hydrocarbon Development Institute of Pakistan – HDIP. Although this facility is available, cng cylinder testing is not an enforced practice.

[2] MOT - The **Ministry of Transport test** is an annual test for testing vehicle safety from roadworthiness aspects and exhaust emissions as required in Great Britain for most vehicles which are over three years old used.

[3] Vehicle roadworthiness **(*Hauptuntersuchung* or HU)** tests are mandatory in Germany. Failure to comply to these tests, or losing proof that the examinations have been carried out, would result in a fine and/or points on the driving license.

5. CONCLUSION

The focus of this study was to analyze the practice of disposal of obsolete automobiles in the perspective of Pakistan. In Pakistan, there is no criteria defined by the government, on the basis of which, a vehicle may be classified as fit to be disposed of, demolished, written off the automobile registries and no longer allowed to be used in any part of the country.

The participants of the research agreed that vehicles that are not safe to be driven on the road, based on factors such as structural integrity or physical fitness of the vehicle or the excessive damage they cause to the environment due to emissions.

Emission standards in Pakistan were discussed that regulate the use of vehicles. Currently, Pakistan is running on the Euro II emission standard that was very recently adopted. The standard however, is applied to new cars only. Due to the implementation of the standards, most of the vehicles available today have been converted to electronic fuel injection and have a device called a catalytic converter installed in the exhaust, both of which help reduce the vehicle emissions while improving the fuel efficiency as well.

There are facilities called VETS setup in different parts of Islamabad for testing vehicle emissions, however, the testing is not mandatory because of a lack of regulatory authority. In addition, there are no facilities test the vehicles in terms of safety and mechanical fitness.

The emission standards are not being applied to all cars present on the road, and testing of vehicle emissions is not mandatory. Unemployment is a potential negative aspect of the policy as many people earn their livelihood by fixing and rebuilding old cars. Lack of awareness and poverty are major limitations to discarding obsolete vehicles. However, something needs to be done to diminish the damage being done to the environment and to ensure the safety of road users.

6. RECOMMENDATIONS

This study covered the issue of the disposal of obsolete automobiles in the perspective of Pakistan. Certain limitations were observed which may not allow such a practice to be followed in Pakistan, the most prominent of which was the issue of people not being able to afford new cars because of the low income of most of the households. To help aid people in buying modern vehicles, the following recommendations may be considered.

As observed in the literature, early vehicle retirement programs are initiated by the government in which, people are provided incentives to adopt such practices. An early vehicle retirement program should be introduced in the country, in which, the owners of obsolete vehicles are given a monetary incentive in exchange for replacing their vehicle and scrapping it. This would promote the purchase of new vehicles and would also help replace the damaging vehicles from the road.

Currently, the law does not allow the import of vehicles older than 3. If the government allows for older cars up to 7-8 years, considering that they fulfil the Euro II standard, it would make it a lot cheaper to import quality cars. If the import of more than 3 years old cars cannot be allowed, if duty free import of “Kei” cars is allowed, it can form a healthy competition in the market, disrupting the monopoly of local automobile manufacturers, pushing them to improve vehicle performance.

Many citizens are not aware of the consequences of the use of such vehicles, they don’t realize how harmful using high emission vehicles would be in the long term. The government should start campaigns to educate the people.

If the complete removal of these vehicles is not possible at this point in time, fitness inspection centers should at least be set up and fitness examination enforced for all road going vehicles.

The quality of fuel that is currently available in Pakistan is not good enough to allow cars with higher euro standards to run properly, and the current standard of emissions cannot progress to higher standards unless the quality of fuel is improved. The refineries should invest in better plants that refine the fuel to higher standards with the aid of the government.

REFERENCES

[1] Adler, E. S., & Clark, R. (2007). How its done: An Invitation to Social Research (3rd ed.). United States of America: Thomson Wadsworth.

[2] Alberini, A., Harrington, W., & McConnel, V. (1995). Determinants of Participation in Accelerated Vehicle-Retirement Programs. Wiley on Behalf of RAND Corporation, 26, 93–112.

[3] Bailey, K. D. (1994). Methods of Social Research (4th ed.). New York: The Free Press.

[4] Beaton, S. P., Bishop, G. A., Zhang, Y., Ashbough, L. L., Lawson, D. R., & Stedmam, D. H. (1995). On-Road Vehicle

Emissions: Regulations, Costs, and Benefits. American Association for the Advancement of Science, 268, 991–993.

[5] Cummings, P., D. Koepsell, T., P. Rivara, F., McKnight, B., & Mack, C. (2002). Air Bags and Passenger Fatality According to Passenger Age and Restraint Use. Lippincott Williams & Wilkins, 13(5), 525–532.

[6] Davis, L. W., & Kahn, M. W. (2010). International Trade in Used Vehicles: The Environmental Consequences of NAFTA. American Economic Association, 2(4), 58–82.

[7] D. Gershoff, A., & J. Koehler, J. (2011). Safety First? The Role of Emotion in Safety Product Betrayal Aversion. The University of Chicago Press, 38(1), 140–150.

[8] D. Levitt, S., & Porter, J. (2001). Sample Selection in the Estimation of Air Bag and Seat Belf Effectiveness. The MIT Press, 83(4), 603–615.

[9] G. Jaeger, R., & R. Halliday, T. (1998). On Confirmatory versus Exploratory Research. Herpetologists' League, 54, 64–66.

[10] Greenspan, A., & Cohen, D. (1999). Motor Vehicle Stocks, Scrappage, ,and Sales. The MIT Press, 81(3), 369–383.

[11] Ha, T. (2011). Greeniology 2020. Melbourne.

[12] H. Gibbons, J. (1992). Retiring Old Cars.

[13] Kahn, M. W. (1996). New Evidence on Trends in Vehicle Emissions. Wiley on Behalf of RAND Corporation, 27(1), 183–196.

[14] King, N., & Horrocks, C. (2010). Interviews in Qualitative Research. California: SAGE Publications.

[15] M Jameson Wetmore. (2004). Redefining Risks and Redistributing Responsibilities: Building Networks to increase Automobile Safety. Sage Publications, Inc., 29(3), 377–405.

[16] Nash, C. A. (1976). The Replacement of Road Transport Vehicles. University of Bath and The London School of Economics and Political Science, 10, 150–166.

[17] Patton, M. Q. (2002). Qualitative Research & Evaluation Methods (3rd ed.). Saint Paul: Sage Publications.

[18] Purohit, D. (1992). Exploring the Relationship between the Markets for New and Used Durable Goods: The Case of Automobiles. INFORMS, 11(2), 154–167.

[19] Rubin, H. J., & Rubin, I. S. (2011). Qualitative Interviewing: The Art of Hearing Data. SAGE Publications.

[20] Toor, W., & Havlick, S. (2004). Transportation and Sustainable Campus Communities: Issues, Examples, Solutions.

[21] Urquhart, C. (2012). Grounded Theory for Qualitative Research: A Practical Guide. SAGE Publications.

[22] Weber, J. (2009). Automotive Development Processes. Springer.

[23] Weiss, R. S. (1994). Learning from Strangers: The Art and Method of Qualitative Interview Studies. New York: The Free Press.

[24] Yin, R. K. (2013). Case Study Research: Design and Methods. Washington DC: Sage Publications.