



# **Performance Audit**

## **Vehicle Emissions Control Schemes**

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## List of Acronyms

ADT	Malta Transport Authority
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
DLG	Department for Local Government
EAC	Emission Alert Campaign
EU	European Union
LES	Local Enforcement System
LESC	Local Enforcement System Committee
LN	Legal Notice
LTD	Licensing and Testing Directorate
MEPA	Malta Environment and Planning Authority
NAO	National Audit Office
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
O <sub>3</sub>	Ozone
PAH	Poly Aromatic Hydrocarbons
PM <sub>2.5</sub>	Particulate Matter with an aerodynamic diameter of 2.5 microns and less
PM <sub>10</sub>	Particulate Matter with an aerodynamic diameter of 10 microns and less
RET	Roadside Emissions Test
RTI	Roadside Technical Inspection
SMS	Short Message Service
SO <sub>2</sub>	Sulphur Dioxide
VERA	Vehicle Registration and Administration System
VRT	Vehicle Roadworthiness Test



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## Executive Summary, Conclusions and Recommendations

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## Executive Summary, Conclusions and Recommendations

### Background

Since 2002, the Maltese Government launched four vehicle emissions tests as part of the following schemes: the Vehicle Roadworthiness Test, the Emissions Alert Campaign, the Roadside Technical Inspection, and the Roadside Emissions Test. These schemes aim to reduce air pollution emanating from vehicle emissions and thereby improve Malta's ambient air quality.

In view of the environmental health concerns and legislative obligations associated with air pollution from vehicles, the audit focused on Malta's vehicle emissions control schemes, as implemented between 1 October 2006 and 30 June 2007.

The audit particularly sought to evaluate whether:

1. the vehicle emissions control schemes were conducted properly and effectively;
2. the quality control carried out by the regulatory bodies concerned was adequate to ensure that the schemes were properly implemented;
3. the enforcement action contemplated by these schemes was adequately and consistently undertaken so as to ensure that vehicles found to have excessive emissions rectify their situation.

Wherever possible, any developments in the schemes up to the time of publishing are also included in the appropriate sections and reflected in the conclusions of this report.

### Emissions testing in the Vehicle Roadworthiness Test

Most vehicles aged four years and over are legally obliged to undergo a periodic Vehicle Roadworthiness Test (VRT). Since 2002, the VRT has included emissions testing, namely the testing of the exhaust gas opacity of diesel-

engine vehicles and the carbon monoxide (CO) level of petrol-engine vehicles' exhaust. The VRT also checks vehicles' exhaust system. The majority (94 per cent) of vehicles are obliged to undergo a VRT biennially, whilst the remainder undergo the test annually.

During the audit period almost 98,000 vehicles underwent a VRT. Of these vehicles, 1,088 were found to have excessive emissions and another 1,003 had faulty exhaust systems. Most of these subsequently rectified the faults in question and passed a retest. Sixteen vehicles did not pass a retest and so were unable to renew their road licence.

This audit also sought to evaluate the duration of the VRT compliance effect. The results of on-the-road emissions tests suggest that the VRT compliance effect is very temporary, diminishing substantially in the first months of the VRT cycle. During the period under review, 1,241 vehicles failed a roadside emissions test (34 per cent of those tested). About one fourth of those failed were still in the first quarter of their VRT cycle, while almost half failed during the first half.

The data clearly indicates that for continuous and long term emissions compliance, the VRT must be complemented by a substantive roadside emissions testing regime. The VRT results indicate that such a regime should particularly target vehicles found to be most at risk of having excessive emissions - older vehicles across all categories, diesel, and commercial vehicles.

The audit also focused on the inspection regime conducted by the Malta Transport Authority (ADT). The VRT Regulations empower the ADT to undertake various quality control measures to ensure that VRT operators comply with the law and conduct VRT tests correctly. During the audit period, however, the ADT's inspections were not fully adequate or risk-based to ensure that VRT was conducted properly by all stations.

Subsequent to the conduct of this audit, the ADT reported that, in 2008, it adopted various initiatives in a bid to



improve the inspection and monitoring of VRT stations. The ADT introduced a penalty point system for VRT station operators and undertook a more rigorous inspection regime, including risk-based targeting of VRT stations. As a result of these initiatives, six VRT stations were fined for VRT related infringements – of these only one has paid up while the rest are currently appealing their case. Eight cases were referred for police investigations and subsequently one of the stations was closed down after being found guilty by the Courts. Seven testers were also instructed to comply with emissions testing standards.

## The Emission Alert Campaign

The ADT launched the Emission Alert Campaign (EAC) in August 2005. The Campaign aimed to increase awareness about harmful emissions and to increase enforcement through public participation. This Campaign urged the public to report vehicles emitting excessive fumes through a mobile phone text message. It is to be noted that to date the public may still report vehicles with excessive fumes. However, the ADT has not summoned reported vehicles for testing since the latter part of 2008.

The EAC generated significant public response. During the nine month period under review, the public reported 14,322 vehicles – over five percent of the Maltese vehicle population. The public mostly reported diesel engine vehicles, vehicles aged over eight years and public transport vehicles. Since the public's reporting is based on what is visible, the public is generally unable to identify and report noncompliant petrol engine vehicles. Consequently, the Campaign cannot be regarded as a means of identifying noncompliant petrol engine vehicles.

According to the ADT's prescribed procedures, vehicles which get reported by three different mobile phone numbers within a three month period would be summoned for an emissions test. In the period under review 1,200 vehicles were summoned for at least one test but only 721 turned up for the test. Nearly 14 percent of the tested vehicles failed the emissions test.

The Campaign did prod a number of vehicles to rectify their emissions. During the nine month audit period 42 vehicles which failed a Campaign emissions test rectified their situation and subsequently passed a second emissions test or a VRT.

Vehicles which failed or did not undertake two tests had a restriction set on the renewal of their road licence. During the audit period the EAC administrators instructed the Licensing and Testing Directorate (LTD) to set such a restriction for 338 defaulting vehicles. This audit found that these restrictions were effective for 84 percent of these vehicles.

However, the following concerns relating to the ADT's filtering and testing of the reported vehicles were observed:

- The ADT applied a higher filtering threshold than that prescribed due to a lack of testing capacity.
- The ADT did not maintain a record of the beginning and end of the three month filtering period used to determine which reported vehicles should be summoned for an emissions test.
- During the period August 2005 to August 2007, about 4,393 vehicles which were reported at least four times were not summoned for testing.
- At least 273 out of the 4,393 unsummoned vehicles should have been tested. However, it transpired that most of these vehicles pertained to the public transport category and were referred for testing under the Roadside Technical Inspection scheme. The vast majority of these vehicles passed the emissions test when inspected.

The ADT stated that it was not in a position to cope with the significant public response due to its limited testing resources. The Authority contends that from the outset there was no intention to increase resources, especially taking into consideration all other obligations of its Enforcement Section. Additionally, according to the ADT, the Campaign was primarily intended to increase awareness, while enforcement was a secondary objective.

## Roadside Vehicle Emissions Tests

During the period under review, two roadside vehicle emissions test schemes were in operation as detailed below.

The Roadside Technical Inspection (RTI) scheme was initiated by the Malta Transport Authority in October 2005. Roadside Technical Inspections entail twelve testing criteria, including checking emissions levels and the exhaust system. Almost 20 percent of the 1,164 vehicles subjected to a Roadside Technical Inspection (RTI) were found to have excessive emissions. Another four percent were found to be at high risk of developing excessive emissions because they had a fault in their exhaust system. The 295 vehicles concerned were issued with the relative citation and summoned to undergo a VRT shortly after.

Commercial vehicles had the highest emissions failure rate for vehicles less than 16 years old. The failure rate of private vehicles rose steadily with age, reaching that of commercial vehicles in the 13 to 16 year old age group, and becoming the highest for the vehicles aged over 17 years. None of the inspected public transport vehicles

under 16 years of age failed the emissions component. However, the significance of this result is limited since only 17 such vehicles were inspected. A more significant number of public transport vehicles, 109, aged at least 17 years were inspected. For this age group, public transport vehicles had roughly the same failure rate as commercial vehicles but lower than private vehicles.

The RTI scheme, as managed by the ADT, was effective in identifying noncompliant diesel engine vehicles. Moreover, this scheme particularly targeted those vehicles considered to be high risk by the EU and national legislation. This scheme was also supported by a thorough audit trail. The scheme, however, hardly targeted Gozo based vehicles.

The second roadside test scheme which was implemented during the audit period was the Roadside Emissions Test (RET). This scheme was conducted by the Joint Committees of Local Councils, as part of the Local Enforcement System. During the audit period eight Joint Committees implemented the RET while the Joint Committee of Fgura opted not to implement it. Emissions testing was carried out by local wardens provided on a contract basis by two private warden service agencies. The Scheme was overseen by a ministerial, interdepartmental Local Enforcement System Committee (LESC).

During the period under review, at least 1,500 vehicles were subjected to an RET. The total vehicles tested is, however, likely to be higher since some Joint Committees did not record the total number of vehicles tested. The failure rate relating to the 1,500 tested vehicles was around 50 percent. The RET findings also indicated a lack of maintenance by vehicle owners – even for new vehicles.

The RET had a significant potential to identify non-compliant vehicles since it exclusively focused on emissions. However, the scheme's full potential was not realised due to a number of factors.

Operating standards and reporting obligations were not documented. Additionally, communication and accountability lines were complex and unclear. There was no record of any monitoring undertaken. Such omissions are deemed to have detracted from the scheme's operational transparency, especially as the scheme was part of a self-financing programme.

Despite its potential, the scheme was discontinued in early 2008 as the ADT decided to limit the conduct of emissions testing to trained certified officers. It is envisaged that the RET, as part of the Local Enforcement System, will be reviewed within the undergoing local council reform exercise.

## Overall Conclusions

This audit was concerned with the extent to which the implementation, monitoring and enforcement of Malta's Emissions control schemes had the desired impact. These schemes aimed to bring about greater compliance from owners to properly maintain their vehicles to ensure that emissions are within the levels prescribed by law.

The four schemes reviewed are complementary to each other since they range from a mandatory periodic VRT, a campaign which encourages the public to report defaulting vehicles, to two other schemes involving surprise roadside emissions testing. In practice, there was minimal effort to coordinate the planning, operational, enforcement and monitoring elements of the schemes. Moreover, in 2008, the roadside emissions tests performed by local wardens and the enforcement component of the EAC were suspended.

The results obtained through this audit indicate that, since the implementation of the schemes, there has been an improvement in vehicle emissions compliance. This is as expected, as prior to these schemes there was only a rudimentary framework to ensure vehicle emissions compliance. However, further analysis shows that the schemes did not fully realise their potential.

To varying extents, the four schemes lacked the appropriate planning. Additionally, the lack of an integrated management information system hindered effective management, rendered data analysis problematic, and resulted in incomplete audit trails.

The schemes' outcomes and credibility – especially in the self-financing schemes - were also potentially jeopardised since monitoring carried out by the regulators concerned was limited, in terms of frequency, quality and documentation.

Enforcement with regards to defaulting vehicles was largely effective. In 2008, the ADT also took various enforcement initiatives with regards to defaulting VRT stations. However, enforcement was not always timely and consequently, fully effective.

The health and environmental concerns associated with excessive vehicle emissions necessitate that a robust emissions control framework is in place to ascertain that pollution from vehicles is maintained within the limits prescribed by law.

In recent years a number of initiatives have been implemented in this regard. However, more needs to be done so as to reap the full potential of these initiatives. The fine tuning of the schemes discussed in this report, coupled with the recently introduced fiscal measures which base vehicle road licensing on the polluter pays principle, will

contribute towards providing a more robust and sustainable vehicle emissions control framework.

## Recommendations

In view of the foregoing, the NAO is proposing that the effectiveness of Malta's emissions control framework be strengthened through various improvements at the strategic and operational levels. The NAO is also making a number of recommendations aimed at specific schemes.

## Strategic issues

1. A review of all the emissions control schemes be undertaken so as to formulate more effective and efficient schemes. The review should aim to ensure that schemes are not piecemeal and incremental but rather designed as part of a holistic and comprehensive strategy aimed at tackling excessive vehicle emissions. Schemes should be designed in such a way as to complement each other in terms of targeting and enforcement action, as well as feeding into each other.

The NAO recommends that the strategy is to encompass:

- Educating and incentivising owners to undertake regular vehicle maintenance;
- Devising emissions control schemes which increasingly target all high risk vehicles, including old petrol engine vehicles. In this context, consideration may be given to making VRT required annually for vehicles over a certain age. A robust emissions control framework also requires the strengthening and expanding of roadside emissions testing.

## Operational recommendations common to all schemes

2. The entities involved in the implementing of the various emissions control schemes need to be equipped with the appropriate data management applications so that data is recorded in computer systems that enable good data analysis, monitoring and minimum transcription errors. Ideally, the data should also be inputted in real time so as to ensure effective enforcement.
3. The various IT systems used should be integrated and available to all of the schemes' implementers in order to facilitate the co-ordination of the various emissions control initiatives. Moreover, such an approach would also streamline operations and

yield economies of scale with regard to IT data management.

4. Enforcement procedures should ensure that defaulting vehicles are promptly repaired. This may entail that the current practices adopted to impose road license renewal restrictions be revised to prevent noncompliant vehicles from circulating on the road for more than is practically reasonable.
5. Management control relating to existing schemes needs to be strengthened, particularly with regard to the following aspects:
  - All schemes require better planning in order to be able to assess and obtain the level of resources necessary.
  - The existing schemes necessitate the undertaking of the relevant risk and data analysis. This would optimise the targeting of on-the-road schemes and facilitate the evaluation of the schemes' effectiveness.
  - The regulators concerned need to improve the monitoring they provide with respect to all the existing schemes.

## Scheme specific recommendations

### *Vehicle Roadworthiness Test (VRT)*

6. The ADT is to routinely analyse the VRT results. This will enable the Authority to identify, investigate and act on abnormal trends in VRT results with respect to individual stations and / or specific vehicle categories.
7. The improved inspection regime of VRT stations, as adopted in 2008, needs to be sustained and the necessary timely follow-up undertaken in cases of infringements.
8. The ADT is to ensure that comprehensive documentation relating to quality control inspections of VRT stations is maintained. The quality of such documentation will serve to strengthen the audit trail regarding these inspections.

### *The Emissions Alert Campaign*

9. The Campaign's operational strategy is to be reviewed in the light of the public's response to the initiative and of the resources - including testing capacity - available or to be provided to the ADT. An updated operational strategy should facilitate

the planning, implementation, enforcement, monitoring and improve the overall effectiveness of the Scheme.

10. The filtering time period should start from the date a vehicle is reported for the first time. Such vehicle-centred filtering has various advantages over the current method of setting the same filtering period for all vehicles. It would link eligibility for testing more directly to a vehicle's actual performance.
11. The publicity component of the Campaign should be revived and particularly aim to educate vehicle owners about the vehicle maintenance they should undertake to ensure emissions compliance.
14. Roadside tests should also strive to address on-the-road abuses, such as engine tampering and the illegal use of certain fuels. Moreover, fines should be introduced for vehicle owners found to have tampered with fuel pump seals.
15. Adequate testing equipment used for on-the-road schemes should be made available and regularly checked to ensure that it is functioning properly.
16. Considerations be given for the Roadside Emissions Test (RET) conducted as part of the Local Enforcement System to be restarted. This scheme had the potential at being highly effective at identifying vehicles with excessive emissions since it exclusively focused on vehicle emissions.

### *Roadside testing*

12. The roles and responsibilities of all stakeholders involved in the roadside emissions schemes need to be clearly defined. This is particularly important if there are more than one such schemes operating simultaneously, and if any scheme entails self-financing elements.
13. Roadside emissions tests are to be conducted on a more frequent basis, particularly targeting vehicles older than eight years, and the vehicle categories with a high failure rate in road-side tests or in VRT.
17. The RET Scheme should however be restarted within an improved regulatory and implementation framework. Firstly there is an urgent need for Government to study and determine which entity is to be assigned lead responsibility for regulating, monitoring and providing quality control of all initiatives undertaken as part of the Local Enforcement System. The opportunity exists to take these issues in consideration as part of the LES review to be undertaken in 2009.



## **Chapter 1**

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### **Introduction**

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## Chapter 1 – Introduction

### 1.1 Introduction

Since 2002, the Maltese Government launched four vehicle emission test schemes. Emission testing as part of the Vehicle Roadworthiness Test (VRT) came into effect in January 2002. The Roadside Technical Inspection was launched in May 2004. The Emission Alert Campaign was launched in August 2005. The Roadside Emissions Test conducted by local wardens came into effect in June 2006. These schemes aim to reduce air pollution emanating from vehicle emissions and thereby improve Malta's ambient air quality. In turn, this would have a positive impact on public health and help Malta comply with certain national and EU legislative obligations.

The National Audit Office (NAO) audited these emission control schemes as implemented between October 2006 and June 2007. Where the data for this time period was not available, the NAO audited the data available for the period nearest to the audit period.

Wherever possible, any developments in the schemes up to the time of publishing this report are also included in the appropriate sections and reflected in the conclusions of this report.

### 1.2 Audit concerns

Vehicle emissions have various harmful effects on public health, particularly increasing the risk of respiratory illnesses and of certain cancers.<sup>1</sup> Vehicle emissions also harm world climate and the environment.<sup>2</sup>

In Malta, vehicles are a major source of air pollution.<sup>3</sup> This situation is aggravated by the fact that a relatively large number of vehicles circulate in a very small area: while Malta is one of the smallest EU countries it has one of the highest vehicle per capita rates in the EU, with approximately two vehicles for every three persons. Additionally, the Maltese vehicle population is a relatively old one, with an average age of fifteen years, in contrast to the EU average of eight years.<sup>4</sup> This age factor further aggravates air pollution from vehicles since emissions tend to worsen with vehicle age.

Reduction of air pollution from vehicle emissions is regulated through various national and EU legislation. These include the (Malta) Motor Vehicle Roadworthiness Test Regulations, EU Directives 96/96/EC and 2000/30/EC, and various directives which arise from the air quality framework directive 96/62/EC. Such local and EU legislation set on Malta various monitoring, reporting and compliance obligations regarding vehicle emissions.

### 1.3 Audit objectives

Given the above-mentioned environmental health concerns and legislative obligations, this audit focused on Malta's vehicle emission control schemes, as implemented between October 2006 and June 2007.

The audit particularly sought to evaluate whether:

- the vehicle emissions control schemes were conducted properly and effectively;

<sup>1</sup> Michal Krzyzanowski, Health effects of transport-related air pollution: summary for policy-makers, page 1, World Health Organisation, 2005, ISBN 92-890-1375-3.

<sup>2</sup> National Audit Office - UK, Vehicle Emissions Testing – Report by the Comptroller and Auditor General, page 25, May 1999.

<sup>3</sup> Source: Malta Environment and Planning Authority, 'State of the Environment Indicators 2007', page 12, July 2008.

<sup>4</sup> Budget Speech 2009, page 56, Ministry of Finance, the Economy and Investment, November 2009, at [http://finance.gov.mt/image.aspx?site=MFIN&ref=2009budget\\_Budget\\_Speech\\_en](http://finance.gov.mt/image.aspx?site=MFIN&ref=2009budget_Budget_Speech_en).

- the quality control carried out by the regulatory bodies concerned was adequate to ensure that the schemes were implemented properly;
- the enforcement action contemplated by these schemes was undertaken properly and consistently to ensure that vehicles found to have excessive emissions rectify their situation.

## 1.4 Audit methodology

The audit sought to make its evaluations by:

- examining the Maltese and EU legislative framework regulating the vehicle emission control schemes;
- examining the Malta Transport Authority's (ADT's) records relating to the Vehicle Roadworthiness Test, the Emission Alert Campaign and the Roadside Technical Inspection;
- examining the Local Council Joint Committees' records relating to the Roadside Emissions Test undertaken by local wardens; and
- conducting interviews with the relevant officials at the ADT's and Local Council Joint Committees.

## 1.5 Audit constraints and limitations

This audit did not examine the cost-effectiveness of the schemes or whether the schemes resulted in vehicle emission reductions. The audit also did not attempt to assess the reliability of the equipment used for emission testing by undertaking a technical examination of this equipment.

Additionally, this audit was at instances constrained due to a lack of audit trails, namely with regard to the Emission Alert Campaign and the Roadside Emissions Tests carried out by local wardens.

## 1.6 Background information

### 1.6.1 Vehicle emissions are a major source of health-damaging pollutants

Throughout EU member states, vehicle emissions remain a major source of health-damaging pollutants.<sup>5</sup> Harmful vehicle emissions include carbon monoxide, fine particulate matter, hydrocarbons (particularly benzene and 1,3 butadiene), and nitrogen oxides (NOx). Table 1 sets out the ill effects of the main pollutants contained in vehicle emissions.

**Table 1: The main air pollutants in vehicle emissions and their ill effects**

Air Pollutant	Ill Effects
<b>Carbon Monoxide (CO)</b>	Prevents the normal transport of oxygen by the blood causing heart problems and brain damage.
<b>Nitrogen Oxides (NOx), for example nitrogen dioxide</b>	Cause respiratory illnesses and indirect greenhouse gas.
<b>Fine particulate matter- PM<sub>10</sub> and PM<sub>2.5</sub></b>	Cause respiratory and cardiovascular problems.
<b>Sulphur dioxide (SO<sub>2</sub>)</b>	Causes respiratory problems and harmful to vegetation.
<b>Benzene and 1,3butadiene (hydrocarbons)</b>	Released from petrol engine vehicles. Benzene is considered harmful in any dose; cause cancers of bone marrow, leukaemia and lymphomas.
<b>Lead</b>	Affects the nervous system, kidneys, reproductive system, blood pressure and has been linked with impaired intelligence in children.
<b>Ozone</b>	Produced when nitrogen dioxide and hydrocarbons react together in air. Ozone causes damage to vegetation and some short-term respiratory difficulties.
<b>Carbon dioxide</b>	Greenhouse gas which contributes to adverse climate change.

Sources: UK National Audit Office, Vehicle Emissions Testing – Report by the Comptroller and Auditor General, page 25, May 1999; and State of the Environment Indicators 2007, MEPA, page 21.

<sup>5</sup> European Environment Agency, Transport remains main source of health-damaging pollutants, 28 July 2008, <http://www.eea.europa.eu/highlights/air-pollution-remains-a-threat-to-health-in-eu-27>.

### *1.6.2 Vehicle emissions also harm the environment and world climate*

Vehicles also emit green house gases, notably carbon dioxide (CO<sub>2</sub>). This gas does not directly harm health, but it brings about adverse climate change which in turn has negative effects on the environment and health.<sup>6</sup>

### *1.6.3 Malta has significant monitoring, reporting and compliance obligations regarding vehicle emissions*

Since January 2002, Malta has been obliged to check the exhaust system and emissions of most vehicles on a periodic basis as part of a Vehicle Roadworthiness Test (VRT). This is in accordance with EU Directives 96/96/EC, as transposed into national legislation by the Motor Vehicle Roadworthiness Test Regulations.

Additionally, Directive 2000/30/EC obliges Malta to make unannounced technical roadside inspections of vehicles which carry goods or transport more than eight passengers. Such roadside inspections aim to ensure that, in between VRTs, vehicles subject to heavy use are properly maintained so as to remain roadworthy. Directive 2000/30/EC also obliges Malta to set penalties applicable to vehicles found to be noncompliant on inspection, to take all necessary measures to ensure that these penalties are enforced, and to submit various data relating to these inspections.

Moreover, EU air quality framework directive 96/62/EC and its “daughter directives” oblige Malta to comply with various air quality standards. These set the maximum permissible concentrations for various air pollutants which are largely emitted by vehicles. These include:

- Nitrogen dioxide concentrations;
- Benzene concentrations;
- Fine particulate matter concentrations; and
- Carbon monoxide concentrations.

Vehicle emissions are the most significant source of nitrogen oxides and benzene, and the second most important source for fine particulate matter and carbon monoxide in the atmosphere.<sup>7</sup> Consequently, to comply with the above-mentioned EU air quality standards, Malta’s vehicle emission control schemes need to ensure that vehicle exhaust systems are working properly and that vehicle emissions comply with set emission standards.

### *1.6.4 The Maltese vehicle population, as defined by this audit*

For the purposes of this audit the Maltese vehicle population was taken to comprise the vehicles which were in use and eligible for emission testing, as at 30 June 2007. The following vehicles were consequently excluded:

- Vehicles in use but not required to undergo emission testing, namely motorcycles, agricultural vehicles, and vehicles which did not run on petrol or diesel;
- Vehicles officially registered as not in use and so not required to undergo emission testing, namely, garaged vehicles;
- Vehicles which could not be categorised as some of their profile data, such as engine type, use or age, were unknown.

The exclusion of vehicles not eligible for emission testing from the vehicle population enabled a more precise analysis of the emission control schemes when this was made relative to the vehicle population.

Wherever the term “Maltese vehicle population” is used in this audit report, it has the meaning as defined in this section. Vehicles with excessive emissions are at times referred to as “noncompliant vehicles”.

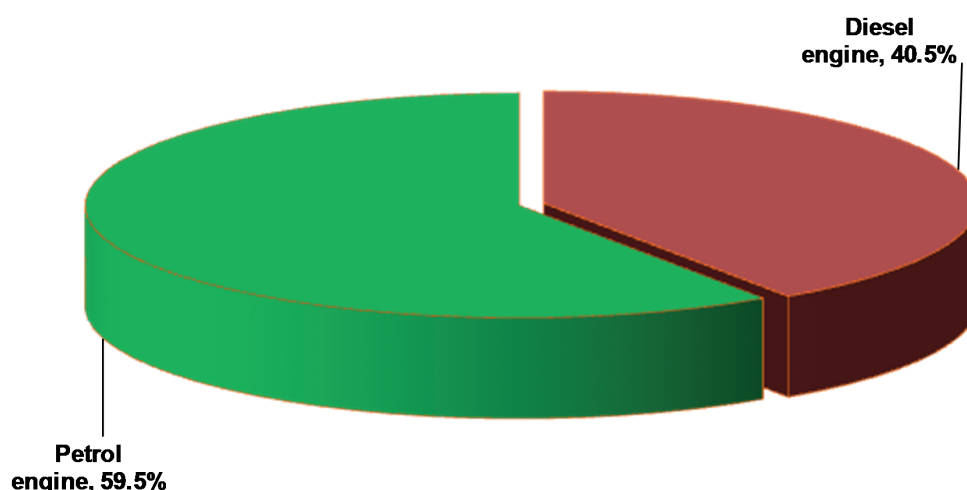
### *1.6.5 A Profile of the Maltese vehicle population*

The Maltese vehicle population comprised 270,689 vehicles, as at 30 June 2007. Of these, almost 60 percent had a petrol engine while about 40 percent had a diesel engine. (Chart 1 refers).

<sup>6</sup> <http://environment.about.com/od/faqglobalwarming/f/globalwarming.htm>.

<sup>7</sup> Annual European Community LRTAP Convention emission inventory report 1990–2006, page 6, Luxembourg: Office for Official Publications of the European Communities, 2008, ISBN 978-92-9167-366-7.



**Chart 1: Maltese vehicles by engine type as at 30 June 2007**

Source: Vehicle Registration and Administration System (VERA) database, Licensing and Testing Directorate, Malta Transport Authority.

For analytical purposes, vehicles may also be divided by use. Table 2 briefly describes, and gives the number of vehicles in each category. It also illustrates that during the audit period private vehicles comprised the largest category. In contrast, the public transport category was the smallest, comprising less than one per cent of the vehicle population.

#### *1.6.6 The Maltese vehicle population is relatively old and this raises the risk of excessive vehicle emissions*

Older vehicles have a higher risk of generating excessive emission levels. This risk increases further with the mileage

of the vehicle. Additionally, old vehicle engines are prone to go out of tune more quickly because older vehicles are generally not equipped with a catalyst system.<sup>8</sup> Almost 70 per cent of the Maltese vehicles were over the EU average age of 8 years, as at 30 June 2007 (see Chart 2).<sup>9</sup>

Older vehicles are also more likely to generate excessive emissions when equipped with a high engine capacity. As illustrated by Table 3, the highest proportion of Maltese vehicles were over eight years and had an engine capacity over 1,400cc. This old age and high engine capacity combination further raises the risk of excessive emissions from the vehicles concerned.

**Table 2: Vehicle categories eligible for emission testing as at 30 June 2007**

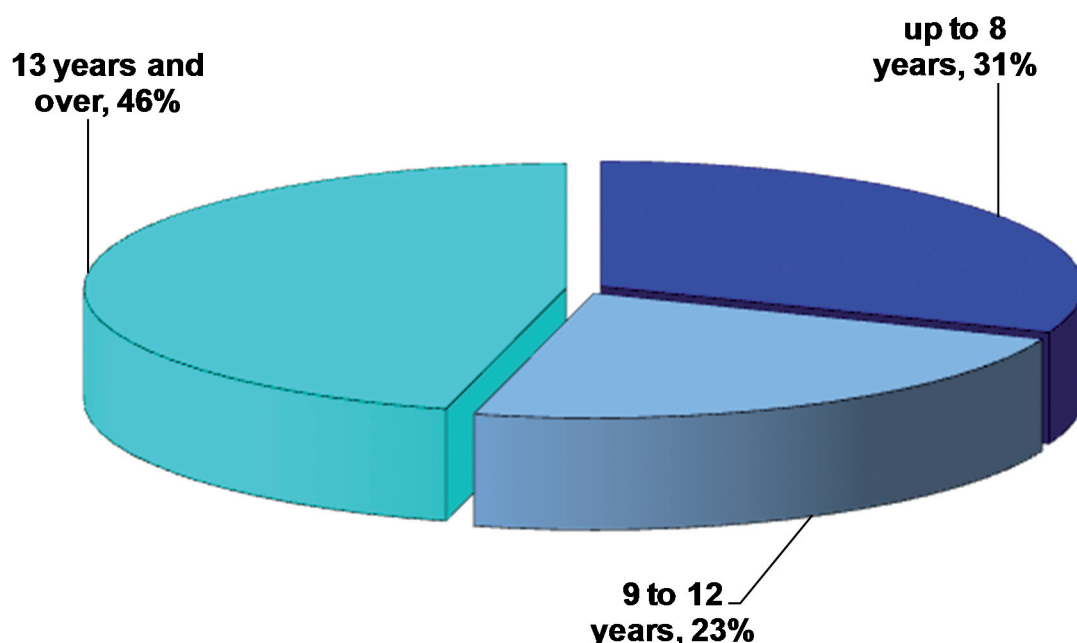
Vehicle category	Description of each category	Number of vehicles in each category	Percentage of vehicles in each category
<b>Private vehicles</b>	Light passenger and self-drive vehicles having less than eight passenger seats.	221,106	81.7
<b>Commercial vehicles</b>	Vehicles used for the carriage of goods.	47,045	17.4
<b>Public transport vehicles</b>	Routebuses, coaches, private buses, midibuses, minibuses and vans, and taxis.	2,538	0.9
<b>Totals</b>		<b>270,689</b>	<b>100.0</b>

Source: VERA database, Licensing and Testing Directorate, Malta Transport Authority.

<sup>8</sup> UK NAO Report Vehicle Emissions Testing, May 1999, page 31.

<sup>9</sup> VERA database, Licensing and Testing Directorate, Malta Transport Authority; EU vehicle age comparison stated in the 2009 Budget Speech.

**Chart 2 : The Maltese vehicle population by age group as at 30 June 2007**



Source: VERA database, Licensing and Testing Directorate, Malta Transport Authority.

### 1.7 Malta’s vehicle emission control schemes

During the audit period, four vehicle emissions control schemes were underway. The Vehicle Roadworthiness Test checked emissions on a periodic basis. Three other schemes (the Roadside Technical Inspection, the Emission Alert Campaign, and the Roadside Emissions Test) operated in between VRTs, testing on-the-road vehicles perceived as being at risk of having noncompliant emissions.

#### 1.7.1 The Motor Vehicle Roadworthiness Test

Since January 2002, most vehicles older than 4 years have been obliged to periodically undergo a Vehicle Roadworthiness Test (VRT). This checks various aspects of vehicle roadworthiness, including the exhaust system and certain emission levels. VRT is undertaken yearly or

biennially, depending on the use and weight of the vehicle, and as prescribed by the VRT Regulations. To renew the road licence, a vehicle must pass all the components of the VRT.

The ADT is the competent authority which oversees and regulates VRT. The VRT is performed by VRT stations licensed to do so by the ADT. As at the end of 2006, there were 31 authorised testing stations in Malta and another six in Gozo.

#### 1.7.2 The Roadside Technical Inspection

The Roadside Technical Inspection (RTI) was launched in May 2004, upon Malta’s accession to the European Union. The Enforcement Unit of the ADT carries out surprise Roadside Technical Inspections on vehicles particularly

**Table 3: The Maltese vehicle population by age and engine capacity as at 30 June 2007**

Age of vehicles	Percentage Vehicle population by engine capacity:	
	Up to 1400 cc	1401+ cc
Up to 8 yrs	18 %	13%
9 yrs +	32 %	37%

Source: VERA database, Licensing and Testing Directorate, Malta Transport Authority.

those subject to heavy use, namely vehicles used to carry goods and vehicles which transport more than eight passengers.<sup>10</sup> The Roadside Technical Inspection checks the roadworthiness of a vehicle, including the exhaust system and emissions.

### 1.7.3 *The Roadside Emissions Test*

The Roadside Emissions Test (RET) scheme was launched as part of the Local Enforcement System in June 2006 by eight Local Councils Joint Committees. This scheme focused exclusively on emissions, empowering wardens to subject any vehicle to an emissions test. Local wardens only tested the emissions of diesel engine vehicles as their testing equipment was only suitable for these engines. Owners of vehicles that failed the Emissions Test were fined €46.59, and instructed to solve the problem. The ADT was periodically informed of the failed vehicles, so that it may call any of the failing vehicles for a subsequent emissions test to ensure that emissions had become compliant. The RET was discontinued in 2008.

### 1.7.4 *The Emission Alert Campaign*

The Emission Alert Campaign (EAC) was introduced by the ADT in August 2005.<sup>11</sup> This scheme encouraged the public to report, via an SMS, vehicles that they deem to be emitting excessive fumes. According to ADT's prescribed procedures, vehicles reported by at least three different mobile phones within a three month period would be summoned to the ADT garage for an emissions test. If a vehicle fails its first test, the vehicle owner is issued a citation of €46.59, and given reasonable time to repair the fault before being summoned for a second test. If the vehicle fails a second time, or does not turn up despite being summoned twice, a restriction would be imposed on the

said vehicle so that the renewal of its road licence would be blocked until the matter is rectified. The public may still submit reports but the ADT has not been summoning any vehicles for testing since the latter part of 2008.

## 1.8 Structure of the Report

Chapter 2 of this report focuses on the vehicle emission tests carried out as part of the Vehicle Roadworthiness Test. This chapter particularly evaluates the quality control carried out by the ADT as regulator of the VRT, the enforcement action taken with regard to vehicles found to have noncompliant emissions, and how effective the VRT scheme was at ensuring that vehicles remained emission compliant at all times.

Chapter 3 examines the Emission Alert Campaign implemented by the ADT. It particularly evaluates how successful the public was at identifying vehicles with noncompliant emissions, the quality of the ADT's follow-up to the public's reports, and the enforcement taken with regard to the vehicles found to have noncompliant emissions.

Chapter 4 evaluates the two schemes which conducted unannounced roadside vehicle emission checks. These are the Roadside Emissions Test Scheme carried out by local wardens on behalf of the Local Council Joint Committees, and the Roadside Technical Inspections carried out by the Enforcement Unit of the ADT.

The NAO is also proposing a number of recommendations aimed at encouraging improvements in Malta's vehicle emissions control framework. These recommendations are included in the Executive Summary of this Report.

<sup>10</sup> Motor Vehicle Roadworthiness Test Regulations, LN 126/1999, Article 26.

<sup>11</sup> Emission Awareness & Enforcement Project Brief, page 4, Executive Office, Malta Transport Authority, 22 August 2005.





## Chapter 2

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### Emissions testing in the Vehicle Roadworthiness Test

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## Chapter 2 – Emissions testing in the Vehicle Roadworthiness Test

### 2.1 Introduction

Chapter 2 focuses on the vehicle emission tests carried out as part of the Vehicle Roadworthiness Test (VRT) between October 2006 and June 2007. This chapter particularly evaluates:

- the quality control carried out by the Malta Transport Authority (ADT) to ensure that VRT emissions testing be carried out properly.
- the effectiveness of enforcement action taken with regard to vehicles which failed the VRT emissions component.
- how effective the VRT scheme was at ensuring that on-the-road vehicles were emission compliant at all times.

As much as possible, any developments that took place in the quality control and enforcement aspects of the VRT after June 2007 have also been included in this chapter.

### 2.2 Background

#### *2.2.1 Vehicles are obliged to periodically undergo emissions testing as part of a Vehicle Roadworthiness Test*

Most vehicles aged four years and over are legally obliged to undergo a periodic VRT. The VRT checks the overall roadworthiness condition of most vehicles aged over four years in a bid to ensure that these vehicles are being maintained in good roadworthy condition.

The VRT started to be gradually introduced in Malta in October 1999 and eventually came to comprise about 20 aspects of the vehicles' roadworthiness. The following emissions-related testing became an obligatory component of the VRT in January 2002:

- testing the exhaust gas opacity of diesel-engine vehicles, as this is considered to be an adequate indicator of a diesel engine vehicle's state of maintenance with regard to emissions;
- testing the carbon monoxide (CO) level of petrol-engine vehicles' exhaust.

The VRT also assesses the security, deterioration and completeness of the exhaust system. This is because any such defects in the exhaust system are likely to lead to excessive emissions in the near future.<sup>12</sup>

Additionally, since 2006, the VRT also examines diesel engine vehicles for the sealing of the high pressure fuel pump.<sup>13</sup> This is because at times vehicle owners break the pump seal so as to adjust the engine performance. However, such adjustment generally also results in excessive emissions.

When a broken fuel pump seal is found, the vehicle owner is obliged to rectify emissions and subsequently the VRT station installs a new enumerated seal supplied by the ADT. The VRT stations record the application of new seals into their online database managed by MITA.

The station charges the vehicle owner concerned €6.99 for each pump seal applied. However, having a broken fuel pump seal is not considered to be an offence, and to date, the vehicle owner concerned is not liable to pay any fine or subject to any penalty.<sup>14</sup>

<sup>12</sup> Explanations given by the ADT officials.

<sup>13</sup> VRT Regulations, (SL65.15), First Schedule (Regulation 2).

<sup>14</sup> Information provided by ADT in correspondence dated 15 June 2009.

**Table 4: VRT frequency required for different vehicle categories**

Vehicles obliged to undergo a VRT annually		Vehicles obliged to undergo a VRT every two years	
Commercial vehicles with a gross weight of 3,500kgs and over.	14,780	Commercial vehicles with a gross weight under 3,500kgs.	32,183
Public transport vehicles (route buses, coaches, midibuses, minibuses, taxis and vans).	2,536	Personal use vehicles (light passenger and self-drive vehicles for less than eight passengers, with a gross weight under 3,500kgs).	220,765
<b>Totals*</b>	<b>17,316</b>	<b>Totals</b>	<b>252,948</b>

Source: VERA database, Licensing and Testing Directorate, Malta Transport Authority.

\* The audit was unable to determine the VRT frequency for the remaining 425 vehicles of the vehicle population.

Vehicles weighing over 3,500 kilograms and those subject to heavy use are legally obliged to undergo a VRT once a year. Commercial vehicles and personal use vehicles weighing less than 3,500 kilograms are required to undergo a VRT once every two years.<sup>15</sup> Almost 94 percent of the Maltese vehicle population is obliged to undergo a VRT once every two years, while only about six percent must undergo VRT once yearly. Table 4 gives the VRT frequency required for different vehicle categories.

VRT emissions testing equipment cannot be used on very old diesel-engined vehicles. Consequently, diesel-engined vehicles manufactured before July 1979 are only tested visually for smoke opacity. Such an assessment provides a feasible way of assessing emissions, however it remains a relatively subjective assessment method, and the correctness of the results critically depends on the subjective interpretation of the tester.

### *2.2.2 VRT station operators are required to comply with various legislative obligations*

The VRT may only be performed at testing stations run by operators who are granted a permit to do so by the ADT, after the latter is satisfied that they meet the necessary requirements as stipulated in Part 2 of the VRT Regulations. As at end 2006, there were 37 licensed active testing stations: 31 in Malta and six in Gozo.

Every VRT station is required to have fully computerized test lanes equipped to test the exhaust gas opacity of diesel engines; and the carbon monoxide and hydrocarbon gas

levels of petrol engine exhaust emissions. VRT stations must employ a minimum of one licensed qualified tester and an assistant tester for each test lane. They must also maintain the testing equipment in calibration up to the standard required by VRT Regulations.

VRT station operators have various record keeping and reporting obligations. For every vehicle tested, they must update the ADT's computerised vehicle database as required by the VRT regulations. They must electronically transmit to the ADT, the actual values resulting from the VRT tests on the same date that the tests are carried out.

### *2.2.3 The Malta Transport Authority is responsible for quality control of the VRT scheme*

To ascertain that the VRTs are being carried out well, the VRT Regulations empower the ADT to undertake various quality control measures to ensure that VRT operators comply with the law and conduct VRT tests correctly. The ADT sought to undertake quality control by making unannounced inspections of the VRT stations.

The ADT Inspectorate Unit was staffed by three officers: a clerk who dealt with the VRT paper work and data, while a technical officer and a vehicle evaluator carried out inspections of VRT stations. The officers had other duties in addition to VRT related ones. The officers estimated that on average their combined time spent on VRT amounted to 48 hours weekly – in effect to a little over what one full time officer would spend on a job.

<sup>15</sup> VRT Regulations, SL65.15, Eight Schedule.

**Table 5: Overview of the VRTs undertaken  
(1 October 2006 – 30 June 2007)**

Petrol vehicles:		Diesel vehicles:		Total vehicles which underwent a VRT	Total failed emissions in VRT
Underwent a VRT	Failed emissions in VRT	Underwent VRT	Failed emissions in VRT		
53,886	437	43,828	651	97,714	1,088

Source: VERA database, Licensing and Testing Directorate, Malta Transport Authority.

## 2.3 Audit findings

Table 5 gives an overview of the VRTs undertaken during the nine month audit period.

As can be seen from Table 5, less diesel-engine vehicles underwent a VRT than petrol engine vehicles. Yet, more diesel engine vehicles failed the emissions component than petrol-engine ones.

In total, 1,088 vehicles failed the emissions component. Of these, 95 also failed the exhaust system component (see Table 6).

Another 1,003 vehicles passed the emissions but failed the exhaust system component of the VRT. This implies that although these vehicles were emission compliant at the time of VRT, they were at high risk of having excessive emissions in the near future due to the faulty exhaust system.<sup>16</sup>

In 2007, the VRT stations applied 2,033 new seals, while in 2008 they applied 1,599 seals. The ADT anticipates that the number of seals that VRT stations will decrease annually since newer vehicles (those having Euro 3 emissions standards and above) do not use seals. Instead the newer vehicles are equipped with computer controlled devices which are tamper-proof.

The audit made an analysis of the vehicles which were found to have excessive emissions at the time of VRT. Chart 3 and Chart 4 illustrate the findings of these analyses.

### 2.3.1 Old, diesel-engine and commercial vehicles had the highest VRT emission failure rate

During the period under review, the vehicles which failed the VRT emission test most were:

- older vehicles;
- diesel-engine vehicles;
- commercial vehicles;
- vehicles with an engine capacity over 1,800cc.

As may be seen from Chart 3, the emission failure rate rose with age – both for diesel and petrol-engine vehicles. However, for all age groups, diesel-engine vehicles had a higher failure rate than petrol-engine ones. Overall, the VRT emission failure rate also increased with engine capacity (see Chart 4).

**Table 6: Vehicles which failed the VRT due to excessive emissions or faulty exhaust system  
(1 October 2006 – 30 June 2007)**

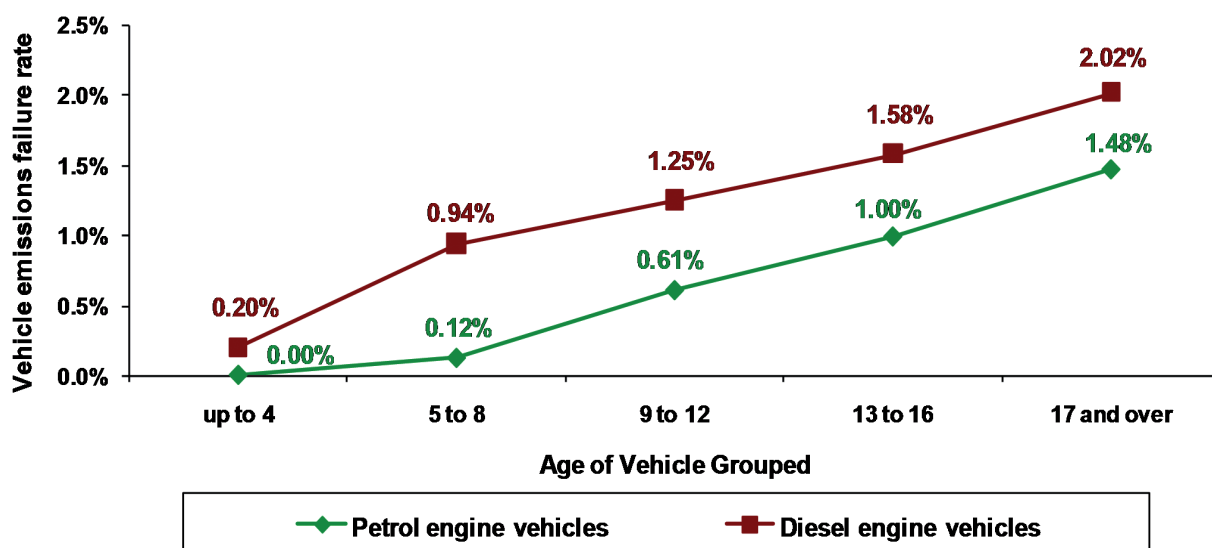
Vehicles which underwent a VRT	Vehicles which failed the VRT:	
	due to excessive emissions :	993
	due to faulty exhaust system :	1,003
	due to excessive emissions and faulty exhaust system :	95
<b>97,714</b>	<b>(2.1% of vehicles VRT tested)</b>	<b>2,091</b>

Source: VERA database, Licensing and Testing Directorate, Malta Transport Authority.

<sup>16</sup> According to the ADT officials concerned, the exhaust system may have been incomplete or deteriorated in such a way as to raise the risk of excessive emissions in the near future. For example the system may have had a missing mounting point or one that did not fully support the exhaust.



**Chart 3 : Vehicle VRT emissions failure rate, by engine type and age (1 October 2006 – 30 June 2007)**

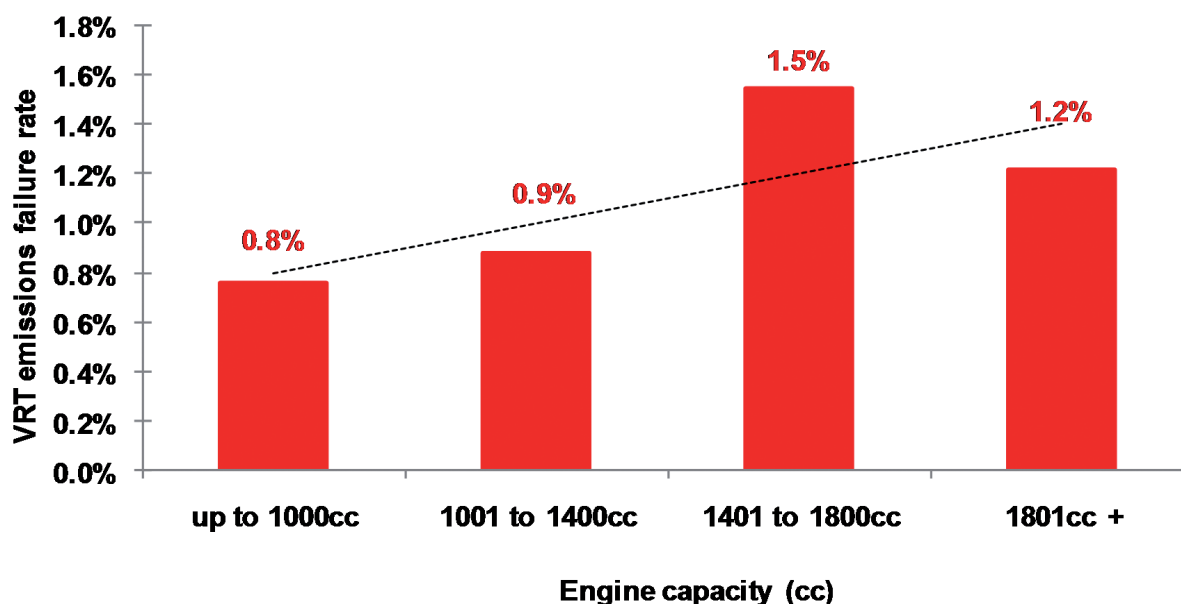


Source: VERA database, Licensing and Testing Directorate, Malta Transport Authority.

For all age groups, of the vehicles tested, commercial vehicles, had the highest VRT emissions failure rate while the public transport category had the lowest emission failure rate (see Chart 5). Moreover, public transport vehicles aged less than eight years, and between 13 and 16 years, had a zero emission failure rate.

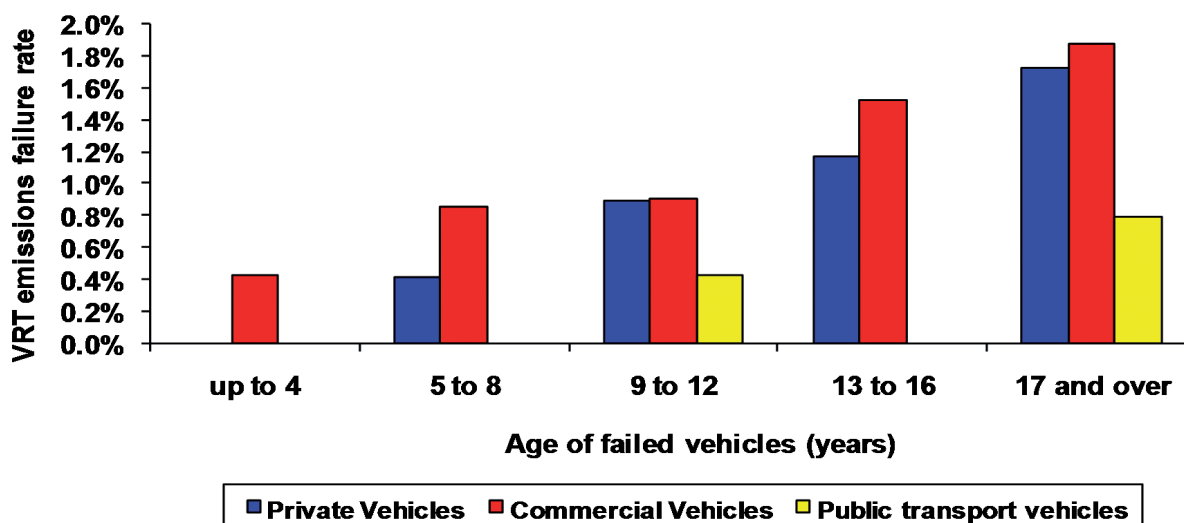
These VRT results consequently indicate that the vehicles most at risk of having excessive emissions were old vehicles (both petrol and diesel engine ones), diesel-engine vehicles and commercial vehicles. Such VRT result analysis is particularly useful to help optimise the targeting of on-the-road emission tests, which are discussed in Chapter 4 of this Report.

**Chart 4 : Vehicle VRT emissions failure rate, by engine capacity (1 October 2006 – 30 June 2007)**



Source: VERA database, Licensing and Testing Directorate, Malta Transport Authority.

**Chart 5 : The VRT emission failure rate, by vehicle category and age (1 October 2006 – 30 June 2007)**



Source: VERA database, Licensing and Testing Directorate, Malta Transport Authority.

### 2.3.2 *Quality control included routine inspections but lacked risk-based targeted inspections*

In the period under review, the ADT undertook routine inspections of the VRT stations. During 2006 the ADT inspected each VRT station once, while in 2007, the ADT made two routine inspections of each station.

The doubling of routine inspections from 2006 to 2007 is commendable. However, apart from these routine inspections, targeted inspections were not made on stations deemed to have a high risk of conducting VRT improperly.

In turn, risk-based targeted inspections were not carried out largely because a risk analysis of each VRT station was not made by the ADT. A station's risk would rise if:

- past inspections yielded unsatisfactory findings about the station;
- complaints are received about the station;
- the station's VRT results are significantly at variance with those of the majority of the stations.

In the absence of such risk analysis, the NAO sought to obtain an indication of each VRT stations' risk based on the data available, namely by comparing each station's VRT emission failure rate with the mean failure rate for all VRT stations.<sup>17</sup> Chart 6 illustrates the emission failure rate of each station compared with the mean failure rate.

### 2.3.3 *Quality control did not investigate the significant variation in VRT stations' emission failure rates*

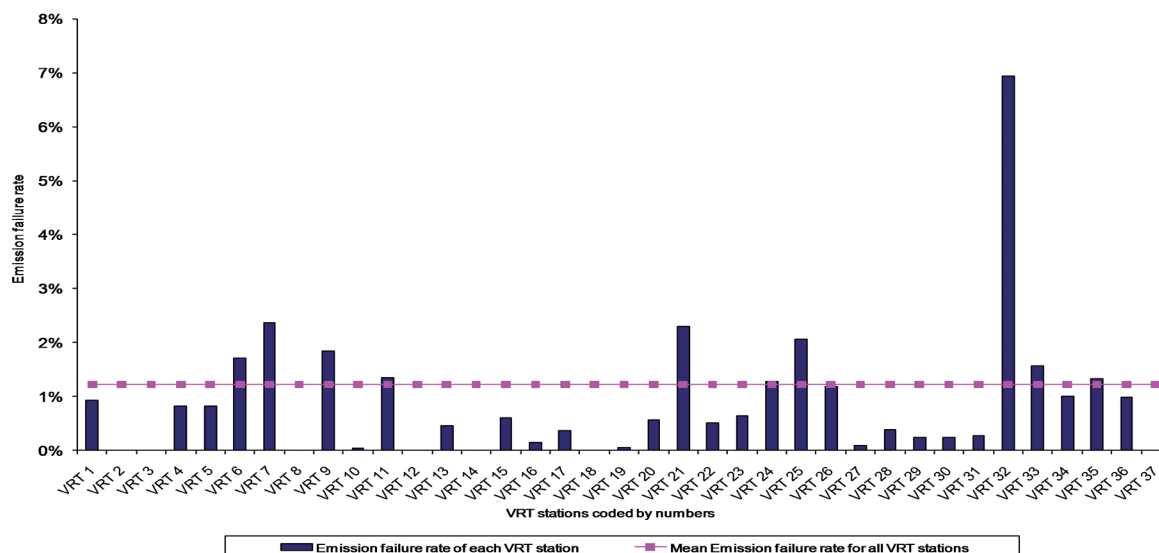
The VRT stations' mean emissions failure rate was 1.22 percent, during the audit period. Chart 6 shows that there was significant variation in VRT stations' emission failure rates. Seven stations had a zero emission failure rate, even though between them they tested 8,560 vehicles during the nine month audit period. Another station had a failure rate four times higher than the mean failure rate.<sup>18</sup>

The NAO found no evidence indicating that the ADT sought to investigate these failure rate variations, namely through additional inspections of the VRT stations concerned. The lack of targeted inspections based on risk and data analyses may have significantly detracted from the ADT's quality control function.

<sup>17</sup> This comparison assumes that all stations tested the same distribution of vehicle types and that they carried out approximately the same number of VRTs. Despite such assumptions, the comparison still elicits a reliable indication of individual stations' risk.

<sup>18</sup> Calculations based on data recorded in VERA database, Licensing and Testing Directorate, Malta Transport Authority.

**Chart 6 : The VRT Emissions failure rate of each VRT station  
(1 October 2006 – 30 June 2007)**



Source: VERA database, Licensing and Testing Directorate, Malta Transport Authority.

### 2.3.4 Quality control did not investigate why old public transport vehicles had a much lower VRT emission failure rate than other old vehicle categories

For thorough quality control VRT emission results should also be analysed, namely by vehicle category and age group. As explained in Section 2.3.1, an analysis of the VRT emission test results reveal that public transport vehicles had a much lower emission failure rate than commercial and private vehicles (See Chart 5).

The NAO found no evidence indicating that the ADT undertook such data analysis or that it investigated the significant variation in vehicle category emission failure rates.

With regard to this issue, the ADT has pointed out that in August 2008, the ADT and the Public Transport Association agreed to adopt more rigorous emission testing criteria for public transport vehicles, as proposed by the Malta Standards Authority.

### 2.3.5 Routine inspections were thoroughly made in twenty eight VRT stations but were incomplete in the other nine VRT stations

The audit found that routine inspections were thoroughly

made in twenty eight of the VRT stations. However, inspections of the other nine stations were incomplete because they did not monitor the actual testing of vehicles. This inspection gap arose because no vehicles were being tested when the ADT inspectors inspected these stations. The ADT did not attempt to inspect these stations again on other occasions.<sup>19</sup> This omission detracted from the quality control regarding the nine garages concerned because “in general the greatest difficulties with conducting emissions tests derive from the degree of care with which the test procedure is followed and the testing equipment is used and maintained”.<sup>20</sup>

### 2.3.6 A more rigorous inspection regime was adopted in 2008

Subsequent to the conduct of this audit, the ADT reported that, in 2008, it adopted various initiatives in a bid to improve the inspection and monitoring of VRT stations. Firstly, a penalty point system for VRT station operators was introduced.<sup>21</sup> Additionally, it undertook a more rigorous inspection regime, namely:

- Between March and April 2008 the ADT conducted a full day inspection of 36 VRT stations, (the stations which test a high number of vehicles each month);
- Between January 2008 and March 2008, ADT also carried out spot checks on 14 VRT stations.

<sup>19</sup> ADT files do not mention any such attempts or give results of any subsequent reinspections.

<sup>20</sup> “Vehicle Emissions Testing”, UK National Audit Office, page 39, May 1999. Corroborated by ADT officials in meeting of 7 June 2007.

<sup>21</sup> Legal Notice 43/2008 Regulation 21 Schedule 12

Additionally, during 2008, the ADT monitored the VRT emissions testing procedures in 36 VRT stations. The ADT found that VRT was being undertaken correctly except that seven testers were not conducting emission testing in accordance with set procedures. The ADT stated that it guided the seven testers on how to conduct the testing correctly.

To complement its inspection regime the ADT also undertook various measures aimed at minimising the possibility of abuse by VRT stations, namely:

- ADT retested about 840 vehicles which had passed their VRT;
- mystery shoppers were employed to take seven vehicles for VRT;
- an independent private investigator was employed to conduct covert surveillance of seven high risk VRT stations;
- ADT identified gaps in the data submitted by VRT stations.

As a result of these initiatives, the ADT fined five stations for passing vehicles which had various failing defects and another station for not conducting the VRT emissions test of a vehicle properly. Of these fined six stations, only one has paid up while the rest are currently appealing their case before the Traffic Appeals Board.

Another result of these quality control initiatives was that the ADT referred eight VRT related cases for police investigation. One of the stations concerned was subsequently closed down after being found guilty by the courts of falsifying VRT related documents.

### *2.3.7 The pre-calibration readings of the VRT equipment started to be recorded in 2007*

The risk that the VRT emission testing equipment is significantly out of calibration is minimised because the equipment has a self diagnostic system that alerts the user if the equipment goes significantly out of calibration. In such circumstances the system would also not let the user conduct any further emission tests.

However, the accuracy of the VRT emission results ultimately depends on the proper calibration of the emission meter. For this reason, VRT stations are legally obliged to maintain their testing equipment in calibration to the required standards at all times and to calibrate it at least once a year. Calibration is carried out by the equipment suppliers which subsequently issue a certification stating that the equipment has been properly calibrated.

Unfortunately, most calibration certificates issued during the period under review only gave post-calibration results, without indicating the extent of adjustments made. However, as a result of the awareness created by the carrying out of this audit, the ADT has since required VRT Stations to record both pre-calibration and post-calibration check values.

### *2.3.8 Quality control lacked various inspection-related records*

The NAO audit found that the inspection-related records for about half the VRT stations were incomplete. These constituted an incomplete audit trail for ADT's quality control activities and made it difficult to assess the VRT operators' compliance.

On inspection, twenty stations were found to have some shortcoming and a follow-up inspection was scheduled to ensure that the shortcoming was resolved. The initial inspection and follow-up reports were in file for only one of these stations. The files for 16 other stations lacked the follow-up report, although according to the officer in charge of VRT station inspections, the follow-up inspections had been made. The file for the three other stations lacked both the inspection report and the follow-up report.

From the stations for which records were available, two were found to have emissions-related shortcomings. One VRT station was issued with a warning letter stating that the ADT was to carry out a follow-up inspection. However, the relevant file did not contain any details regarding such a follow-up inspection. In the second case, the VRT fined the station €11,650 in relation to emissions-related and other breaches.

According to the ADT, thorough reports on the follow-up inspection visits are now being drawn up and filed.

### *2.3.9 Effective enforcement action was taken with regard to the vehicles that failed a VRT*

The NAO evaluated the enforcement action taken regarding vehicles which failed to undertake a due VRT, or which failed the VRT emission test. The evaluation found that the ADT had an effective enforcement mechanism in place – that of setting a restriction on the road licence renewal of noncompliant vehicles.

During the nine month audit period, 1,088 vehicles failed the VRT emission component. Of these, 1,071 passed a retest. The other 16 did not undertake a retest and consequently could not renew their road licence.

### 2.3.10 *The compliance effect of VRT was found to be short-lived in the vehicles subjected to an on-the-road emissions test*

The VRT has a compliance effect on vehicle owners – it encourages owners to maintain their vehicles at least once annually or biennially.<sup>22</sup> However, vehicle owners are obliged to maintain their vehicles in good roadworthy condition at all times, not only when the VRT is undertaken.

In between one VRT and another, vehicles' emissions may be tested as part of three on-the-road emission schemes: the Roadside Technical Inspection, the Emission Alert (SMS) Campaign, and the Roadside Emissions Test conducted by local wardens. Between October 2006 and June 2007, 1,241 vehicles failed one of these on-the-road emission tests.<sup>23</sup>

The audit sought to analyse how lasting the VRT compliance effect was for these failed vehicles. The VRT compliance effect would have lasted, at most, from the date the vehicle passed its last VRT to the date that vehicle failed an on-the-road emission test.<sup>24</sup> The findings that emerge from this analysis throw some light on the VRT's compliance effect and the limitations the VRT may have. The findings and their implications are discussed below.

**Table 7: The duration of VRT emission compliance on vehicles obliged to undergo a VRT annually (1 October 2006 – 30 June 2007)**

Vehicles, obliged to undergo a VRT annually, which failed an on-the-road emissions test	Days lapsed between passing a VRT and failing an on-the-road emission test				Total
	0 – 90	91 - 180	181 - 270	271 - 360	
Commercial vehicles weighing more than 3500kg	28	34	32	35	129
Public transport	4	5	11	8	28
<b>Totals</b>	<b>32</b>	<b>39</b>	<b>43</b>	<b>43</b>	<b>157</b>
<i>The percentage of vehicles which failed an on-the-road emission test every quarter of the VRT cycle</i>	<i>20.4%</i>	<i>24.8%</i>	<i>27.4%</i>	<i>27.4%</i>	<i>100%</i>

Source: VERA database, Licensing and Testing Directorate, Malta Transport Authority.

Note: The proportion of failed vehicles could not be expressed as a percentage of total vehicles tested on the road since the relative data was not maintained by one local warden agency.

<sup>22</sup> As illustrated in Table 4, about 94 percent of the vehicle population is obliged to undertake the VRT once every two years, while nearly six percent is obliged to undertake the VRT annually.

<sup>23</sup> About twenty of these vehicles failed more than one on-the-road emission test during the period under review.

<sup>24</sup> This assumes the best-case scenario that the vehicle only developed excessive emissions on the day it failed an on-the-road emission test. In reality, a vehicle is likely to have developed faulty emissions before the day it undergoes an on-the-road emission test. Consequently, this assumption yields the maximum possible duration of VRT's compliance effect.

Tables 7 and 8 illustrate how the duration of the VRT compliance effect differed from one vehicle category to another.

Table 7 shows that, of the failed vehicles obliged to undergo VRT once a year, over 20 percent had noncompliant emissions less than three months after undergoing the VRT, while 45 percent failed in the first half of their VRT cycle.

Of the failed vehicles obliged to undergo VRT once every two years, about 12 percent failed the emission test less than three months after passing the VRT, while around half of them failed an emission test by mid-VRT cycle.

In aggregate, about half of all the vehicles that failed an on-the-road emission test did so in the first half of their VRT cycle – whether this was one year or two years long. This finding highlights the fact that an annual VRT has a much greater compliance effect than a biennial VRT. Yet, only six percent of the Maltese vehicle population is required to undergo VRT annually.

The results of on-the-road emission tests also strongly suggest that the VRT compliance effect is very temporary, diminishing substantially in the first months of the VRT

**Table 8: The duration of VRT emission compliance on vehicles obliged to undergo a VRT every two years (1 October 2006 – 30 June 2007)**

Vehicles which failed an on-the-road emission test, obliged to undergo a VRT every two years	Number of days lapsed from VRT to an on-the-road emission test					Total
	0 - 90	91 - 180	181 - 270	271 - 360	361+	
Commercial vehicles weighing less than 3500kg	87	92	96	103	324	702
Private vehicles	40	47	46	38	211	382
<b>Grand Total</b>	<b>127</b>	<b>139</b>	<b>142</b>	<b>141</b>	<b>535</b>	<b>1,084</b>
<i>The percentage of vehicles which failed an on-the-road emission test after passing the VRT</i>	<i>11.7%</i>	<i>12.8%</i>	<i>13.1%</i>	<i>13.0%</i>	<i>49.4%</i>	<i>100%</i>

Source: VERA database, Licensing and Testing Directorate, Malta Transport Authority.

Note: The proportion of failed vehicles could not be expressed as a percentage of total vehicles tested on the road since the relative data was not maintained by one local warden agency.

cycle. The reasons behind this short-lived compliance may be various. Firstly, as explained in Chapter 1, the Maltese vehicle population is a relatively old one – almost 70 percent are aged nine years and over. Consequently, due to their old age, most Maltese vehicles are prone to becoming noncompliant relatively quickly unless frequently maintained.

Secondly, the short-lived compliance may be indicating that the VRT has certain limitations, particularly to identify emission infringements which take place only on-the-road. To illustrate, there is a risk that some vehicles are emission compliant at the VRT, but on the road, they generate excessive emissions as a result of tampering with the vehicle's pump seal to improve the vehicle's driving performance, or because they use fuels which are cheaper but more polluting than diesel. Efforts to minimise this risk have been taken by requiring VRT stations to install new seals whenever a broken seal is identified in a diesel-engine vehicle. However, since no penalty is imposed on the defaulting vehicle owner, the deterrent to break the seal is not deemed to be sufficient.

Since half the vehicles which failed an on-the-road emission test did so soon after passing their VRT, this also raises the question whether these vehicles' VRT emission test was conducted properly. The ADT has addressed this risk during 2008 by undertaking monitoring of emission testing procedures. As a result, it instructed seven testers to correct their method of emission testing.

With regard to the VRT's noted short-lived compliance effect, the ADT stated that it plans to correlate VRT results and those of on-the-road emission tests. The ADT hopes that such correlations would help it identify repeat offending stations. Additionally, during the VRT, an

enumerated pump seal is being installed on diesel vehicles. This should help stop the tampering of pump seals and the use of illegal fuel.

## 2.4 Concluding comments

The audit findings indicate that, between October 2006 and June 2007, the ADT carried out routine inspections of all VRT stations and undertook the prescribed enforcement action with regard to vehicles which failed the VRT emission component. However, during the period under review the ADT did not undertake risk-analysis for the VRT stations. Consequently, significant variations in the VRT failure rate of individual VRT stations and of different vehicle categories were not identified or investigated through targeted inspections.

Quality control was further constrained because inspection-related records for twenty of the VRT stations were incomplete. Additionally, routine inspections did not check the actual testing of vehicles in nine of the VRT stations.

Subsequent to the period under review, quality control of the VRT procedure improved significantly because the ADT embarked on various initiatives aimed at strengthening its monitoring and quality control functions. In 2008 it retested about 850 vehicles which had just passed their VRT and undertook surveillance of seven VRT stations deemed to be at high risk. It also undertook whole day inspections in 36 VRT stations.

As a result of its stepped up monitoring, six VRT stations have been fined for VRT related infringements. However, it must be noted that enforcement is being constrained by

a long drawn process at the appeal stage. In fact, to date, only one station has paid the fine due. The ADT has also referred eight VRT related cases for police investigation, with one of the stations concerned subsequently being closed down after being found guilty by the courts of falsifying VRT related documents.

The VRT emission compliance effect was found to be short-lived on the vehicles subjected to a roadside emissions test since half the failed vehicles did so when still in the first half of their VRT cycle. The short-lived VRT emission compliance may be due to various factors. One likely reason may be the old age of most Maltese vehicles coupled with lack of regular maintenance and due to on-the-road abuses by vehicle owners. However, the ADT has since introduced the installation of enumerated pump seals at VRT which should minimise the possibility of such abuses. The deterrence to abuse is not strong yet as no penalties are imposed on vehicle owners found to have broken their vehicles' fuel pump seal.

While the reasons behind the short-lived compliance effect of VRT could not be ascertained, the comparative analysis clearly indicated that year-round roadworthiness cannot be ensured through VRT alone but also needs ongoing, on-the-road emission testing. In this regard, the analysis of the VRT emission results provided useful information to optimise targeting the vehicles most at risk of having excessive emissions. According to the VRT results, these were older vehicles (both petrol and diesel engine ones), diesel-engine vehicles, and commercial vehicles.

To ensure that vehicles remain emission compliant throughout the VRT cycle, during the period under review Government implemented three on-the-road emission control schemes which complement the VRT. These were the Emissions Alert Campaign, the Roadside Technical Inspection and the Roadside Emissions Test. The subsequent chapters will focus on these emissions control schemes.







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## Chapter 3

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### The Emission Alert Campaign

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## Chapter 3 – The Emission Alert Campaign

### 3.1 Introduction

Chapter 3 focuses on the Emission Alert Campaign which was launched by the Malta Transport Authority (ADT) in August 2005. It particularly evaluates:

- how successful the public was at identifying vehicles with noncompliant emissions;
- the quality of the ADT's follow-up to the public's reports;
- the Campaign's effectiveness at ensuring that vehicles found to have noncompliant emissions rectify their situation.

The NAO audited the Emission Alert Campaign (EAC) conducted between October 2006 and June 2007. Evaluation of the ADT's follow-up was constrained because the cut-off dates used by the ADT to determine which vehicles should be summoned for testing were not recorded for the audit period. The NAO sought to alternatively evaluate the ADT's follow-up as reliably as possible by analysing the data available for the period between August 2005 and June 2007. The time period of any data used is specified throughout the chapter.

### 3.2 Background

Vehicle owners are legally obliged to ensure that, at all times, their vehicle conforms to the emission levels stipulated in the VRT Regulations. These Regulations in fact specify that a pass in VRT does not exonerate

vehicle owners from complying with the Regulations' requirements at all times.

The ADT launched the Emission Alert Campaign in the last week of August 2005. The EAC was launched to:

- increase public awareness on the negative impact of harmful vehicle emissions;
- increase enforcement by involving the general public;
- drastically reduce vehicle emissions.<sup>25</sup>

The Campaign was also intended to induce VRT stations to act more responsibly when issuing VRT certificates -- if a reported vehicle fails the emission test after it has recently passed a VRT emission test, it would throw a bad light on the VRT station concerned.<sup>26</sup>

To increase vehicles' emission compliance, the EAC urged the public to report, via a mobile phone text message, the registration number of vehicles which they perceive as emitting "excessive fumes".<sup>27</sup>

According to the ADT's prescribed follow-up procedures, vehicles which get reported by at least three different mobile phone numbers within a three month period would be summoned for an emissions test at the ADT's Emissions Test Centre.<sup>28</sup> This filtering mechanism aims to increase the likelihood that tested vehicles have noncompliant emissions. It also minimises the risk that tested vehicles would be victims of prank or malicious reports.

<sup>25</sup> Emission Alert information leaflet issued by the Malta Transport Authority (ADT), Ministry for Urban Development and Roads.

<sup>26</sup> Emission Awareness and Enforcement Project Brief issued by the PR/Executive Office of the Malta Transport Authority, page 3, 22 August 2005.

<sup>27</sup> Emission Alert information leaflet issued by the ADT, Ministry for Urban Development and Roads.

<sup>28</sup> In reality, the ADT aimed to summon vehicles which were reported by at least four, not three, different mobile phones in three consecutive months.

Summoned vehicles would be subjected to the emission components of the VRT, namely:<sup>29</sup>

- checking of the exhaust system;
- testing the opacity of diesel-engine vehicles' exhaust;
- testing the carbon monoxide and hydrocarbon exhaust levels of petrol-engine vehicles.

If the vehicle fails the test, the vehicle owner would be issued a fine of €46.59. The owner would be asked to rectify the matter and return for a subsequent emissions test within one week. If a vehicle fails the retest or does not turn up for the test after being summoned twice, the ADT would place a restriction on the vehicle's road licence renewal.<sup>30</sup>

To date, the public may still report vehicles with excessive fumes. However, the ADT has not summoned any reported vehicles for testing since the latter part of 2008.

### 3.3 Audit findings

#### 3.3.1 The Emission Alert Campaign generated significant public response

The Emission Alert Campaign generated significant public response. Between August 2005 and August 2007, the public made 121,868 reports regarding 35,868 vehicles.

During the nine month audit period alone, the public reported 14,322 vehicles – over 5 percent of the Maltese vehicle population. Table 9 gives an overview of the vehicles reported, summoned and tested during the audit period.

#### 3.3.2 The public mostly reported diesel vehicles aged over eight years and, by proportion, the public transport category

Table 10 gives a brief overview of the vehicles reported most by the public. Over 90 percent of vehicles reported were over eight years old, while 84 percent of the reported vehicles had a diesel engine. By proportion, the public transport category was reported the most.

**Table 9: Vehicles reported, tested and failed in the Emission Alert Campaign (1 October 2006 and 30 June 2007)**

SMS Reports received	Total vehicles reported	Vehicles reported more than three times	Vehicles summoned for at least one test	Vehicles that turned up for test	Vehicles that failed the first test:	
					number	as a percentage of vehicles tested
32,454	14,322	3,204	1,200	721	98	13.59

Source: Aggregate figures compiled from data given by ADT.

Note: Some of the vehicles summoned in the audit period may have been reported before October 2006, while the vehicles reported towards the end of the audit period may have been summoned after the audit period elapsed, that is after June 2007. This audit makes the assumption that on average, these two opposite factors cancel each other out in any given time period.

<sup>29</sup> Emission Alert information leaflet issued by the Malta Transport Authority (ADT), Ministry for Urban Development and Roads.

<sup>30</sup> Emission Awareness & Enforcement Project Brief, pages 3-4, August 2005, Executive Office, Malta Transport Authority. In evaluating the enforcement action taken with regard to noncompliant vehicles, the NAO focused on the setting of restrictions on licence renewals.

**Table 10: The vehicles reported most by the public  
(1 October 2006 – 30 June 2007)**

<b>Diesel engine vehicles</b>	Over 84 per cent of the reports were for diesel engine vehicles, even though these comprise only about 40 percent of the audit population. Reported vehicles also tended to have an engine capacity over 1,400cc – the capacity of most diesel engines.
<b>Vehicles over 8 years old</b>	Almost 91 percent of the reports referred to vehicles aged over 8 years.
<b>Public transport vehicles</b>	The public reported 30 percent of the public transport vehicles, as against 10 percent of the commercial, and almost four per cent of the private vehicles in the audit population.

Source : Malta Transport Authority.

The public is likely to have reported mostly diesel-engine vehicles because while defaulting diesel-engine vehicles tend to have visible exhaust, petrol-engine vehicle emissions tend to be invisible, albeit still very harmful. Due to this reporting constraint, the Campaign mainly targets diesel-engine vehicles.

### *3.3.3. The ADT summoned for testing about one third of the vehicles reported more than three times - mostly old diesel-engine commercial and private vehicles*

The ADT summoned 37 percent of the vehicles which were reported more than three times in the period under review. The summoned vehicles were mostly diesel-engine commercial and private vehicles aged over eight years. The ADT stated that at various instances it did not summon public transport vehicles for testing because of a dispute with the Public Transport Association regarding the conduct of the emission test. This dispute was resolved in August 2008 when both parties agreed that the test should be conducted in accordance with criteria set out by the Malta Standards Authority.

### *3.3.4 The vehicles which failed the EAC emission test most were private and commercial diesel-engine vehicles aged over 8 years*

As illustrated by Table 9, only 60 percent of those summoned went for the test. An analysis of the tested

vehicles reveals that the highest failure rate was obtained by private and commercial diesel-engine vehicles aged over eight years. As may be seen from Tables 10 and 11, these test results tallied with the public perception that older vehicles were more likely to have excessive emissions.

However, according to the test results, the most noncompliant category was the private vehicle category -- not the public transport category as perceived by the public.

### *3.3.5 The audit could not thoroughly assess the ADT's filtering of reports because the dates used to filter the reported vehicles were not recorded*

While the potential of the Campaign depended on the public's ability to report noncompliant vehicles, the Campaign's effectiveness ultimately depended on the quality of the ADT's follow-up to the public's reports. This consisted of three stages:

1. Filtering the reports to more reliably identify which vehicles were most likely to be noncompliant;
2. Summoning and testing the vehicles selected through the filtering process;
3. Undertaking effective enforcement action with regard to vehicles which failed the emission test, or did not show up for the test, twice.

**Table 11: The vehicles which failed the Campaign's emission test most  
(1 October 2006 – 30 June 2007)**

<b>Vehicles over 8 years old</b>	Over 94 percent of the failed vehicles were aged over 8 years.
<b>Private and commercial vehicles</b>	Private vehicles had the highest failure rate - almost 14 percent. (Commercial vehicles had a failure rate of about 12 percent. Public transport vehicles had the lowest failure rate of about 9 percent).

Source : Malta Transport Authority.

The NAO evaluated the three stages of the ADT's follow-up.

With regard to the filtering of vehicles reported, the audit could not make a thorough assessment of the ADT's filtering process due to an incomplete audit trail. This is because while the ADT maintained records about the SMSs received, it did not, however, record the dates taken to filter the reported vehicles. Due to this incomplete audit trail, the audit could not conclusively determine how many of the reported vehicles were actually eligible for testing, and

so verify whether the filtering of reports was conducted properly.

Given this limitation, the NAO sought to make an alternative evaluation of the filtering process by analyzing the data available regarding the ADT's follow-up between August 2005 and August 2007 (summarised in Table 12). The subsequent sections set out the audit findings based on the available data for this time period.

**Table 12: SMS reports and vehicles summoned for testing  
(1 August 2005 – 31 August 2007)**

SMS reports received per vehicle	Vehicles summoned to:					Vehicles not summoned	Total vehicles reported*
	one emission test	two emission tests	three emission tests	four emission tests	five emission tests		
1	31	-	-	-	-	18,574	18,605
2	25	-	-	-	-	5,718	5,743
3	45	-	-	-	-	3,051	3,096
4	255	1	-	-	-	1,599	1,855
5	417	2	-	-	-	980	1,399
6	437	1	-	-	-	601	1,039
7	415	3	-	-	-	360	778
8	390	6	-	-	-	263	659
9	318	5	-	-	-	150	473
10	224	12	-	-	-	96	332
11 to 20	908	216	6	-	-	168	1,298
21 to 31	121	117	15	-	-	41	294
32 to 40	32	29	10	1	-	39	111
41 to 50	13	19	8	2	-	17	59
51 to 60	7	10	5	3	-	17	42
61 to 70	1	5	5	-	-	14	25
71 to 80	2	2	1	1	-	9	15
81 to 90	1	-	-	-	-	5	6
91 to 100	-	-	-	-	-	5	5
101 to 200	-	2	1	1	1	24	29
201 to 300	-	-	-	-	-	4	4
301 to 349	-	-	-	-	-	1	1
<b>Totals</b>	<b>3,642</b>	<b>430</b>	<b>51</b>	<b>8</b>	<b>1</b>	<b>31,736</b>	<b>35,868</b>

Source: Malta Transport Authority.

\* Some time is likely to elapse between the receiving reports and summoning of vehicles for testing. Consequently, some of the vehicles reported before during the time period in question may have been summoned for testing after August 2007.

### 3.3.6 *Vehicles with a significant number of reports were not summoned for testing*

Between August 2005 and August 2007, 4,393 vehicles were reported at least four times but were not summoned for testing. (Illustrated by the data given in Table 12).

In the absence of the filtering dates used by the ADT, the NAO could not ascertain exactly how many of these unsummoned vehicles were actually eligible for testing. However, the available data is sufficient to ascertain that at least 273 of these vehicles should have been summoned for testing because they were reported a minimum of four times in one month.<sup>31</sup> Two hundred and thirty of these were public transport vehicles, mostly aged seventeen years and over.

In response to the above, the ADT explained that its limited testing resources were not adequate to cope with the significant public response. Testing of reported vehicles was conducted by only two enforcement officers. Moreover, these officers had various other duties to see to.

In these circumstances, the ADT stated, it gave vehicles that were reported most within the last three months first priority. ADT stated that it would summon a vehicle that was reported say five times in the last three months, rather than a vehicle reported ten times in the previous three months, since the latter vehicle was deemed more likely to have already been repaired, or subjected to roadside checks and VRT.

The ADT additionally contended that, although not all the vehicles eligible for testing were summoned, the

Campaign's primary objective to raise awareness was still achieved.

With regard to the unsummoned public transport vehicles, the ADT stated that the filtering criteria used for public transport vehicles was the same as that used for other vehicle categories. Instead of summoning public transport vehicles as part of the Campaign, the ADT had referred them to the officers in charge of the RTI scheme for testing. The audit verified that, between October 2006 and June 2007, 187 of the unsummoned public transport vehicles were emission tested as part of the Roadside Technical Inspection. Most of these passed the RTI emissions test.

The ADT added that at times public transport vehicles were not summoned because of a dispute which arose with the Public Transport Association regarding the conduct of the emission test. However, the ADT added, in August 2008, this dispute was resolved when both parties accepted the emission testing criteria recommended by the Malta Standards Authority.

### 3.3.7 *The Campaign issued effective restrictions with regard to 84 percent of the vehicles which failed or did not attend two emissions tests*

During the period under review, the Campaign was effective at bringing about emission compliance in 42 vehicles which failed their first EAC emission test, subsequently undertook the necessary repairs, and passed a second EAC emission test or a VRT, which includes an emissions test.<sup>32</sup>

**Table 13: Road licence renewal restrictions issued (October 2006 and June 2007)**

Restrictions Issued	Number	Percentage
<b>Effective Restrictions</b>		
Restrictions were registered by LTD, and the vehicles concerned have either not renewed their road licence or only renewed it after passing a VRT	284	84
<b>Ineffective Restrictions</b>		
Restrictions which were registered by LTD after vehicles concerned renewed road licence	25	7
Restrictions which were registered but vehicles concerned were still allowed to renew their licence	16	5
Issued restrictions which were still not registered by LTD, as at 24 March 2009	13	4
<b>Total Restrictions issued</b>	<b>338</b>	<b>100</b>

Source: Malta Transport Authority.

<sup>31</sup> Most of these vehicles were in fact reported between twenty and 349 times between August 2005 and August 2007; VERA database, Licensing and Testing Directorate, Malta Transport Authority.

<sup>32</sup> Compiled from data provided by EAC administration.

Additionally, the Campaign administration undertook enforcement action by issuing a restriction on the road licence renewal of 338 vehicles which had failed or did not attend two emission tests.<sup>33</sup>

As illustrated in Table 13, the audit found that 84 percent of the issued restrictions were effective. On the other hand 16 percent of the issued restrictions were ineffective due to some shortcomings in the enforcement process.

One main shortcoming that detracted from the restrictions' effectiveness was the substantial time lag that arose between the issuing and registering of these restrictions. When the Campaign administration issues restrictions, it sends them to the Licensing and Testing Directorate (LTD) for registering in the licence renewal computerised system. In turn, the LTD registers batches of restrictions at isolated intervals. For example, during the audit period the LTD registered restrictions only on two occasions, once in October 2006 and subsequently in May 2007.<sup>34</sup>

Due to the time lag created by this fragmented registration process, there is the risk that vehicles renew their licence before the LTD registers a restriction in their regard. In fact, during the period under review, 25 vehicles managed to renew their license even though a restriction had been issued in their regard. Consequently these vehicles remained on the road with excessive emissions until they went to renew their licence a year later (unless the owner voluntarily repaired the vehicle).<sup>35</sup>

As illustrated in Table 13, the effectiveness of the Campaign's enforcement actions was also somewhat diminished because the restrictions issued with regard to 13 vehicles were never registered by the LTD. Additionally, 16 other vehicles with a registered restriction, still managed to renew their licence.

### *3.3.8 The Campaign's effectiveness was limited by insufficient preliminary planning and inadequate resources at implementation stage*

The audit findings indicate that the Campaign's potential, particularly with regard to enforcement, was constrained because the Campaign was not preceded by adequate preliminary planning and not supported by the necessary resources at implementation stage.

Initial resources allocated to the Campaign were significantly below those required to cope with the public

response generated. Moreover, the ADT did not increase the number of officers conducting emission testing when the public response generated over the months indicated the need for more testing officers. This inadequate capacity building (and failure to review the Campaign) limited the effectiveness and sustainability of the Campaign.

The ADT contends that from the outset there was no intention to increase resources, especially taking into consideration all the other obligations of the enforcement section, and the fact that the Campaign was primarily intended to increase awareness, while enforcement was a secondary objective.<sup>36</sup>

The efforts to "drastically reduce vehicle emissions" may have also been constrained by the fact that the Campaign largely lacked a proactive educational component explaining simple measures vehicle owners need to take so as to prevent excessive emissions. When the Campaign was launched, some information was given about the maintenance vehicle owners should undertake to ensure compliant emissions. However, this was not developed further or sustained. The ADT explained that budgetary constraints did not permit the undertaking of a sustained proactive educational campaign.

Although not comprehensive, the Campaign's publicity component was still successful at raising awareness about the harmful effect of vehicle emissions, and about how the public may report vehicles emitting "excessive fumes".

The Campaign's effectiveness and transparency were also handicapped by the lack of a fully automated and integrated data management system. Without such a system, the data regarding reported vehicles and other related data had to be inputted a number of times – thereby increasing the risk of transcription errors. Additionally, in the absence of an automated filtering system, the filtering of reported vehicles was not undertaken on a regular basis and the audit trail for the filtering process was incomplete because the filtering dates used were not recorded. The ADT stated that it had considered adopting a fully automated and integrated system. However, the costs involved were deemed to outweigh any arising benefits.

## 3.4 Concluding comments

The audit findings indicate that, to varying extents, the Campaign was successful in attaining its objectives of creating awareness, bringing about enforcement, and reducing vehicle emissions.

<sup>33</sup> Campaign's Excel database.

<sup>34</sup> A further 30 percent of the issued restrictions were eventually posted by LTD after June 2007, mostly in October 2007. However, four percent of the issued restrictions issued remained unposted.

<sup>35</sup> Data obtained from Licensing and Testing Directorate's (VERA) vehicle database.

<sup>36</sup> Malta Transport Authority correspondence dated 1 June 2009.

The Campaign was highly effective in making the public more aware about the health hazards and illegality of excessive fumes. In fact, during the nine month audit period, in expression of this awareness, the public reported five percent of the vehicle population. However, the Campaign is not deemed to have managed to generate a preventative and proactive awareness, that is, an awareness about the simple maintenance measures that vehicle owners need to take to prevent excessive emissions. According to the ADT, budgetary constraints do not permit it to undertake such educational publicity on an ongoing basis.

With regard to the Campaign's objectives of enforcing emission standards and of reducing vehicle emissions, the Campaign made modest inroads, although less than its potential. To its credit, the Campaign prodded 42 vehicles to rectify their excessive emissions and issued restrictions on the licence renewal of 338 vehicles which failed two tests, or did not turn up for two tests. The majority of licence renewal restrictions, 84 percent, were effective. The rest were rendered ineffective mostly because of the time lag in registering issued restrictions, while some other restrictions were either never registered, or ignored once registered.

The potential of the Campaign was not fully realised largely because a significant number of reported vehicles which were eligible for testing were not summoned. The implementation of the Emission Alert Campaign was not always consistent and transparent. Particularly, the vehicle reports were not filtered regularly and the summoned vehicles did not always follow the Campaign's publicised procedures. The failure to record the filtering dates constitutes an incomplete audit trail and reduces the Campaign's operational transparency.

In explanation of the above mentioned shortcomings, the ADT stated that, firstly, enforcement was a secondary objective of the Campaign. Secondly, it did not summon all vehicles eligible for testing because it lacked the necessary resources, particularly the testing capabilities needed to cope with the significant public response. The ADT acknowledged that an integrated automated data management system would have increased transparency and reduced transcription error risks, but deemed the costs to outweigh the arising benefits.

The Campaign was effective at identifying diesel-engine vehicles with excessive emissions. However, since the public is generally unable to assess the exhaust of petrol-engine vehicles, the Campaign cannot be regarded as a means of controlling emissions from petrol-engine vehicles. The latter would need to be targeted through other forms of vehicle emission control schemes.

Since the latter part of 2008, the potential of the Campaign has unfortunately diminished further. The public may still report vehicles deemed to emit excessive fumes. However, vehicles are not being summoned for testing.

Despite its limitations and shortcomings, the Campaign has played a meaningful role in Malta's efforts to curb excessive vehicle emissions. An adequately resourced and well planned Campaign has the potential to complement the VRT and roadside emission test schemes.





## Chapter 4

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### Roadside Vehicle Emissions Tests

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## Chapter 4 – Roadside Vehicle Emissions Tests

### 4.1 Introduction

Chapter 4 evaluates the two schemes comprising surprise roadside checks of vehicle emissions. These are the Roadside Technical Inspection (RTI) scheme carried out by the Malta Transport Authority (ADT) and the Roadside Emissions Test scheme conducted by the Joint Committees of Local Councils. These schemes aimed to help curb excessive vehicle emissions in two ways: firstly, through their deterrent effect, and secondly by identifying vehicles with excessive emissions so as to bring about their compliance.

This chapter particularly evaluates:

- the implementation of these two schemes;
- the schemes' effectiveness at identifying vehicles with excessive emissions and in having a deterrent effect.

The NAO audited the two roadside schemes as implemented between October 2006 and June 2007. The auditing of the Joint Committees' Roadside Emissions Test scheme was constrained because details about the emission tests carried out by local wardens on behalf of six Joint Committees were not complete.

The first section of this chapter focuses on the Roadside Technical Inspection scheme while the second section evaluates the Roadside Emissions Test scheme.

### 4.2 Emissions testing as part of the Roadside Technical Inspection – Background

As explained in previous chapters, vehicle owners are legally obliged to ensure that, at all times, their vehicle conforms to the emission levels stipulated in the Motor Vehicle Roadworthiness Test (VRT) Regulations.

Vehicles tend to lose their road worthiness with age and use. Consequently, they are unlikely to remain roadworthy throughout the VRT cycle unless regularly maintained. So as to ensure that vehicles subject to extensive use are kept in roadworthy condition all throughout the VRT cycle, the European Union Directive 2000/30/EC requires member states to carry out roadside inspections (including emissions testing) on the following:

- vehicles used to transport passengers with at least eight passenger seats;
- vehicles weighing more than 3,500kg, and used for the carriage of goods (referred to as commercial vehicles throughout this report);
- trailers and semi-trailers weighing more than 3,500kg.

Directive 2000/30/EC also requires member states to set penalties for drivers or owners of vehicles found not to be in roadworthy condition.

The VRT Regulations transpose the EU obligation to conduct surprise Roadside Technical Inspections on the above-mentioned heavy-use vehicles into Maltese law. Such Roadside Technical Inspections check twelve aspects of a vehicle's roadworthiness, including the following emissions-related components:

- the exhaust system;
- the smoke opacity of diesel-engine vehicles;
- gaseous emissions of petrol-engine vehicles.

The Motor Vehicles Regulations contain more comprehensive provisions relating to vehicle roadworthiness. They also empower police officers to

inspect not only commercial and public transport vehicles, but also private vehicles.<sup>37</sup>

The Enforcement Section of the ADT initiated the Roadside Technical Inspections (RTIs) in May 2004.

During the audit period an assistant manager had overall charge of the roadside inspections. The inspections were conducted by six Enforcement Officers of the ADT. In two teams of three, the Enforcement Officers performed RTIs on a day-in day-out basis. Apart from conducting RTIs, the Enforcement Officers had various other duties, and consequently the Officers were limited to spending an aggregate of about 20 hours a week on roadside inspections. A clerk gave secretarial support and inputted the inspections-related data into a word processing document.

According to the ADT's Roadside Inspection procedure, when the RTI reveals a minor fault, the vehicle owner concerned would be obliged to pay a fine of €46.59. The owner would also be summoned to undergo a Vehicle Roadworthiness Test at the ADT garage, after being given enough time to repair the fault/s. If the faulty vehicle does not turn up for the VRT, or fails the VRT as well, the Licensing and Testing Directorate would be instructed to set a restriction on the licence renewal of the vehicle in question.<sup>38</sup>

If an inspected vehicle is found to be in very bad condition, the driver would be obliged to call a towing truck so that the vehicle would be garaged forthwith. The number plates would be revoked until the vehicle is repaired.

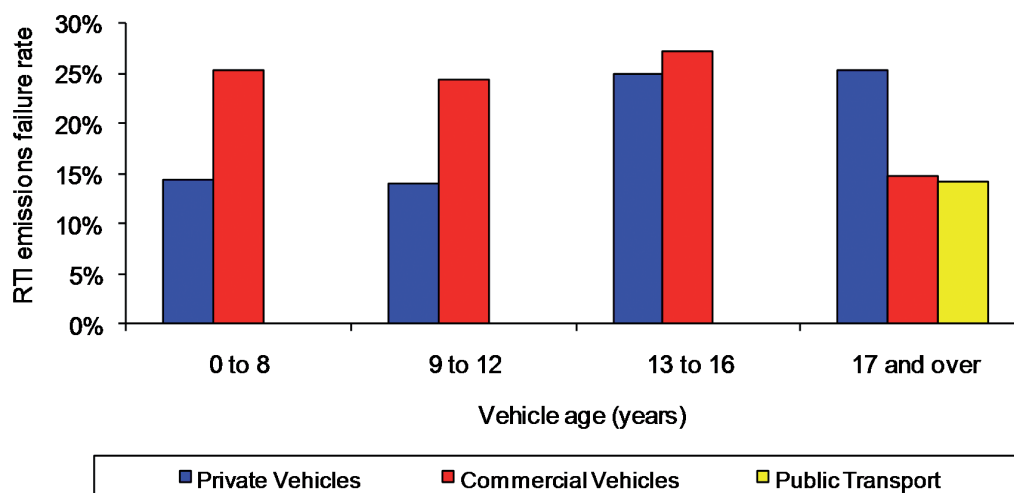
### 4.3 Emissions testing as part of the Roadside Technical Inspection – audit findings

#### 4.3.1 The Roadside Technical Inspection scheme was effective at identifying a significant number of vehicles with excessive emissions

During the audit period the Roadside Technical Inspections checked the emissions of 1,164 vehicles.<sup>39</sup> Almost 20 percent of these vehicles were found to have excessive emissions. Another four percent were found to have a fault in their exhaust system. These figures indicate that the RTIs were reasonably successful in identifying vehicles with excessive emissions, particularly since emissions compliance is just one of twelve roadworthiness criteria targeted by RTIs (see the RTI roadworthiness criteria in Appendix 1).<sup>40</sup>

Of the inspected vehicles aged up to sixteen years old, commercial vehicles had the highest emission failure rate. Of the inspected vehicles aged over sixteen years, private vehicles had the highest emission failure rate.

**Chart 7: The RTI emissions failure rate by vehicle category and age (1 October 2006 – 30 June 2007)**



Source: Malta Transport Authority.

<sup>37</sup> Subsidiary Legislation 65.11, Motor Vehicles Regulations, regulations 94, 126, 120, and 195.

<sup>38</sup> Information provided by the ADT Inspectorate Unit.

<sup>39</sup> Data compiled from information given by the ADT. During the audit period 1,455 RTIs were carried out, but some of the inspections did not check the emissions while some others checked the emissions of the same vehicle twice. In aggregate terms, 1,455 inspections checked the emissions of 1,164 vehicles.

<sup>40</sup> Between October 2006 and September 2007, over half the inspected vehicles failed one or more components of the RTI. This high failure rate indicates that the RTI was highly effective at identifying vehicles which were not in a roadworthy condition (ADT annual report 2007, page 23).

None of the inspected public transport vehicles under sixteen years of age failed the emissions component, however this result must be taken in the context that only seventeen such vehicles were inspected. Another 109 of public transport vehicles aged at least seventeen years were inspected.<sup>41</sup> For this age group, public transport vehicles had roughly the same failure rate as commercial vehicles. Chart 7 illustrates how the RTI emission failure rate varied by age for every vehicle category.

### 4.3.2 RTIs were effective at targeting high-risk diesel-engine vehicles but less so at targeting high-risk petrol engine vehicles

Roadside Technical Inspections aim to target vehicles which are at high-risk of not being in roadworthy condition, including having excessive emissions. Such risk-based targeting is meant to make optimal use of limited testing resources.

Targeting should be preceded by a risk analysis. According to EU and local legislation high-risk vehicles are commercial and public transport vehicles due to their extensive use. Additionally, according to the VRT results, old vehicles and diesel-engine vehicles are high-risk vehicles. These factors together consequently indicate that RTIs should target commercial and public transport vehicles, particularly old and diesel-engine ones.

In compliance with legislative obligations, the Roadside Technical Inspections largely targeted commercial and public transport vehicles (illustrated by Table 14). The daily schedule of inspections pragmatically targeted the sub-categories on the road at different times of the day, namely:

- public transport and school-vans in the early hours of the morning;
- public transport and private vehicles during the mornings;
- mini-buses, school-vans, and public transport in the afternoons;
- public transport and private vehicles later in the afternoon;
- public transport and taxis late in the evening.

In turn, on location, the Enforcement Officers made on-the-spot decisions about which particular vehicles to inspect by targeting vehicles that appeared to be in poor condition or to emit significant smoky exhaust.<sup>42</sup> However, while diesel-engine vehicles with excessive emissions have smoky fumes, defaulting petrol-engine vehicles tend to have clear exhaust. Consequently, the Enforcement Officers mostly targeted diesel-engine vehicles with visible exhaust and overlooked high-risk petrol-engine sub-categories. (This is illustrated in Table 14).

Ninety eight percent of the inspected vehicles were diesel engine ones (see Table 14).<sup>43</sup> This is partly justified by the fact that 95 percent of the public transport and commercial vehicle populations had a diesel engine. Diesel vehicles also warranted more targeting because, during the audit period, they had a higher VRT emission failure rate than petrol engined vehicles.

**Table 14: Vehicle population and vehicles emissions tested in an RTI, broken down by category and engine type (1 October 2006 – 30 June 2007)**

Vehicle Type	Petrol population	Petrol vehicles subjected to RTI		Diesel population	Diesel vehicles subjected to RTI	
<b>Commercial</b>	2,392	2	0.08%	44,653	860	1.93%
<b>Public Transport</b>	113	0	0.00%	2,425	126	5.20%
<b>Private use</b>	158,559	24	0.02%	62,547	152	0.24%
<b>Totals</b>	<b>161,064</b>	<b>26</b>	<b>0.02%</b>	<b>109,625</b>	<b>1,138</b>	<b>1.04%</b>

Sources: Population data: VERA database, Licensing and Testing Directorate, Malta Transport Authority; data re RTI: Malta Transport Authority.

<sup>41</sup> Data given by ADT.

<sup>42</sup> Information given during meetings held with officials involved in the implementation of the RTIs.

<sup>43</sup> Data compiled from information given by the ADT, and VERA database, Licensing and Testing Directorate, Malta Transport Authority.

However, the 2,505 petrol engine commercial vehicles and public transport also warranted targeting as their risk of having excessive emissions was high, namely because:

- they are subject to extensive use;
- half the petrol-engine commercial vehicles and 70 percent of the public transport vehicles were at least 17 years old.<sup>44</sup>

#### *4.3.3 RTIs adequately targeted Malta-based vehicles but did not adequately target Gozo-based vehicles*

During the nine month period under review, 1,438 RTIs were carried out in Malta while only seventeen were conducted in Gozo.<sup>45</sup> The Malta-based RTIs were carried out in various sessions while the Gozo inspections were conducted in only one session.

The Malta RTIs were conducted in 46 locations. Almost half of these were conducted in six locations, namely the St Andrews, Fgura, Zabbar, Mosta, Burmarrad and Hal-Far areas.<sup>46</sup> These locations are considered good RTI sites since a large proportion of the Malta-based vehicles is likely to pass through them. It is to be noted that in 2009, the ADT is undertaking RTIs in Gozo on a monthly basis.

#### *4.3.4 RTIs were conducted on one percent of the vehicle population*

During the audit period, roadside inspections were carried out on less than one percent of all the vehicle population.<sup>47</sup> Inspections were held on two percent of the commercial and public transport category population. On average, six RTIs were conducted daily. Limited testing resources are likely to have put a constraint on the Roadside Technical Inspections' scale of operations.

#### *4.3.5 RTI data was adequately recorded to fulfil EU reporting obligations*

According to Article 5, Directive 2000/30/EC an inspection report must be drawn up for each inspection made and periodically this compiled information must be submitted to the EU. During the audit period the ADT complied with this requirement. The Enforcement Officers recorded the details of the inspected vehicles and of any faults found in a Technical Roadside Inspection Report (reproduced in Appendix 1).<sup>48</sup> The ADT also compiled the information relating to the retesting of faulty vehicles.

Unfortunately, all inspection-related data was recorded in a word processing document, an application that does not readily lend itself to data analysis. This rudimentary data compilation system also rendered the monthly compilation of inspection-related data unnecessarily time-consuming.

### **4.4 Roadside emissions testing as part of the Local Enforcement System – Background**

The Roadside Emissions Test (RET) was launched in June 2006. It formed part of the Local Enforcement System (LES) which is administered by nine Joint Committees of Local Councils.<sup>49</sup>

During the audit period, eight Joint Committees conducted roadside emissions testing as part of the LES while the Joint Committee of Fgura opted not to implement this test. Emissions testing was carried out by local wardens provided on a contract basis by two private warden service agencies. Table 14 lists the Joint Committees which implemented the RET and the respective warden agency which conducted the Roadside Emissions Test on behalf of each Joint Committee.

<sup>44</sup> Data compiled from VERA database, Licensing and Testing Directorate, Malta Transport Authority.

<sup>45</sup> Aggregated ADT data.

<sup>46</sup> Public transport vehicles were inspected at City Gate, Valletta to minimise disruption of the service.

<sup>47</sup> Malta Transport Authority data and VERA database, Licensing and Testing Directorate, Malta Transport Authority.

<sup>48</sup> As required by Schedule 10 of the VRT Regulations, and as confirmed by the ADT officials concerned during meetings on the subject.

<sup>49</sup> To administer the Local Enforcement System on a regional basis, local councils were grouped into nine Joint Committees.

**Table 15: Joint Committees and Warden Agencies involved in Roadside Emissions Testing (1 October 2006 – 30 June 2007)**

Joint Committees	Warden Agency
Valletta	Warden Agency A
Sliema	Warden Agency A
B’Kara	Warden Agency A
Qormi	Warden Agency A
Tramuntana	Warden Agency A
Gozo	Warden Agency A
Zejtun	Warden Agency B
Zurrieq	Warden Agency B

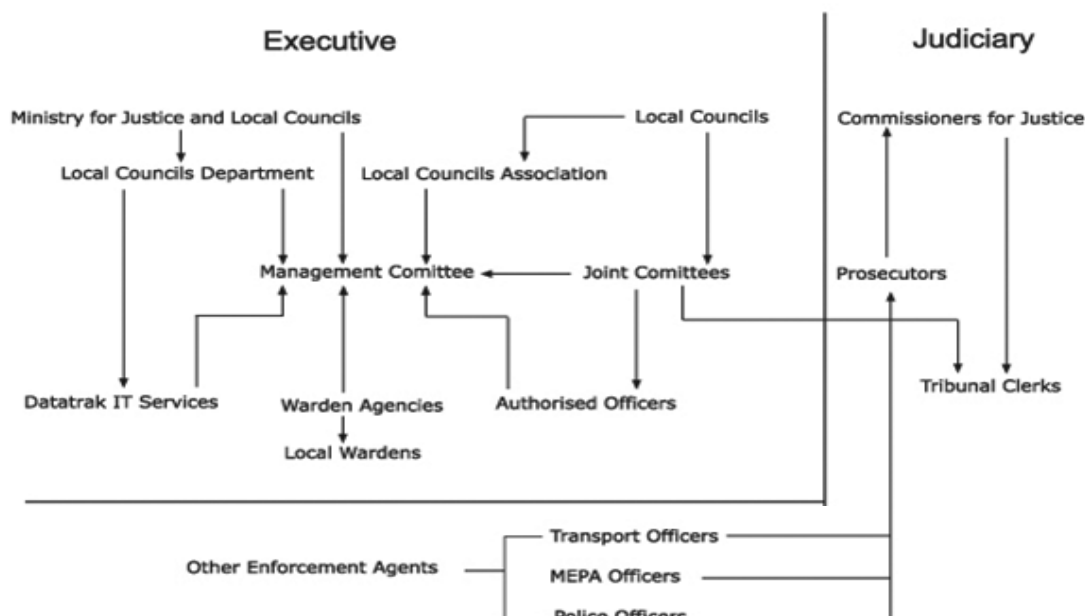
The ADT trained local wardens to conduct emissions testing and leased one emission testing device to each warden agency. The leased equipment was calibrated annually by the ADT. The Agencies were required to submit a list of the tested vehicles to the ADT every month. However, due to a lack of resources, the ADT could not monitor regularly the conduct of RETs by local wardens.

Every Joint Committee appointed an Authorised Officer to administer the local wardens. This Officer was responsible for preparing the schedule of work and to monitor closely

the services of the local wardens so as to ascertain that the optimum level of enforcement was delivered in the most cost-effective manner.<sup>50</sup>

Local wardens issued traffic offence tickets to vehicles which failed Roadside Emissions Test - obliging vehicle owners to rectify the excessive emissions and to pay a fine of €46.59. Local wardens also inputted the failed vehicles’ data electronically into the centralised LES database system. This computerised database was maintained by a private IT service company.<sup>51</sup> The vehicle owners served with a ticket

**Figure 1: LES stakeholders involved in the implementation of the Roadside Emissions Test (1 October 2006 – 30 June 2007)**



Source: <https://les.gov.mt/descriptionles.aspx>.

<sup>50</sup> <https://les.gov.mt/descriptionles.aspx>, page 2 of 4.

<sup>51</sup> <https://les.gov.mt/descriptionles.aspx>, page 3 of 4.

could pay the fine, which would constitute an admission of the contravention, or else contest the contravention with the Local Tribunal or Board of Petitions.

In 2006, the Local Enforcement System Committee Regulations were issued. These assigned regulatory responsibility for the LES to a newly-constituted Committee, the Local Enforcement System Committee (LESC). This Committee was assigned the following functions:

- to draw up and implement a general policy regarding the implementation of LES; including parameters for the operation of any local enforcement;
- to review the workings of local enforcement in all localities;
- to give such orders which it may deem appropriate to any stakeholder involved in the carrying out of local enforcement, in all matters related to local enforcement;
- to ensure that wherever local enforcement is in place, the minimum legal requirements of service are followed.

The Department for Local Government also has legal responsibility, albeit a less specific one, to ensure the proper function of the LES, including Roadside Emissions Testing. This arises from the Local Council Act, which empowers the Director, DLG to issue procedures, guidelines, directions or other instruments as may be necessary to facilitate the effective and efficient functioning of Local Councils. It is noted that the DLG issues guidelines on technical issues in consultation with the relevant Competent Authority, in this case the ADT.

Figure 1 illustrates the various stakeholders involved in the Roadside Emissions Test. The many stakeholders involved make coordination of the LES a complex task.

## 4.5 The LES Roadside Emissions Test – Audit findings

### 4.5.1 *The LES emissions testing was not adequately monitored and regulated*

As explained earlier on in this chapter, the LES Committee was legally assigned the responsibility to formulate and implement the general policies with regards to LES implementation, including the setting of operational parameters to any aspect of LES. This Committee was also

assigned the responsibility to review the implementation of the LES in every locality.

Between October 2006 and October 2007, the Committee addressed a number of fundamental LES-related issues: the compilation of a code of ethics and a revised training schedule for local wardens, the setting up of a disciplinary board for local wardens, and the introduction of speed cameras. It met approximately once a month. It also held introductory meetings with each Joint Committee, with the two warden agencies contracted to implement the LES and with the company contracted to maintain the centralised LES database.

In these circumstances, Roadside Emission Testing was not considered a top priority - the Committee discussed the Roadside Emissions Test scheme once.<sup>52</sup> This discussion focused on the public's negative reaction to this test. Public complaints about RETs were also considered by the LES and subsequently referred to the relevant Joint Committee.

However, the LES did not draw up and implement any parameters regarding the conduct of RETs, or undertake periodic reviews to ensure that the minimum legal requirements of service were followed in the conduct of RETs.

The situation discussed in the preceding paragraphs and the relationship between the stakeholders of the LES, as shown in Figure 1, gave rise to the following issues:

- Although the Department for Local Government is empowered to participate in the LES (through membership in the Committee), its regulatory role with regards to the LES is no longer clear.
- In practice, the LES was not provided with the appropriate resources to enable it to fully implement its mandate, as outlined in LN237/06.
- A formal agreement relating to the conduct of emission tests was not formulated. Such an agreement is of particular importance to ensure that the LES is in a position to implement effectively Roadside Emissions Testing. In addition, it also needed to ensure that the scheme is operated in a more transparent manner, especially as the scheme is a self-financing one.

It is to be noted that the LES has not been reconstituted following the taking of Office by the new Administration in March 2008. Consequently, the LES has continued operating in the absence of this Committee.

<sup>52</sup> Director, Department for Local Government.

It is also to be noted that the RET was discontinued in 2008 due to a decision by the ADT to limit the conduct of emission testing to trained certified officers.<sup>53</sup> Moreover, the DLG noted that the LES, including the RET, will be reviewed within the undergoing Local Council reform exercise.

#### *4.5.2 The absence of documented minimum standards and reporting obligations severely constrained the evaluation of Roadside emission testing*

The performance and effectiveness of the RET scheme was severely constrained because certain minimum standards and reporting obligations for the stakeholders implementing RETs were lacking.

Joint Committees and warden agencies were not obliged to maintain comprehensive records about the vehicles tested. In the absence of such obligatory record keeping, these entities only maintained and inputted into the LES database records of the vehicles which failed a RET and which were fined – but not of all the vehicles tested.

Joint Committees were neither obliged to draw up a plan regarding RETs, to justify the number they choose to undertake, to undertake a minimum number of RETs in their localities, or to periodically report the number of tests undertaken and the results obtained.

The contract entered into by the Joint Committees with the two warden agencies has various provisions regarding the warden services but it does not have any sections setting any minimum standards or conditions regarding the conduct of Roadside Emissions Tests.

The absence of such documented minimum standards, and reporting and data-keeping obligations hampered the evaluation of the Scheme, as will be further explained in the subsequent sections.

#### *4.5.3 Data of vehicles subjected to an RET was not complete*

In the absence of specific instructions regarding what data had to be compiled by the warden agencies and Joint Committees, each of these stakeholders kept records at its discretion.

Warden Service Agency B, which serviced the Zejtun and Zurrieq Joint Committees, maintained comprehensive records of all the vehicles that were subjected to a Roadside Emissions Test. The latter forwarded this data to the Zejtun and Zurrieq Joint Committees as well as to the ADT.<sup>54</sup>

Warden Service Agency A, which catered for the other six Joint Committees, kept details of the vehicles fined, but did not keep details of the vehicles that passed an emission test. The agency argued that it did not keep such records so as not to risk breaching data protection legislation.<sup>55</sup> This agency claimed that between June 2006 and January 2007, it tested 3,225 vehicles of which 85 per cent failed. However, these figures were not supported with the relevant documentation.

As mentioned earlier on in the chapter, a private IT company maintains a centralised LES database. Once again, only records of issued fines were recorded in this database.

Since comprehensive records were not available regarding the RETs conducted by Warden Agency A on behalf of six Joint Committees, the NAO was only able to analyse the data relating to the emissions tests undertaken by Warden Agency B, on behalf of Zejtun and Zurrieq Joint Committees. The following sections give the findings obtained from this analysis.

#### *4.5.4 Over half the vehicles subjected to a Roadside Emissions Test had excessive emissions*

Over half the vehicles subjected to a Roadside Emissions Test were found to have excessive emissions.<sup>56</sup> Table 16 gives an overview of the Roadside Emissions Tests conducted by Warden Agency B on behalf of the Zurrieq and Zejtun Joint Committees.

<sup>53</sup> The ADT has applied for EU funds to, *inter alia*, finance a training programme for ADT officers. Such a programme would enable them to train and certify emission testing officers.

<sup>54</sup> Information obtained from relevant local councils and warden service agencies.

<sup>55</sup> Information given by Warden Agency A.

<sup>56</sup> Warden Agencies A and B gave the relevant data for the six Joint Committees they service, while Warden Agency B gave the relevant data for Zurrieq and Zejtun Joint Committees.



**Table 16: Vehicles subjected to a Roadside Emissions Test and vehicles which failed this test, by Warden Agency (1 October 2006 – 30 June 2007)**

Roadside Emissions Tests undertaken by:	Tested vehicles	Failed vehicles	Percentage failure rate
Warden Agency B, on behalf of Zurrieq and Zejtun Joint Committees	1,210	632	52%
Warden Agency A, on behalf of the six other participating Joint Committees	Not available	301	Not available

Sources: Zejtun and Zurrieq Joint Committees, and Warden Agency A

The validity of these test results were contested by over one third of the vehicle owners concerned. About six per cent of the emission contraventions issued were successfully contested during the audit period.

*4.5.5 The Roadside Emissions Test's compliance and deterrence effects were limited because the testing equipment could only test diesel-engine vehicles*

RETs were only conducted on diesel-engine vehicles. Petrol engine vehicles require a more complex testing procedure. It was felt that emission testing on such vehicles should only be conducted by certified ADT officers. Consequently,

the Roadside Emissions Test could not target the Maltese petrol-engine vehicles, half of which were nine years and over.

*4.5.6 Zejtun and Zurrieq Joint Committees mostly targeted old and commercial diesel-engine vehicles*

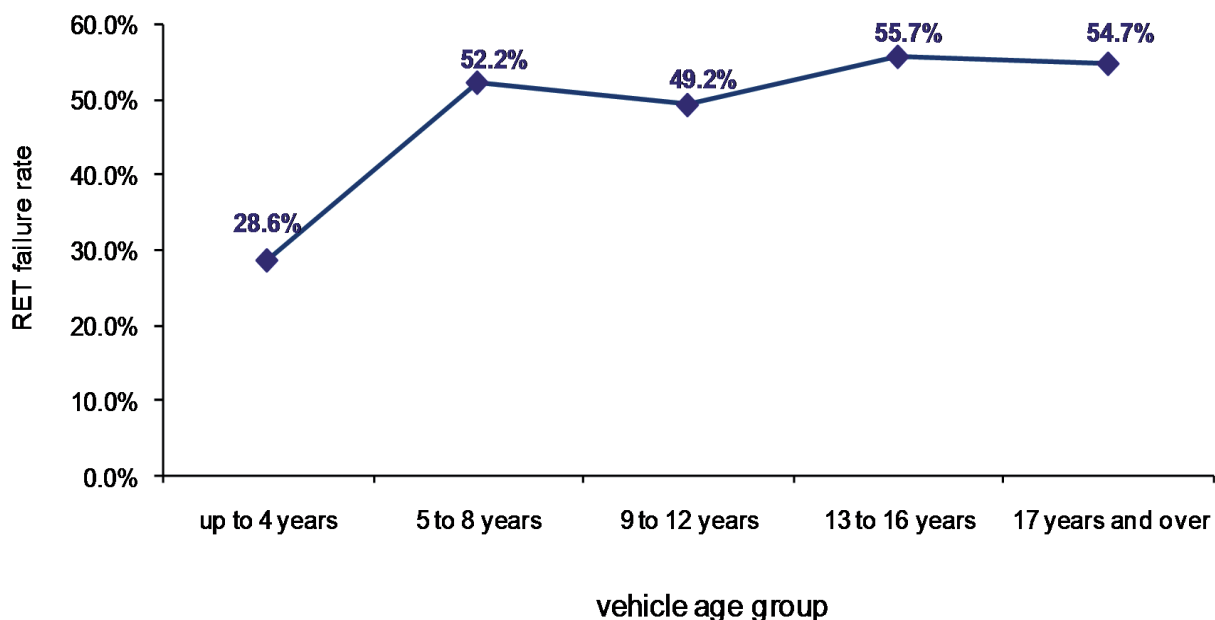
Table 17 gives the age groups and category of the vehicles which were emissions tested by wardens for Zurrieq and Zejtun Joint Committees. Most of these vehicles were relatively old: aged nine years and over. About two thirds were commercial vehicles, the other third private vehicles, while practically no public transport vehicles were tested.

**Table 17: Vehicles emissions-tested by wardens for Zurrieq and Zejtun Joint Committees, by age and category (1 October 2006 – 30 June 2007)**

Vehicle Category	up to 4 years	5 to 8 years	9 to 12 years	13 to 16 years	17 years and over	Grand Total
Commercial vehicle	12	95	262	225	179	773
Private vehicles	2	61	203	74	95	435
Public transport	0	1	0	1	0	2
<b>Grand Total</b>	<b>14</b>	<b>157</b>	<b>465</b>	<b>300</b>	<b>274</b>	<b>1,210</b>

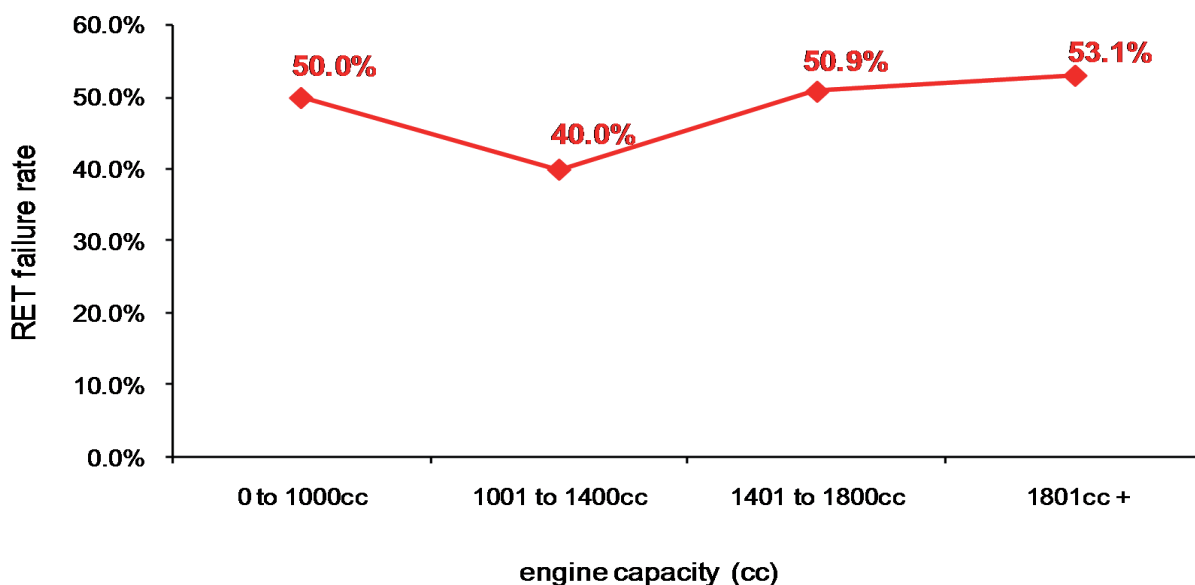
Source: Zurrieq and Zejtun Joint Committees.

**Chart 8: RET failure rate, by age, for Zurrieq and Zejtun Joint Committees, (1 October 2006 – 30 June 2007)**



Source: VERA database, Licensing and Testing Directorate, Malta Transport Authority.

**Chart 9 : RET failure rate, by engine capacity, for Zurrieq and Zejtun Joint Committees, (1 October 2006 – 30 June 2007)**



Source: Compiled from data obtained from VERA database, Licensing and Testing Directorate, Malta Transport Authority.

#### *4.5.7 Noncompliant vehicles were detected across all vehicle age groups and engine capacities*

Chart 8 indicates that the failure rate was high throughout all age groups. The lowest failure rate was for vehicles aged below four years. However, it is still a relatively high failure rate. It is also a significant finding since these vehicles had never undergone a VRT on the assumption that, before four years of age, vehicles are unlikely to lose their roadworthiness.

Chart 9 indicates that the scheme was able to detect noncompliant vehicles across all engine capacities. The failure rate was lowest for vehicles having an engine capacity between 1,001 and 1,400cc, however, it was relatively high for all engine capacities.

The high failure rates obtained for all vehicle age groups and engine capacities indicate that regular maintenance is essential for continuous roadworthiness, even for new vehicles and those with low engine capacities.

#### *4.6 Concluding comments*

The Schemes discussed in this chapter tended to complement each other with regards to the targeting of different vehicle categories: RTIs primarily concentrated on commercial and public transport vehicles, while the RET largely focused on commercial and private ones. Both schemes mainly targeted diesel engine vehicles. Consequently, a gap in the emission control framework exists since high-risk petrol engine vehicles remained largely untargeted.

The RTI scheme, as managed by the ADT, was effective in identifying noncompliant diesel engine vehicles.

Moreover, this scheme particularly targeted those vehicles considered to be high-risk by the EU and national legislation. This scheme was also supported by a thorough audit trail. The scheme, however, hardly targeted Gozo based vehicles.

The RET had a significant potential to identify noncompliant vehicles since it exclusively focused on emissions. However, the scheme's full potential was not realised due to a number of factors.

Operating standards and reporting obligations were not documented. Additionally, communication and accountability lines were complex and unclear. There was no record of any monitoring undertaken. Such omissions are deemed to have detracted from the scheme's operational transparency, especially as the scheme is part of a self-financing programme.

Despite its potential, the scheme was discontinued in early 2008 as the ADT decided to limit the conduct of emission testing to trained certified officers. It is envisaged that the RET, as part of the Local Enforcement System will be reviewed with the undergoing local council reform exercise.

This Chapter has shown that both the Roadside Technical Inspection and the LES Emissions Test were able to identify a significant number of vehicles with excessive emissions. Noncompliant vehicles were detected throughout all vehicle age groups and engine capacities. This indicates the critical importance of such schemes to ensure that vehicles are appropriately maintained at all times, and not just prior to VRT. In this respect, the high failure rates of these initiatives illustrate that, with an enhanced management framework and risk based targeting, these schemes have an essential and complementary role within the vehicle emission control regime.



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## Appendix

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## Appendix 1: Technical Roadside Inspection Report (as set out in the 10th Schedule of the VRT Regulations, S.L. 65.15)

1. Place of check .....
2. Date .....
3. Time .....
4. Vehicle nationality mark and registration number .....
5. Trailer/semi-trailer nationality mark and registration number .....
6. Class of vehicle.....
- (a)  Light goods vehicle (3.5 to 12 t) (1)
- (b)  Trailer (2)
- (c)  Road train (3)
- (d)  Bus or coach (4)
- (e)  Lorry (more than 12 t) (5)
- (f)  Semi-trailer (6)
- (g)  Articulated vehicle (7)
7. Undertaking carrying out transport/address.....
8. Nationality.....
9. Driver.....

10. Checklist
- |   | checked | not checked | failed |
|---|---------|-------------|--------|
| (a) braking system and components (1)   |         |             |        |
| (b) exhaust system (1)  |         |             |        |
| (c) smoke opacity (diesel) (1)  |         |             |        |
| (d) gaseous emissions (petrol, natural gas or liquefied petroleum gas (LPG) (1) |         |             |        |
| (e) steering linkages   |         |             |        |
| (f) lamps, lighting and signalling devices                                      |         |             |        |
| (g) Wheels / tyres  |         |             |        |
| (h) suspension (visible defects) (8)  |         |             |        |
| (i) chassis (visible defects) (8)   |         |             |        |
| (j) tachograph (installation) (9)   |         |             |        |
| (k) speed limiting device (installation) (10)                                   |         |             |        |
| (l) evidence of fuel and/or oil spillage  |         |             |        |
11. Result of inspection:

Ban on using the vehicle, which has serious defects ?

12. Miscellaneous / remarks

13. Authority / officer or inspector having carried out the inspection.

Signature of testing authority`agent or inspector: .....

(1) Motor vehicles with at least four wheels and used for the carriage of goods and having a maximum mass exceeding 3.5 t but not exceeding 12 t (category N2).

(2) Any vehicle intended to be coupled to a motor vehicle, with the exception of semi-trailers, which because of its design and equipment is used for the carriage of goods; trailers of a maximum mass exceeding 3.5 t but not exceeding 10 t (category O3); trailers of a maximum mass exceeding 10 t (category O4).

(3) Motor vehicle intended for the carriage of goods, with a maximum mass exceeding 3.5 t (categories N2 and N3 coupled to a trailer (categories O3 and O4).

(4) Motor vehicle with at least four wheels used for the carriage of passengers, comprising more than eight seats in addition to the driver’s seat (cat. M2 and M3).

(5) Motor vehicles with a least four wheels used for the carriage of goods and having a maximum mass exceeding 12 t

(category N3)

(6) Any vehicle intended to be coupled to a motor vehicle in such a way that part of the semi-trailer rests on the motor vehicle and a substantial part of its weight or of the weight of its load is supported by that vehicle and which, because of its design and equipment, is used for the carriage of goods (categories O3 and O4).

(7) Towing vehicle coupled to a semi-trailer.

(8) Motor vehicles that operate nationally from 1st January 2005.

(9) Motor vehicles that operate internationally only.

(10) Motor vehicles manufactured after 2002 or from 1st January 2006 for nationally operating vehicles manufactured 1988-2001.