







### **Executive Summary**

A major challenge for Low- and Middle Income Countries (LMICs), mainly in the Global South, is that of motorization management. This is a deliberate, diligent, and coordinated process to shape, through public policies and programs, the profile, quality, and, to some degree, quantity and intensity of use of the motor vehicle stock as it progresses through a country's motorization process<sup>1</sup>,

Whilst improving vehicle safety is a key pillar in a safe system approach to help solve this problem, ideally actions to address the global planetary challenges of climate change, nature and biodiversity loss, and pollution and waste, should be taken simultaneously. For vehicles, this involves actions to ensure that they are safer, cleaner, greener and disposed of in an environmentally friendly manner at their end of life.

Given that the majority of vehicles in the Global South are used vehicles imported from High-Income Countries (HICs), efforts by the United Nations (UN) and government stakeholders to date have mainly focussed on development of

TRL can support government stakeholders in this complex process by providing technical advice, bespoke technology roadmaps which take into account interacting challenges, analysis of issues and development of countermeasures, as well as cost-effectiveness analysis of policy measures under consideration.

regulatory measures, such as maximum age and minimum emission standards, to help ensure that only quality – safe and clean – used vehicles are imported. This process is not straightforward because modern exhaust after-treatment systems require low-sulphur fuels, which are not available in many LMICs. In practice this leads to the systems being removed in-country, causing increased emissions. TRL can support government stakeholders in this complex process by providing technical advice, bespoke technology roadmaps which take into account interacting challenges, analysis of issues and development of countermeasures, as well as cost-effectiveness analysis of policy measures under consideration.

TRL can help by providing practical procurement guidance and decision tools, custom-tailored to the specific regional challenges and the practical requirements of the future fleet.



There is also demand for new vehicles from fleet operators such as public transport operators and small and medium firms in the Global South. UN Resolution 74/299 from 2020 recommends a set of minimum technical requirements for new vehicles which should decrease the possibility of a road crash and better protect occupants and other participants in road traffic in the event of a crash. Fleet operators should consider these but can go even further and use their buying power to impose higher safety levels. TRL can help by providing practical procurement guidance and decision tools, custom-tailored to the specific regional challenges and the practical requirements of the future fleet.

> TRL has helped to develop tools to assess inplace national inspection systems and we can support the development of national regulations and the building of in-country capacity.



Vehicle technical inspection is a key factor to assure the quality of used vehicles and that a vehicle's roadworthiness, safety and environmental performance is maintained throughout its life. UN Resolution 74/299 from 2020 references the minimum inspection requirements in the 1997 agreement that should help improve global road safety. TRL has helped to develop tools to assess in-place national inspection systems and we can support the development of national regulations and the building of in-country capacity.

In summary, improving the safety of vehicles in Global South countries is a complex challenge with many stakeholders and interdependencies. At the same time, this offers great opportunities to harness the synergies between safety and environmental protection. Through its work with a wide variety of stakeholders, TRL has vast experience in sustainable transport and road safety across all pillars of the safe system approach. This longstanding expertise helps us to deliver successful programs to address complex challenges such as these.







### 1 The challenges for the Global South

Global road deaths went up from 1.15 million in 2000 to 1.35 million in 2016<sup>2</sup>. The Global North (HICs), however, has seen a reduction in killed and seriously injured casualties (KSIs) over the last thirty years and this is mainly due to improvements in secondary safety features of vehicle design (reduction of the severity of injury outcomes during a collision). We are now seeing primary safety systems (e.g. crash avoidance such as electronic stability control and automatic emergency braking) leading the next phase of vehicle safety improvements. However, the fleets of vehicles in the Global South (LMICs ) often lag in terms of the vehicle safety features available.

Whilst improving vehicle safety is a key pillar to help reduce road casualties, ideally actions to address the global planetary challenges of climate change, nature and biodiversity loss, and pollution and waste, should be taken simultaneously. For vehicles, such actions include reduction of vehicle exhaust emissions and improvement of disposal of End-of-Life Vehicles (ELVs) so that a larger proportion of them is re-used, recycled or recovered. Thus, actions to improve vehicle safety should not be considered in isolation, but their effect on other global challenges should also be taken into account. Fortunately, often actions taken to improve road safety can also improve environmental aspects; for example, if the standards for the import of used vehicles are increased to enhance safety, the vehicles usually have improved exhaust emission performance because they are newer and have had to meet more stringent emission regulations in their country of origin.

> Figure 1: Actions associated with the main challenges facing countries in the Global South

The main challenges for countries in the Global South are:

- throughout each vehicle's lifetime
- manner at their end of life

The main actions associated with these challenges are shown in the figure below, and they should be acted upon simultaneously in order to have the greatest impact on the fleet.



#### **VEHICLE ENTRY**

- Improve standards for safety and tailpipe emissions simultaneously
- For imported used vehicles & new vehicles manufactured in country

To get safer and more environmentally friendly vehicles into their national fleets and improve standards to which vehicles are manufactured in-country

To ensure the emission and safety performance of all vehicles within the national fleet are maintained

To dispose of vehicles in an environmentally friendly





#### **ACTIVE SERVICE VEHICLES**

- Vehicle roadworthiness inspections to ensure performance maintained
- Quality assurance of after-market parts and bodywork modifications



#### **VEHICLE EXIT**

- · Clean and safe vehicle repurposing by regulating lifetime permitted uses
- Circular economy to promote in-country recycling industries



## 2 Vehicle entry

Much work has been performed by the United Nations (UN) and partners to understand and control the trade of 'used vehicles' from HICs to LMICs for example the 'Global trade in used vehicles report' funded by the UN Environment Programme<sup>3</sup>. There are also projects ongoing, for example 'Safer and cleaner used vehicles for Africa' funded by the UN Road Safety Fund<sup>4</sup>. Working alongside these projects are organisations such as the European Commission (EC) and the African Organisation for Standardisation (ARSO). As part of their Global Gateway strategy, the EC provide funding for the Tripartite Transport and Transit Facilitation Programme (TTTFP) which aims to facilitate the development of a more competitive and sustainable relationship between the European Union and Africa through the development of harmonised road transport policies, laws and regulations. The aim of ARSO is to develop and harmonise standards which can be implemented, ideally throughout the continent, to enhance Africa's trading capacity.

For safer and cleaner vehicles, the overall aim Work is ongoing but recommendations emerging is to put into place regulations, standards and processes to ensure that global south countries only receive quality used vehicles, which will deliver vehicle disposal. major road safety benefits and co-benefits for the environment and economy. It is envisaged that these regulations should be harmonised, at least at a regional level, to minimise loopholes to avoid them, for example by using a transit country, i.e. importing via another country close to the destination country. The Department for Energy Security and Net Zero (International Net Zero Directorate) will soon be releasing a study on the scale and quality of used vehicle exports from the UK to Overseas Development Assistance (ODA) eligible countries. This is a recognition that the UK has a role to play, and TRL was commissioned to deliver the study.



for regulatory requirements include safety, emissions, vehicle roadworthiness inspection, and





#### Case study

Given TRL's extensive experience in the development of regulation of crashworthiness and crash avoidance safety systems, we were commissioned by Bloomberg Philanthropies to examine the effect of vehicle safety standards in four Latin American countries. The three vehicle standards examined were:

1. Minimum standards for crashworthiness, i.e. regulations that help to protect occupants in front and side impact crashes;

2. Electronic Stability Control (ESC) for crash avoidance: and

3. Pedestrian protection measures to improve safety for Vulnerable Road Users (VRUs) including pedestrians and bicyclists.

A cost-benefit study showed that in total, if Argentina, Brazil, Chile, and Mexico adopted the full set of priority vehicle safety standards from 2020, more than 25,000 lives could be saved and over 170,000 serious injuries prevented within a decade. The benefit-to-cost ratios predicted for the VRU measures indicate these should also be implemented in the region. A delay in implementation by any of the countries would mean that the full level of benefit is not realised.

#### 2.1 Safety

Minimum requirements for vehicle performance when new are specified as part of the UN Resolution 74/299, adopted by the General Assembly in 2020 as shown in Table 1. These relate to the UNECE's 1958 and 1998 Agreements and cover the basic safety aspects of a vehicle which are required to decrease the possibility of a road crash and to better protect occupants and other participants in road traffic in the event of a crash. Some of the regulations seek to increase the vehicle's capability to mitigate passenger and pedestrian injury in the event of a collision, e.g. passive safety, while others aim to improve the driver's ability to maintain control of the vehicle and avoid hazards, e.g. active safety.

These minimum standards have most relevance to in-country built vehicles. Global NCAP have shown that in some countries (e.g. Mexico) that do not enforce these standards the crash performance of in-country built cars, even from major manufacturers, is very poor compared to an equivalent car built in a HIC<sup>5</sup>. For used vehicles imported from HICs, the main issues are related to the roadworthiness of the vehicle because, as a general rule, they meet these minimum standards. As part of the 'Safer and cleaner used vehicles for Africa' project<sup>6</sup> the Human Environment and Transport Inspectorate (ILT) of the Netherlands investigated the quality of cars being exported to African countries. They found that some vehicles were completely worn out and about half would not pass a roadworthiness inspection with about 1 in 8 airbags having a malfunction. It is clear that

Торіс	Passenger cars	PTWs	Commercial vehicles
	UN Regulation	UN Regulation	UN Regulation
Active safety			
Brakes	R13H (incl ABS)	R78 (incl ABS) / GTR3	R13 (incl EVSC)
Electronic Stability Control	R140 / GTR8		
Steering	R79		R79
Tyres	R30 / GTR16	R75	R54
Mechanical couplings			R55
Passive safety			
Helmets		R22	
Safety belt anchorages	R14		R14
Safety belts	R16		R16
Seats / head restraints	R17, R25 / GTR7		
Frontal collision	R94		
Lateral collision / pole side impact	R95, R135 / GTR14		
Pedestrian safety	R127 / GTR9		
Child restraints	R44		
Electric PTW safety		R136	
Cabs strength			R29
General safety			
Buses and coaches			R107
Safety glazing	R43 / GTR6		R43
Devices for indirect vision			R46
Underrun protection			R58, R93
Lighting and light installation			
Installation of lighting	R48	R53, R74	R48

Table 1: Minimum recommended safety requirements emerging for passenger cars, Powered Two Wheelers (PTWs) and commercial vehicles. Note: 'R' and 'GTR' indicate regulations which are part of the 1958 and 1998 Agreements, respectively.

these worn-out vehicles should not have been exported but disposed of in the European Union (EU) in compliance with ELV regulations.

For these reasons, the UN Environmental Programme Partnership for Clean Fuels and Vehicles (PCFV) has recommended that a global voluntary agreement on cleaner and safer used vehicles be pursued with the aim of holding both exporting and importing countries accountable for the quality of used vehicles<sup>7</sup>. Key to the successful implementation of such an agreement is the sharing of vehicle data by the exporting countries in a secure fashion (probably electronically) to ensure the condition of the vehicle and its safety features are known and opportunities for fraudulent activities are minimised.







#### 2.2 Emissions

There are largely three main sets of vehicle standards: United States, Japanese, and European, with various markets mostly using these as their base. These sets of standards have been updated over the years to enable the progressive introduction of increasingly stringent requirements, both to improve air quality and reduce Green House Gas (GHG) emissions. Fuel quality in the destination country dictates what level of vehicle standard can be required because higher sulphur fuels can damage the exhaust after-treatment devices of vehicles that meet the more stringent standards. For example, diesel vehicles that meet the Euro 4 standard require fuel with sulphur content < 50 ppm to work effectively without damage. For the current Euro 6 standard, fuel with sulphur content < 10 ppm is required. A map of sulphur fuel levels is shown here.

The UN Partnership for Clean Fuels and Vehicles (PCFV) has adopted a "Systems Approach" in its support to countries. The systems approach matches the fuel quality progression to the maximum feasible vehicle emission standards. There are various benefits to this approach, the main ones being:

- Improved urban air quality through reduced
  vehicular emissions and potentially, lower fuel
  consumption.
- Improved road safety since, generally these vehicles will also be required to meet more stringent safety requirements.
- Net savings to the countries in terms of reduced imports of spare parts that would have otherwise been required to service an increasingly older fleet.
- A potential reduction in oil imports.

Figure 2: Global diesel fuel sulphur levels January 2022. Source : UN Environmetal Programme<sup>8</sup>





#### 2.2 Emissions (contd)

The current target recommended by the UN PCFV is a maximum of 50 ppm and below sulphur in both petrol and diesel fuel, and a minimum of Euro 4/ IV or equivalent vehicle emissions standard<sup>9</sup>.. The problem with this target is that because Euro 5 was introduced more than ten years ago, many used vehicles will meet improved emission standards (Euro 5 and 6) and this fuel sulphur level will damage their emission after-treatment systems and eventually cause them to break down

The usual practical solution to this problem is to remove the after-treatment systems before they are driven in-country. The result of this solution is that the emission levels of the modified cars are increased, so clearly, in the ideal world, it would be better to improve the fuel quality so that its sulphur content is ultra-low (< 10 ppm) and retain the emission after-treatment systems on the cars. However, although ultra-low sulphur fuels a available in some countries, their general availabi can be problematic because, for example, it takes time to transition refineries to producing it and there are associated costs. Therefore, whilst the highest-impact approach for desulphurisation is at the national level, when this is not feasible immediately, to maximise benefit some countries choose to introduce dual sulphur standards for urban areas first. This entails making lower-sulphur fuels available in cities for a period prior to rolling out low-sulphur fuels at the national level. A part of this type of approach can include cleaner fleets, such as city buses.



ו	To help reduce Green House Gas (GHG) emissions,
	introduction of Internal Combustion Engine (ICE)
are	vehicles with better fuel efficiency and electric,
ility	hybrid and plug-in hybrid vehicles into the vehicle
S	fleet should be encouraged. However, this will
	require further consideration of issues relating to
<u>.</u>	ELV disposal, in particular recycling of batteries
	from electric vehicles.

To help reduce emissions further, import of used electric, hybrid and plug-in hybrid vehicles should ur be encouraged. However, this would require consideration of issues relating to ELV disposal, and recycling of batteries is also required.

Regulatory step	Application date in Europe (all cars)	Correspond diesel fuel max sulphur level
Euro 2	Jan 1997	500
Euro 3	Jan 2001	350
Euro 4	Jan 2006	50
Euro 5	Jan 2011	10
Euro 6	Sept 2015	10

Table 2: Application of emission level regulation for cars in the EU and corresponding diesel fuel sulphur level





#### 2.2 Emissions (contd)

#### Case study

### Safer and greener vehicle procurement for Transport for London

This project focussed on vehicle procurement for Transport for London (TfL) to explore safer and greener vehicle technologies available, ranging from motorcycles, cars, though to buses and heavy goods vehicles. A market review was used to generate a roadmap of when technologies and features are expected to be available for procurement, for each of the vehicle categories. A scoring mechanism was developed for these technologies and features to allow comparative assessment of their usefulness in developing procurement policy. This was combined with a modelling tool to show the estimated effect on casualties and emissions in the future. The tools to help incentivise fleet change were investigated and evaluated, including regulation, standards, consumer testing programs, etc.

Other authorities, cities and fleet operators can use a similar approach to help them select safer and greener vehicles for procurement, or to help them determine the influence of different interventions to promote the vehicles. The modelling could be extended in many ways, for example to cover operational costs, insurance claims, or into a full cost-benefit analysis.



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### 3 Active service vehicles

To help ensure that vehicles are maintained in a roadworthy condition, the use of vehicle technical inspection is recommended as follows:

#### Imported used vehicles

- At export for all vehicles and at import in random or systematic manner to ensure the quality (safety and environmental performance) of these vehicles.
- The reason for this recommendation is that many global south countries lack mandatory vehicle inspection programmes and thus, given that ensuring the quality of the used vehicle should be a burden shared between the exporter and importer, it is more practical for the exporter to inspect the vehicles before they are shipped and the importer to inspect a few to check procedures have been followed in the exportimport process.
- A key enabler for vehicle technical inspection is the exchange of digital data between exporting and importing countries so that importing countries have access to historical vehicle information. Related to vehicle information for vehicles from the EU, EUCARIS and DETA are two candidate data platforms available for international use.

#### **Active service vehicles**

• During the vehicle's operational life to ensure its continued roadworthiness, safety and environmental performance.

#### Roadside

Roadside inspections are generally aimed at commercial vehicles and can include checks such as the following:

- · Vehicle load to ensure secure and not overloaded
- Mechanical faults such as worn-out brakes, extreme corrosion
- Emissions to identify gross polluting vehicles

Requirements for Periodic Technical Inspection (PTI) are set out in the UNECE 1997 agreement with vehicle fleets that are old and poorly maintained, they may be too stringent and result



#### Active service vehicles (contd)







### Case study



### Assessment of Vehicle Inspection Systems (AVIS)<sup>10</sup>

The challenge for many countries of the global south is how to implement a vehicle inspection system from scratch, or how to develop an existing system so that it is more robust and impactful. CITA, the International Motor Vehicle Inspection Committee, in collaboration with TRL, has developed a tool to help countries evaluate their existing systems, and guide them in areas for improvement.

CITA's work began with projects in Togo and Cameroon that examined the development possibilities for inspection systems. Both projects concluded that there was a reasonably strong framework in place for the inspections, but that in practice the implementation was challenging. Specific and practicable recommendations were made for each country. Following this, the wider challenge for CITA was how to build on this experience and develop an assessment system that could be used in any other country.

To meet this challenge, CITA has formed a Task Force to develop the AVIS Tool (a spreadsheet-based scoring) system) and its associated Manual (guidance protocol with a fuller description of the assessment aims and practical information about the scoring). TRL was commissioned to provide independent technical support to CITA. The AVIS Tool assesses the type, quality, and effectiveness of the PTI systems in place within a country. This includes an evaluation of what is mandated by regulations/standards, the reality of the actual implementation of those standards, and the goals for future development. It covers seven main topic areas, including: the rules and general systems; scope of vehicles; inspection content, methods and equipment; inspector qualifications; impartiality and anti-corruption; enforcement; and supervision.

The AVIS Tool went through many iterations and refinements during its development. It has been put through a country validation exercise, where CITA members from across the globe used their experience to complete the assessment for their countries. The resulting revised AVIS is now in use.







### 4 Vehicle exit

Recently the European Commission have reviewed Directive 2000/53/EU and related regulation and propose to replace it with a new regulation on circularity requirements for vehicle design and on management of ELVs. These ELV regulations require vehicles to be treated in an environmentally friendly manner and sets targets for recycling. In turn, this requires the vehicles to be processed as shown in Figure3, which involves their collection, depollution, and dismantling, so that their



constituent materials can be sorted and shredded before being thermochemically processed to recover and recycle as much as possible and reduce landfill.

In many global south countries, little attention is still given to recycling and waste management; ELVs are abandoned or disposed of illegally, and the dismantling of these vehicles, if done at all, is undertaken by the informal sector using poor practices causing high environmental concerns. To help solve this problem, the United Nations Industrial Development Organization (UNIDO) stressed that it was vital to work towards establishing a circular economy and promoting recycling industries in Global South countries. UNIDO further reported that the low cost of labour and the existence of strong (though informal) recovery and remanufacturing sectors in these countries, provides a competitive advantage for further development of the recycling industry, providing efforts are properly controlled. One idea proposed to address this issue is the concept of 'Industrial Parks' or 'Mechanical Villages' where industries which service and dispose of vehicles are encouraged to develop and measures are put in place to ensure that waste is treated in an environmentally friendly manner<sup>12</sup>.

Figure 3: Flow chart for End-of-Life Vehicle (ELV) processing – note: processes are in plain shapes and outcomes in grey shapes. Source : Numfor et al., 2021<sup>11</sup>





#### 4.1 Recent progress examples





In terms of recent progress, the Economic Community of West African States (ECOWAS) have adopted shared regional directives which impose the following for imported used vehicles from January 2021:

- Euro 4/IV emission standard note: new fuel standards which require sulphur content < 50 ppm are also being introduced in parallel to ensure Euro 4/IV vehicles can operate effectively without damage
- Vehicle age, light duty vehicles (LDVs)  $\leq$  5 years, heavy duty vehicles (HDVs) ≤ 10 years



GLOBAL

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**UPDATE OF FLEET BUYERS GUIDE** 

safety systems, such as Electronic Stability Control

Although the vast majority of vehicles in the global south are used imports, there is also demand for new vehicles from wealthy individuals and fleet operators such as security services (e.g. the police), public transport operators, and small and medium firms. These operators have the opportunity to impose requirements before they are mandated countrywide and indeed introduce requirements which exceed a mandated minimum.

To help fleet operators and others select the safest vehicles to purchase/lease within reasonable bounds of affordability, Global NCAP provide a fleet safety guide and safer vehicle purchasing policy, which was updated in 2022 to include recommendations for commercial vehicles and motorcycles in addition to cars.

The guide recommends that purchased vehicles should:

#### At least meet minimum safety requirements:

(or equivalent national performance requirements with effective conformity of production), e.g. for safety belts and restraint systems UN Regulation No. 16 (USA equivalent FMVSS 209). AND, ideally, meet enhanced safety requirements:

These are defined by recommending that wherever possible vehicles have a rating by a recognised relevant New Car Assessment Program (e.g. ASEAN NCAP) of '5 star' and not less than 4 star.



These are defined in terms of 'must have requirements' and 'must have equipment' identified by Global NCAP







### 5 How TRL can help

In summary, the major challenges for vehicles in the global south are to reduce casualties and protect the environment. Actions to address these challenges should be taken simultaneously and include:

- Vehicle Entry: Get safer and more environmentally friendly vehicles into national fleets
- Active Service Vehicles: Ensure safety and emission performance maintained throughout each vehicle's life
- Vehicle Exit: Ensure environmentally friendly disposal (recycling) of vehicles at their end of life

To address these challenges is complex and will involve evidence gathering, followed by the implementation of regulatory and operator influencing activities. There is a large overlap between improving the safety of vehicles and the environmental protection, in particular vehicle tailpipe emissions and ELV disposal, and thus they cannot be treated in isolation. For example, safer vehicles are fitted with Advanced Driver Assist Systems (ADAS) such as Intelligent Speed Adaptation (ISA) which helps the driver control the vehicle's speed are less likley to speed and will therefore have reduced emissions. Also they will likely have lower speed collisions and consequently cause a smaller environmental impact as a result of the collision. TRL has been developing a model to quantify the environmental impact of collisions<sup>13</sup>.

Our framework for safer, greener, and cleaner vehicles in the global south encompasses all three of these challenges, as illustrated :





#### Figure 4: TRL's Framework for Safer, Greener and Cleaner Vehicles in the Global South



## 6 TRL's work in practice

TRL has vast experience in road safety, across all pillars of the safe system approach, including vehicle safety. We also have extensive expertise in delivering programs to monitor and reduce vehicle emissions, including facilitating a clear and transparent policy-making process. Some examples include:

#### **Vehicle Safety & Vehicle Emissions**

- Road map development which takes interacting challenges into account
- (I) For national governments to develop better and more cost effective outcomes
- **C** For fleet operators to help implement safe workplace policies that also reduce emissions
- Cost-benefit analysis to provide justification for changes proposed, considering both minimum requirements for regulation and standards to exceed and create greater fleet change







Consumer test program development



Procurement policy standards and tools, including practical guidance and advice about procurement



Behaviour change studies and campaigns to help encourage fleet and individuals to choose safer and cleaner vehicles

Identification and evaluation of incentive programs



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#### **Vehicle Inspections**

Evaluation of the roadworthiness inspection system using the CITA AVIS tool, including recommendation of future improvements in each of the seven assessed areas: the rules and general systems; scope of vehicles; inspection content, methods and equipment; inspector qualifications; impartiality and anti-corruption; enforcement; and supervision

Development of Periodic Technical Inspection (PTI) Systems

#### **Vehicle Information Management** System

Collection , analysis and sharing of vehicle records data to provide a single source of truth

Gathering and assessing data with continuous analytics in a process as illustrated below

Development of fleet recognition schemes, (e.g. UK ECO stars), to encourage commercial operators to run their vehicles more efficiently to reduce emissions and improve air quality

Investigation of used vehicles export market from HICs to Global South countries, e.g. identify issues and potential counter-measures to resolve

Figure 5: TRL Vehicle Information Management System framework



#### TRL's work in practice (contd) 6

#### **Education & Engagement**

#### Coordinated capability development of government agencies

- Embed skills and capabilities for VIMS data collection and analysis
- Aim to get agencies "talking in the same language'' about vehicle stock management

#### Professionalisation of public transport and logistics

- Establish a professional body to coordinate and accredit sector (similar to CILT)
- Utilise procurement levers to encourage safer vehicle fleets

In conclusion, we believe that promoting safer, greener, cleaner vehicles in the global south is an achievable goal. Motorization management will take a coordinated effort on multiples streams of work, but we all have a desire to reduce casualties and emissions for the future of our planet.

We believe it is a learning process; every country of the global south will be different, so it's a process of continuous improvement.

Figure 6: A data-driven and continuously improving process is needed for an effective motorisation management programme

#### Industry representation and consultation

- Engage stakeholders to ensure economic viability, uniform enforcement, informed consensus
- Exporters, importers, in-country vehicle manufacturers, aftermarket bodybuilders for construction modifications, inspection centres, ELV industries all need representation

#### **Public engagement and outreach**

- Coordinate and deliver strategy for 2-way public communication activities
- Aim to inform and engage different public stakeholder segments using a timely, relevant and relatable program of activities – including social media, etc.





TRL is supporting a multi-agency plan to improve road safety in Himachal Pradesh







### 7 About the Authors



#### Dr Mervyn Edwards

Mervyn Edwards is a technical expert in vehicle safety and technology, developing new regulations and improving vehicle roadworthiness, for example through PTI, to reduce road casualties.





#### **Dr Alix Edwards**

Alix Edwards is Head of Transport for Sustainable Development, generating technical strategies to reduce road casualties and lessen the impact of transport on our climate, with a focus on the Global South.



#### **Dr Phil Martin**

Phil Martin is TRL's Head of Transport Safety. As a consultant he applies the Safe System principles to all surface transport sectors and has worked for clients around the world. He holds a PhD in Injury Biomechanics and a Master's degree in Integrated Engineering.

#### **Matthias Seidl**

Matthias Seidl is TRL's Principal Consultant in the area of vehicle regulation, developing and assessing new regulations for safer vehicles.

## 8 About TRL

## Our mission: Creating clean, easy, efficient transport that is safe and reliable for everyone

TRL is a team of expert scientists, engineers and specialists working together with our clients and partners to create the future of transport.

The TRL group of companies is owned by the Transport Research Foundation: a non profitdistributing social purpose company that enables our experts to give independent advice without influence from shareholders or finance companies. We work to make transport safer, cleaner and more accessible for everyone.

- We publish software that helps the world's largest cities, and many smaller towns too, reduce pollution, carbon footprint and congestion with advanced traffic management, better road design and good asset management
- We conduct leading edge research into infrastructure, vehicles and human behaviours which enables safer, cleaner, more efficient transport.
- We deliver detailed incident investigation, structural survey and other high value field services to help clients to improve the service they give their customers.
- We work with universities and other partners to invest in basic and applied research that will underpin future needs.
- We have built, with partners from government and industry, the Smart Mobility Living Lab: the world's first physical and virtual testbed in a global megacity (London) that lets companies test new mobility products and services safely on live public roads.
- Established in 1933 as the UK government's Road Research Laboratory, the renamed TRL was privatised in 1996 and today has more than 1000 clients in many countries. Our headquarters are in Crowthorne House, near Bracknell, and we have offices in London, Germany and India.





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# THE FUTURE OF TRANSPORT

A major challenge for countries in the Global South is motorisation management, which is essential to help tackle the high and rising number of road casualties, and to reducing emissions for combatting climate change. Whilst improving the safety of vehicles is a key pillar in a safe system approach to help solve this problem, ideally actions to ensure that they are also cleaner and disposed of in an environmentally friendly manner at their end of life should be taken simultaneously to help address the global planetary challenges of climate change and pollution.

Given that the majority of vehicles in Global South countries are used vehicles imported from High–Income Countries (HICs), current efforts are focused on measures to help ensure only safe and clean vehicles are imported. However, implementation of measures is challenging because vehicle emissions are dependent on the quality of fuel used and related somewhat to their safety levels. Through its work with a wide variety of stakeholders, TRL has vast experience in road safety across all pillars of the safe system approach and expertise in delivering programs to address complex challenges such as these. Our framework can help countries of the global south to manage vehicle entry to the stock, their active service, and their exit at end of life.



