17 - 18 October 2023 / Addis Ababa, Ethiopia

IMPROVING VEHICLES TO IMPROVE LIFE

- ECA - The challenge of E-vehicles
- CITA - RAG Africa Conference

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BETTER VEHICLES FOR A BETTER LIFE

SESSION 2

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FDRE MINISTRY OF TRANSPORT AND LOGISTICS

Better Vehicles for a Better Life

Ethiopia's Experience

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Oct 2023

Addis Ababa- Ethiopia

Outlines

1. Introduction
2. Objectives
3. Legal frame works
4. Regulations, Norms and standards
5. Incentives
6. Challenges and opportunities
7. Conclusion

1. Introduction

- The history of vehicles in Ethiopia dates back to 1907/08 during the reign of Emperor Menilik II,
- Since then, the country has made significant progress in the development of its transportation sector, including the construction of rail and road infrastructure,

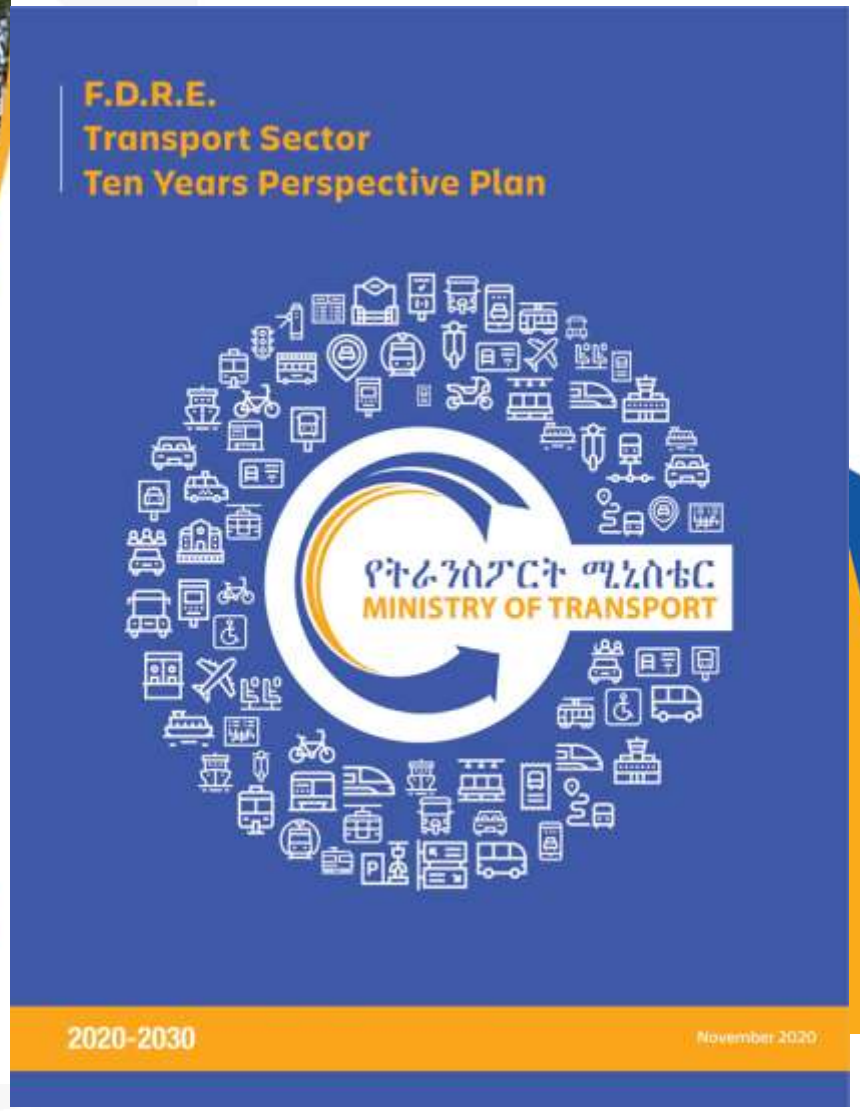
Cont.

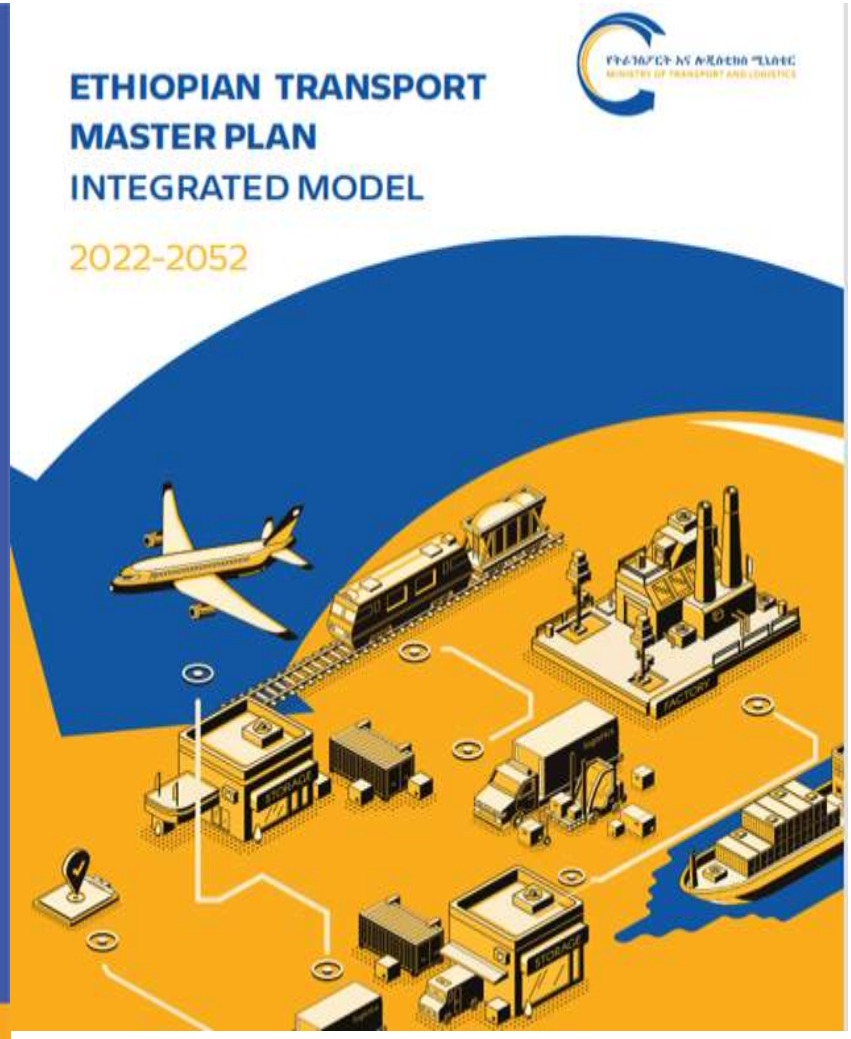
- The first railway in Ethiopia was the 780 km line that connected the capital, Addis Ababa, to the port of Djibouti, opened in 1901,
- However, the automotive industry in Ethiopia is still in its early stages, and the market is dominated by second-hand imported vehicles, particularly commercial vehicles,
- Despite this, the Ethiopian government is taking steps to promote the development of the automotive industry,
- Currently, private sectors are promised in automotive industry including EV assembling,

2. Objectives

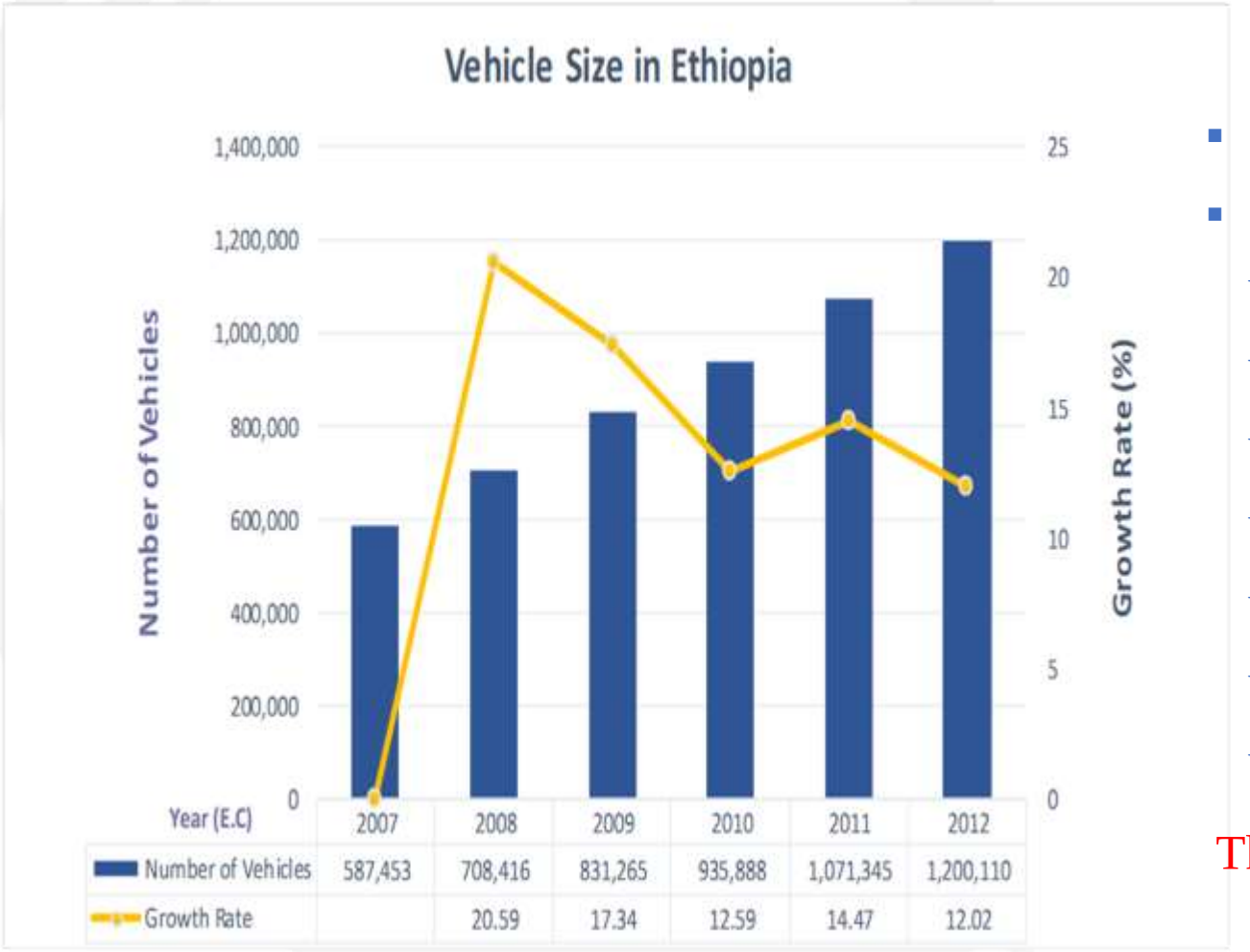
- The objectives of this presentation and discussion are:
  - To share Ethiopian experiences for others about vehicle standard and norms
  - To gain and implement best practices from others
  - To explain Ethiopian new incentive package for new vehicles

3. Legal Frameworks





Vehicle number and growth rate



- The average age of the vehicle population in Ethiopia is 20 years,
- The age distribution of vehicles in the country is as follow:
- In Ethiopia, the percentage of vehicles by age is as follows:

Vehicle age <5: 11.2%

Vehicle age 5-10 years: 13.9%

Vehicle age 11-15 years: 6.9%

Vehicle age 16-20 years: 16.6%

Vehicle age 20-25 years: 13.3%

Vehicle age 26-30 years: 8.8%

Vehicle age >30 years: 6.7%

The share of used vehicles from the total is 80%.(2018)

4. Vehicle safety Standards

- Vehicle Safety Standards are regulations that specify design, construction, performance, and durability requirements for motor vehicles
- These standards ensure that purchased vehicles are designed with driver and passenger safety in mind and manufactured with trustworthy equipment.
- vehicle standards and norms are important for ensuring safety, protecting the environment, and establishing international standards.

cont…

The Ethiopia’s standards include:

- **Safety standards**: These standards ensure that vehicles are designed to protect occupants in the event of a crash. They include requirements for things like seat belts, airbags, and crumple zones
- **Emissions standards:** These standards limit the amount of pollutants that vehicles can emit into the air,
- **Noise standards**: These standards limit the amount of noise that vehicles can produce
- **Safety features:** (seat belts, working brakes, adequate tires, headlights, taillights, and turn signals) and
- **vehicle registration certificates and driver's licenses**:

Norms

- It is illegal to take photographs of transport infrastructure (roads and bridges)
- Horns should be used only to warn pedestrians or other motorists of danger,
- Seat belts are obligatory for drivers and front seat passengers
- Motorists are required to carry a first-aid kit,

Norms…

- Children 7 years of age and under are not allowed in the front seat,
- The National Road Traffic Safety Council of Ethiopia (NRTSC) is responsible for evaluating the effectiveness of existing laws, (standards, norms and directives)
- pedestrians first is other norms

1. Regulations

- Vehicle import regulations are governed by the Ethiopian Customs Commission,
- It depend on the cylinder capacity of the spark-ignition engine used in the car
- Used vehicles import are not directly ban by law, and no age limit restriction,
- But it regulates by **high tariffs on CBUs**, (excise, sure, VAT and custome) and other taxes and charges, registration control, etc. are **indirectly limited the used car import.**

Cont. …

- There are documents required for the import of vehicles, these include:
  - Title and registration certificate,
  - Bill of loading and commercial invoice,
  - international insurance policy,
  - letter of support, and authorization from the MOTL
- Driving license and insurance also required: drivers must carry proof of third-party insurance and at least a temporary Ethiopian driving license.
- Annual inspection is obligatory for every vehicles

5. Vehicle incentives

- The incentives provided for new vehicles in Ethiopia:
  - The Ethiopian government has recently amended the excise tax proclamation,
  - The amendment aims to increase the number of new vehicles imported into the country,
  - This new tax system reduced the tax imposed on new cars from 100% to 30% in the case of vehicles with an engine capacity below 1,300cc

Cont....

- Exemption of electric vehicles from taxes: the MoTL with MoF has exempted different tax from electric vehicles,
- this tax exemption encourages both the importer and users
- GoE permits Duty-free import for vehicle inspection equipment,
- MoTL has plan to incentivize land for infrastructure and import spar-parts for EVs,
- This tax exemption encourages the expansion of EVs in the country,
- In addition GoE provide incentives to investor to import new vehicles
  - ✓ Duty-free import of new vehicles depends on the location and amount of the investment,
  - ✓ The investment sectors covered by this incentives include manufacturing, agriculture, and transportation,

previous and new tax system to EV

	Previous taxation system				New taxation system			
statues of the vehicles	**Customs %**	**Excise %**	**VAT %**	**Sur %**	**Customs %**	**Excise %**	**VAT %**	**Sur %**
Completely knocked down (CKD)	0	0	15	0	0	0	0	0
Semi knocked down (SKD)	5	0	15	0	5	0	0	0
Completely built up (CBU) form	5	0	15	10	15	0	0	0

Private sector engagement on EV assembling

6. Challenges and opportunities

Challenges

- Weak enforcement of existing rules and regulations:
- Limited capacity of regulatory bodies,
- Lack of restrictions on the age of vehicles,
- Limited resources:
- Inadequate road safety financing:

Solutions

- To addressing these challenges will require:
- concerted effort from the government, private sector, and civil society to improve the regulatory environment,
- promote innovation and competition, and allocate adequate resources to implement vehicle standards and norms effectively.

7. Conclusions

- Enforcement of vehicle standards and norms improving the efficiency of the highway system, reducing harmful air pollutant emissions, increasing fuel economy standards, and managing vehicle emission standards to reduce common motor vehicle air pollution,
- There is no clear indication that ban on used vehicle imports in Ethiopia,
- **So,** GoE should have improved regulation and implementation of laws and regulations on vehicle standards and periodic maintenance,
- Strengthen the enforcement of existing rules and regulations.
- The government should also consider improving driver training curriculum and investing in road infrastructure

Thank you for your Attention

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Global Gateway

Improving road transport in partner countries, a priority for the Global Gateway

Pablo MENDOZA VILLAFUERTE
European Commission - DG International Partnerships

CITA RAG Conference, Addis Ababa, 17 October 2023

CITA

“The **Global Gateway Strategy** is a template for how Europe can build more resilient connections with the world.”

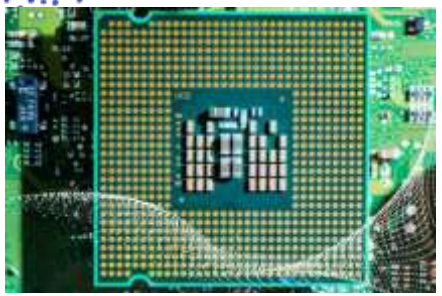
Ursula von der Leyen,
President of the European Commission

Global Gateway – what is it ?

- Our **principles** and **value-based offer** to partner countries: to tackle the infrastructure investment deficit and support the green & digital transition globally

- Reflects a change in the way the EU approaches its external action: combining the **needs of partner countries (SDGs, Paris Agreement ,…)** with a stronger assessment of the **EU's strategic interests** to position the EU more prominently in a competitive world

- **Team Europe:** Whole-of-government approach: EC, EIB, EBRD; all relevant ministries, development agencies, development finance institutions, export credit agencies, private sector



Digital

The EU will support open and secure internet

Health

The EU will help strengthen supply chains and local vaccines production

Climate and energy

The EU will support investments and rules paving the way to the clean energy transition

Education and research

The EU will invest in high quality education, with a focus on girls and women and vulnerable groups

Transport

The EU will support all modes of green, smart and safe transport

Democratic values and high standards

Good governance and transparency

Equal partnerships

Green and clean

Security focused

Catalysing private sector investment

Transport as an investment priority

- Focus on **physical infrastructure** to strengthen digital, transport and energy networks
- Provide an **enabling environment** to make sure projects deliver, by offering attractive investment and business-friendly trading conditions

End-of-life vehicles Regulation proposal

Lack of circularity in design and production

Existing laws have not led to better eco-design of cars nor to an increase in use of recycled materials

High dependency on imported raw materials

Automotive industry consumes vast amounts of raw materials, many of which (such as rare elements for electric motors) must be imported

Poor quality of vehicle waste treatment

Low-quality scrap steel, insufficient separation of materials, low plastics recycling rates

1/3 of vehicles go “missing”

Around 3.5 million vehicles disappear without a trace from EU roads each year - and are exported, or disposed of illegally

Weak governance and lack of cooperation

Lack of financial accountability and not enough cooperation between manufacturers and recyclers

1/3 of vehicles by mass are not regulated

Lorries, motorcycles, buses are not covered by the current end-of-life vehicles rules

Export of used vehicles outside the EU

FACTS:

- The export of ELVs from the EU to non-OECD countries is prohibited
- The EU is the biggest exporter of used vehicles worldwide.
- In 2020, the EU exported > 870,000 vehicles at a value of € 3.85 billion.
- Key destinations: Africa, Eastern Europe, Central Asia and the Middle East

TYPICAL EXPORTED USED VEHICLE

- No valid roadworthiness certificate
- Older than 15 years
- Does not meet Euro 4/IV standards

Export of used vehicles outside the EU

PRACTICAL CHALLENGES

IN THE EU:

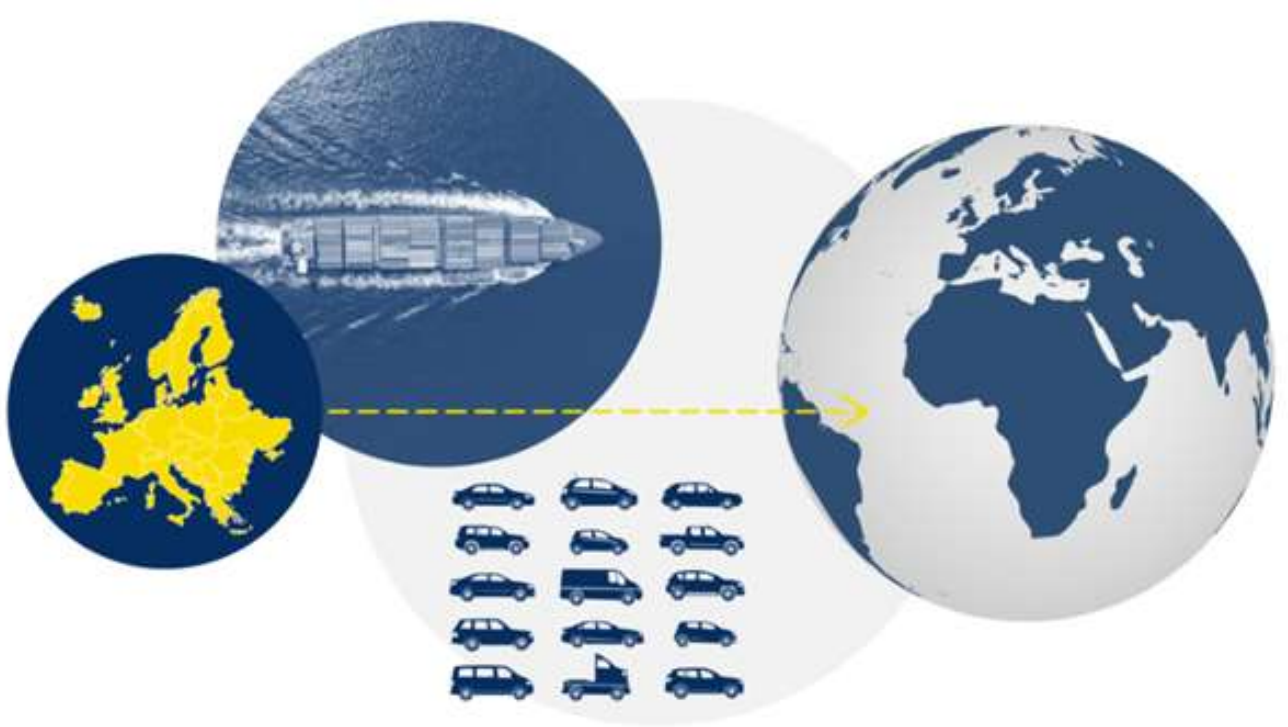
- Absence of clear and legally binding criteria on the distinction between used vehicles and ELVs
- No clear quality requirements for the export of used vehicles
- Insufficient monitoring and enforcement at EU national level
- Loss of secondary material sources

CONSEQUENCES IN THE IMPORT COUNTRIES :

- **Increased fatality rates**
- **High pollution levels**
- EU's external environmental footprint linked to the export of used vehicles
- Constraint to the development of the automotive industry

ELV Proposal addressing the key issues

- Specific export controls:
  - No ELVs allowed to be exported
  - Vehicles need to be roadworthy in order to be clear for export
  - Exporter to declare VIN and country of last registration
- Interoperable vehicle registration systems
- Automated verification and custom controls



ELV will pose challenges to partner countries

- Access to affordable vehicles in Africa is important, ELV regulation could have an important impact, this will be the case also for other (more expensive) vehicles categories (i.e. 4WD, SUVs, vans, etc.)
- EU cannot act alone, ELV will also have implications on EU private sector in terms of market share in Africa (manufacturers, exporters, 2nd hand businesses etc.)

When fully implemented, this regulation is expected to reduce exports by **65% per year from 2035**

ELV Proposal – Benefits expected

12.8 million tons less CO2 emitted

worth 2.9 billion EUR

3.8 million more ELVs collected and treated in the EU

including motorcycles, lorries, buses and vehicles that could have been exported or dismantled illegally

350 tons of rare earth materials collected for reuse and recycling

significantly contributing to the EU's strategic autonomy

5.4 million tons of materials recycled at higher quality or re-used

including plastics, steel, aluminium, copper and critical raw materials

22,000 new jobs will be created in the EU

including 14,000 jobs for SMEs, contributing to a stronger and modernised dismantling and recycling industry

Lower prices for second-hand parts and components

meaning it will be cheaper to maintain and repair vehicles

How is the Global Gateway further contributing…

- African Union road policies and national regulations (vehicle load, fuel quality,…)
- Mobilise Your City
- Africa Transport Policy Programme (SSATP)
- Strategic Corridors in Africa
- UN Road Safety Fund

Conclusions

- Global Gateway strategy is the instrument through which the European Union is investing to **strengthen digital, transport and energy networks** responding to EU and partner countries' interests.

- The ELV Regulation is a unique opportunity to improve inter-European and export used vehicle market for light and heavy-duty vehicles and will have a positive impact in partner countries as **it will deliver safer and cleaner used vehicles**

- On this front, the contribution from **CITA members around the world will be instrumental** towards creating a **periodical technical inspection framework in partner countries** that could keep on verifying the used vehicles are indeed **safe and clean throughout their life**

More information

Proposal for a Regulation on end-of-life vehicles	Press release: https://ec.europa.eu/commission/presscorner/detail/en/IP_23_3819 Dedicated website: https://environment.ec.europa.eu/topics/waste-and-recycling/end-life-vehicles_en Questions and Answers : https://ec.europa.eu/commission/presscorner/detail/en/qanda_23_3820
Your feedback to the proposal at '**Have Your**	https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12633-End-of-life-vehicles-revision-of-EU-rules_en open until 4th of December

Global Gateway

THANK YOU

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Experience in Nigeria: Rapid Emission Profile Verification of Mobile Sources Using iPEMS

Daisy Thomas Ph.D.
Matthew Berry BEng MBA

CITA RAG Africa Conference, 17-18th October 2023

Contents

- Vehicle Emissions Programme
  - Motivation
  - Overview
  - Test protocol
  - Fleet characteristics
  - Results
    - Comparison of vehicle results to type approval standards
    - Repairing two vehicles
- Generator Emissions Programme
  - Proof of Concept
- Conclusions and Future Work

Vehicle Emissions Programme

Motivation

- The number of registered cars and drivers on Nigerian roads is increasing to 11.8 million in 2018, accounting for over 90% of total petroleum consumption in Nigeria [1].
- Levels of PM2.5 in Nigeria are many times greater than the World Health Organization (WHO) recommended levels[2], and levels of other pollutants such as CO, NO_2 and SO_2 have also been of concern in Nigeria[3].
- WHO Director-General, Dr Tedros Adhanom Ghebreyesus: "Air pollution is a threat to health in all countries, but it hits people in low- and middle-income countries the hardest" [2].
- Air pollution is one of the biggest environmental threats to human health, alongside climate change.

[1] M.A. Lala, C.S. Onwunzo, O.A. Adesina, J.A. Sonibare. Particulate matters pollution in selected areas of Nigeria: Spatial analysis and risk assessment. Case Studies in Chemical and Environmental Engineering. 2023; **7**: https://doi.org/10.1016/j.cscee.2022.100288.

[2] https://www.who.int/news/item/22-09-2021-new-who-global-air-quality-guidelines-aim-to-save-millions-of-lives-from-air-pollution

[3] Obanya HE, Amaeze NH, Togunde O, Otitoloju AA. Air Pollution Monitoring Around Residential and Transportation Sector Locations in Lagos Mainland. J Health Pollut. 2018; **8** (19): doi: 10.5696/2156-9614-8.19.180903.

Motivation

- COP27 reached a breakthrough agreement on a new “Loss and Damage” fund to assist developing countries in responding to loss and damage resulting from climate change[1].
- COP27 also saw the launch of the African Carbon Markets Initiative[2], which will produce carbon credits, representing a major fiscal and environmental opportunity.
- By striving to lower emissions, countries will be both protecting health as well as mitigating global climate change.
- Leveraging a National Vehicle Emissions Programme with the United Nations COP27 Loss and Damage fund is a way to achieve this aim.

[1] https://unfccc.int/news/cop27-reaches-breakthrough-agreement-on-new-loss-and-damage-fund-for-vulnerable-countries
[2] https://www.seforall.org/publications/africa-carbon-markets-initiative-roadmap-report

Motivation

Often, real-world emissions testing is compromised due to issues with:

1. Instrument – uni-purpose, cost (with maintenance), size and weight,
2. Time to complete a test – install, test, uninstall,
3. Human resources – required expertise,
4. Finances – total cost per test per pollutant,
5. Validity – claims of lack of *sufficient* repeatability.

Using the parSYNC® FLEX, 3DATX presents a feasibility trial to show how the motivating issues are resolved to measure real-world emissions, as the most accurate predictors of real contribution to air quality; guiding actions to improve vehicles and hence human life.

Overview

- **Trial objective:** Test approximately 100 on-road passenger cars on a first-come first-served basis according to a standard programme to ensure accurate vehicle emissions testing and data integrity.
- **Outcome:** 103 vehicles were tested in 5 days, all with high emissions. We replaced 3WC on two and here's what happened…

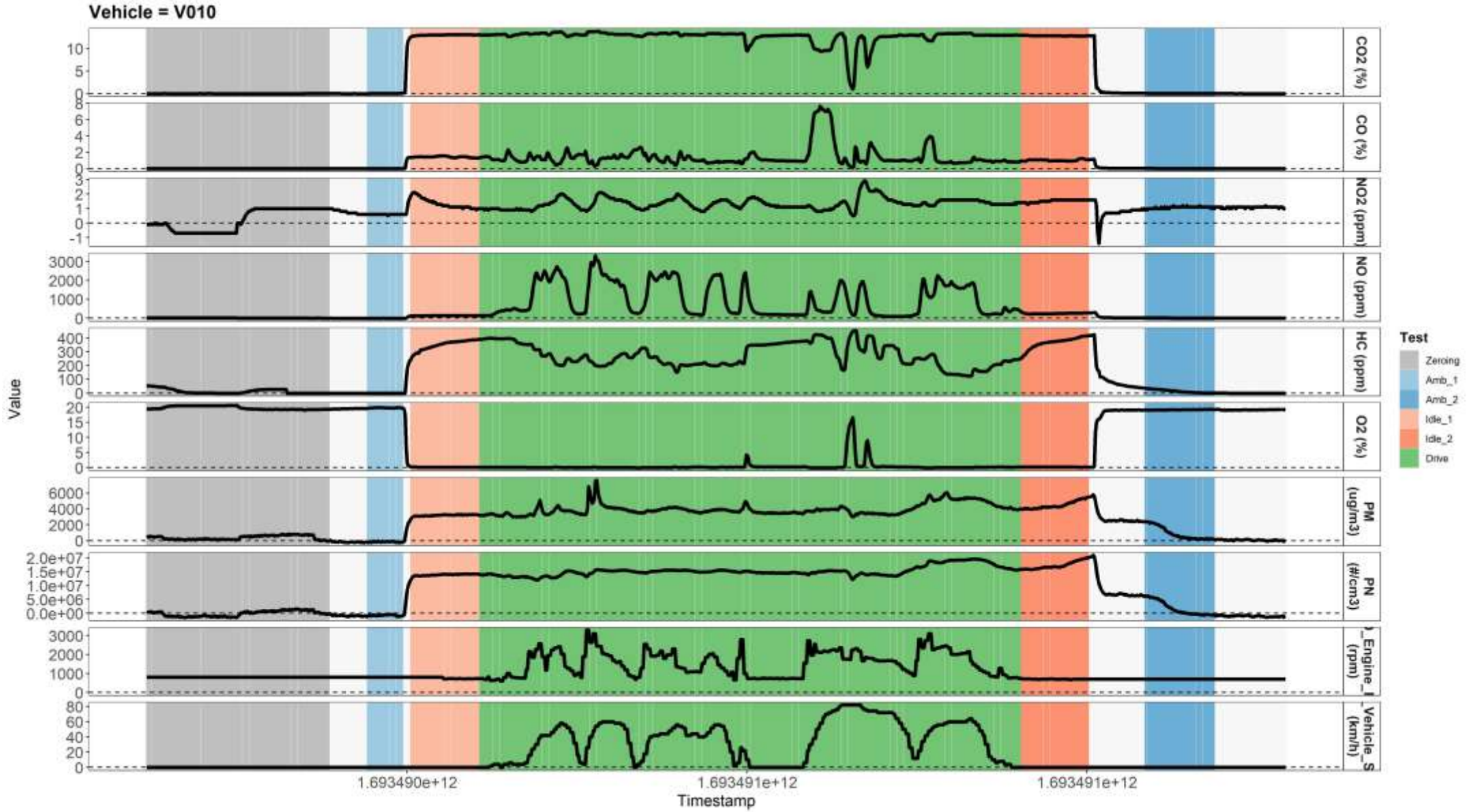



Test protocol followed by each vehicle

Phase	Objectives
1. Zeroing	Zero the parSYNC® FLEX instrument
2. Measure filtered air	Pre-verification of zero
3. Measure ambient air	Pre-check ambient conditions
4. Measure vehicle exhaust at idle	Verify test vehicle emissions without load
5. Measure vehicle exhaust while driving	Verify test vehicle emissions under load: The vehicle is driven around a standard and repeatable route under safe conditions
6. Measure vehicle exhaust at idle	Reverify test vehicle emissions without load
7. Measure ambient air	Post-check ambient conditions
8. Measure filtered air	Post-verification of zero

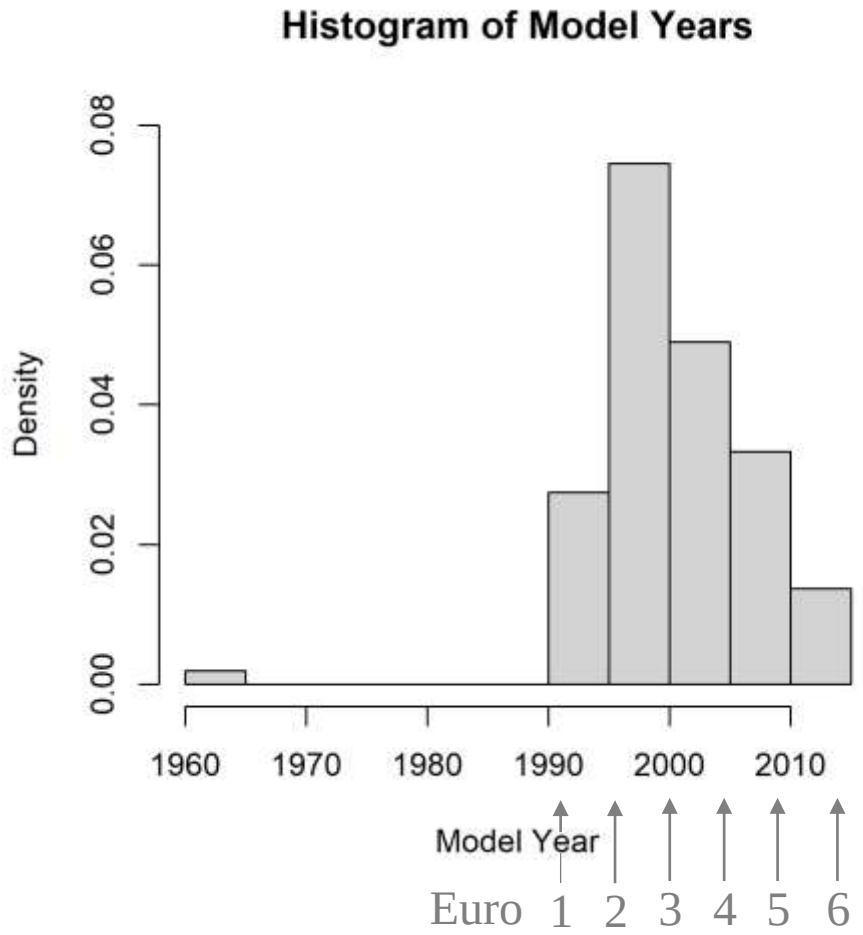
- Test procedure performed in approx. 10 minutes at road-side.
- Drive section took on average 366 ± 23 s to complete, had a mean speed of 34 ± 2 km/h and maximum speed of 73 ± 2 km/h *(calculated from 25 tests)*.

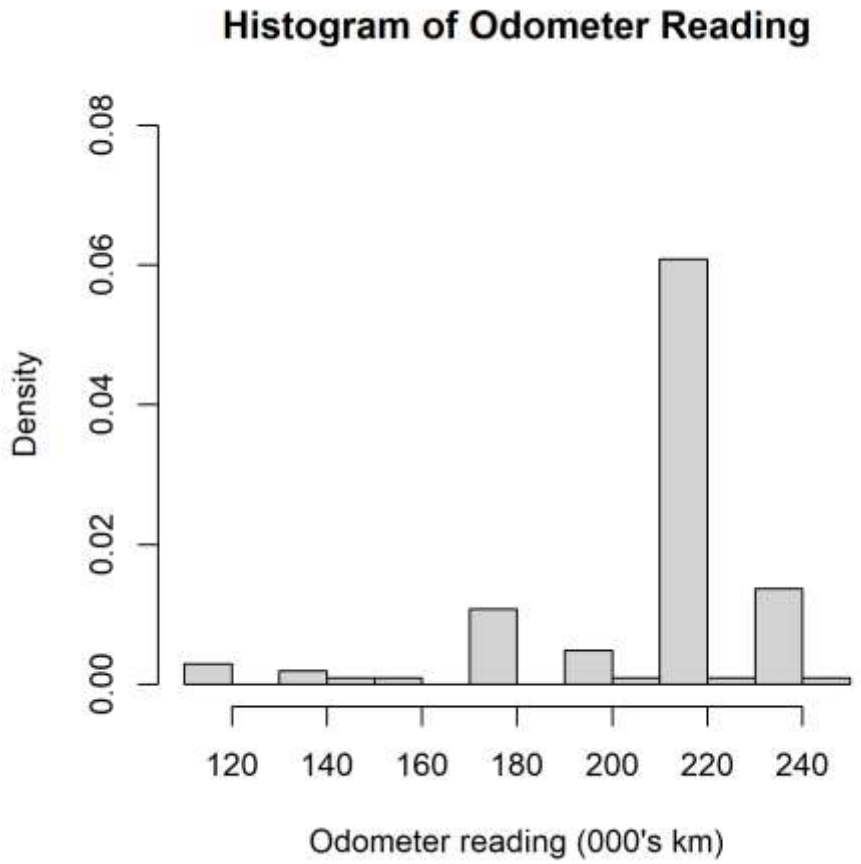
Test Example



Fleet characteristics

103 gasoline-fuelled vehicles were tested during this trial.





Comparison of vehicle results to Type Approval standards

Mass emissions were calculated for a sample of vehicles. Many had emissions far exceeding their type approval values.

Vehicle	Sec.	Distance (km)	NO2 (mg/km)	NO (mg/km)	NOx (mg/km)	CO2 (g/km)		CO (mg/km)	HC (THC) (mg/km)	PM (mg/km)	PN (#/km)
						EPA	Tested				
V04	502	4.98	0.92	2,080	2,081	162 - 177	128	4,954	639	3.45	9.24E+12
V20	451	5.1	5.52	2,665	2,670	177	149	8,620	1,426	2.76	1.08E+13
V21	415	5.03	1.67	2,444	2,445	157 - 171	149	5,085	473	2.70	9.41E+12
V22	492	4.91	3.29	2,598	2,601	177	139	11,821	1,266	2	8.77E+12
V23	488	5.01	5.57	2,484	2,489	210	132	7,357	568	2.29	9.41E+12
V28	472	4.89	4.79	2,023	2,028	177	152	8,422	1,102	2.55	1.14E+13
EURO3 (from Jan 2001)			NA	NA	150	NA		2,300	200	NA	NA
V10	478	4.79	2.74	3,076	3,079	177 - 183	230.05	18,715	435	4.39	1.59E+13
V12	418	4.68	-0.13	2,783	2,783	183 - 195	174.9	5,552	1,036	3.44	1.16E+13
EURO4 (from Jan 2006)			NA	NA	80	NA		1,000	100	NA	NA

Repairing two vehicles

- Two vehicles had their three-way catalysts (TWC) replaced and were retested.
- Repair cost: US$ 300/vehicle.

Repairing two vehicles - Results

- Pollutant emissions of NOx, CO and HC were reduced, though they were still above the type approval thresholds:
  - TWC efficiency improved* but wasn't the sole solution.
- CO2 mass emissions appear unchanged.
- PM emissions increased (perhaps dislodged during repair):
  - Further investigation is required.

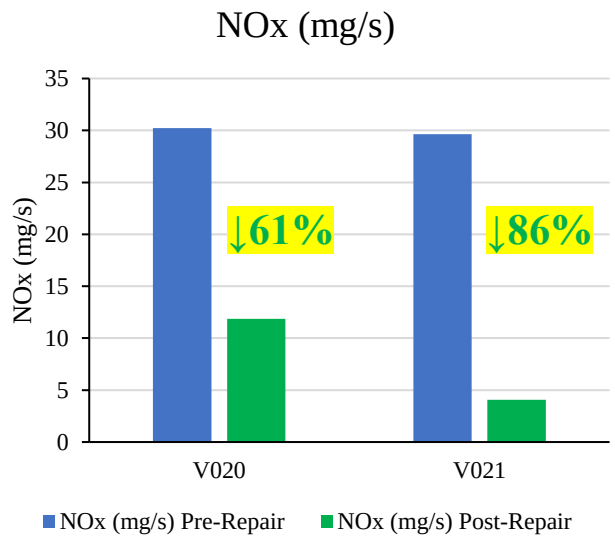
* Optimum TWC temperature likely not reached during first idling and part of drive test.

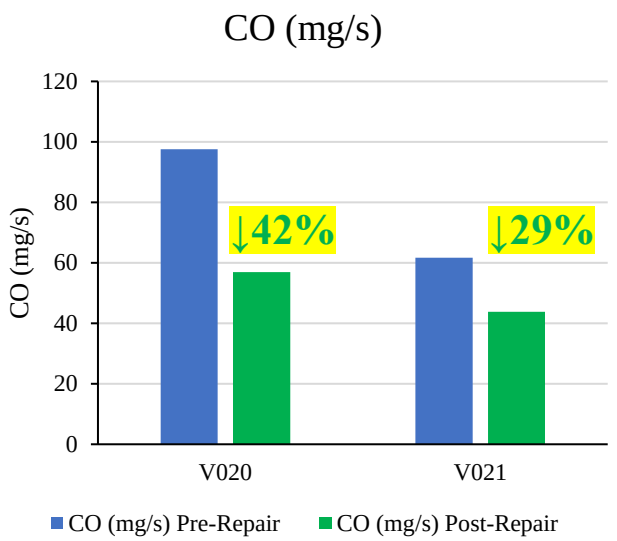
Vehicle	Sec.	Distance (km)	NO2 (mg/km)	NO (mg/km)	NOx (mg/km)	CO2 (g/km)		CO (mg/km)	HC (THC) (mg/km)	PM (mg/km)	PN (#/km)
						EPA	Tested				
V20 – pre-repair	451	5.1	5.52	2,665	2,670	177	149	8,620	1,426	2.76	1.08E+13
V20 – post-repair	352	2.92	1.19	1,427	1,429	177	187	6,867	732	5.26	1.18E+13
V21 – pre-repair	415	5.03	1.67	2,444	2,445	157 -171	149	5,085	473	2.70	9.41E+12
V21 – post-repair	311	2.92	0.73	433	433	157 - 171	200	4,675	229	5.75	1.23E+13
EURO3 (from Jan 2001)			NA	NA	150	NA		2,300	200	NA	NA

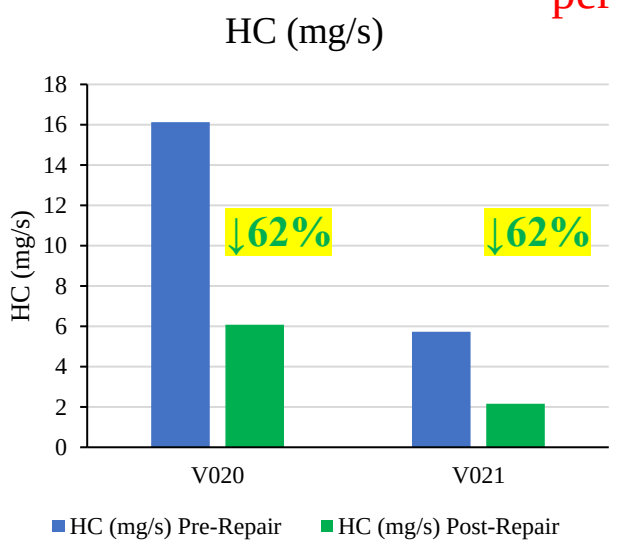
Repairing two vehicles – Drive Cycle

Significant impact per dollar spent

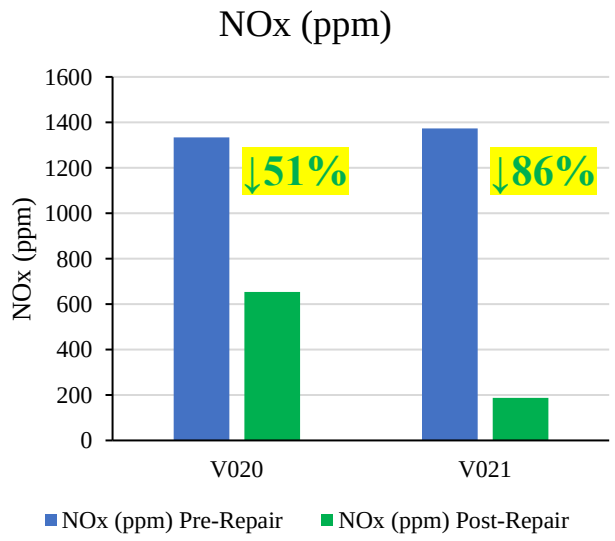
Drive cycle – mass emission factors

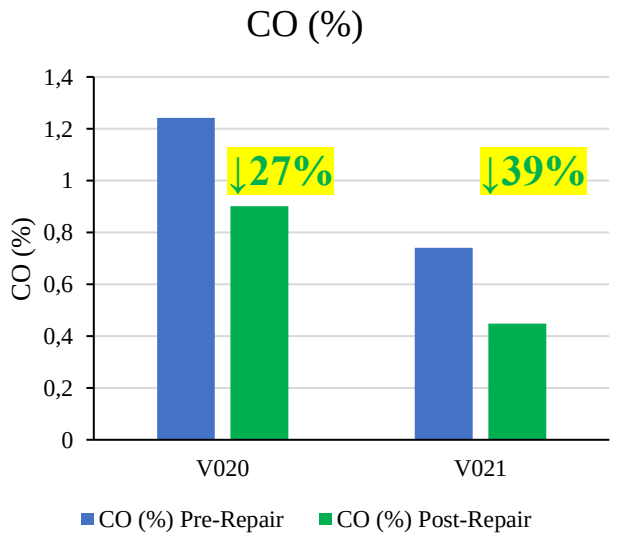


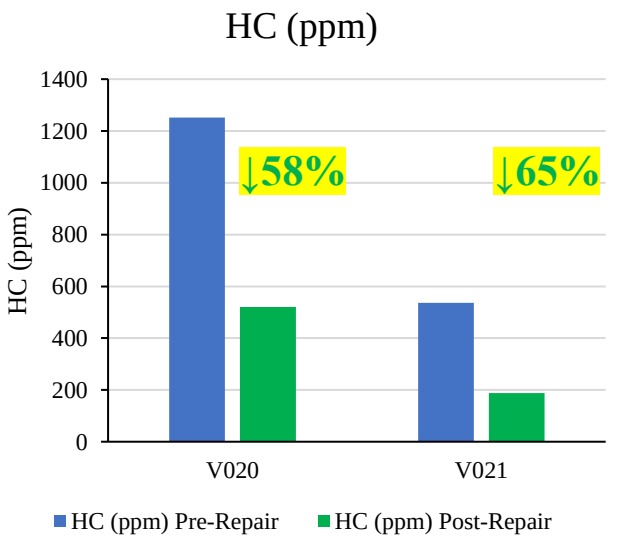




Drive cycle – average concentrations

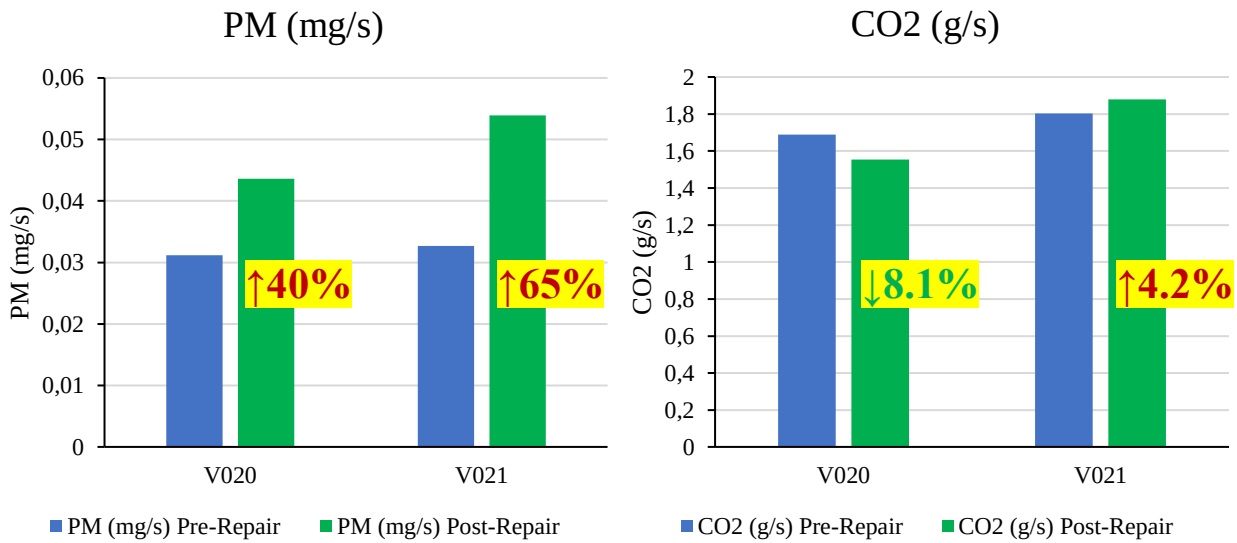




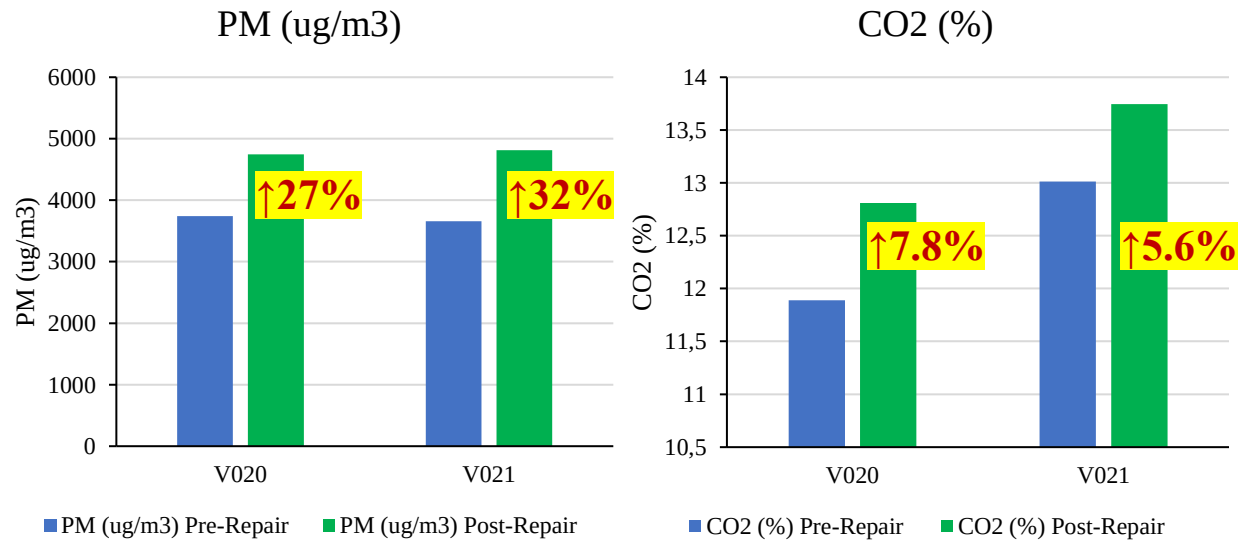


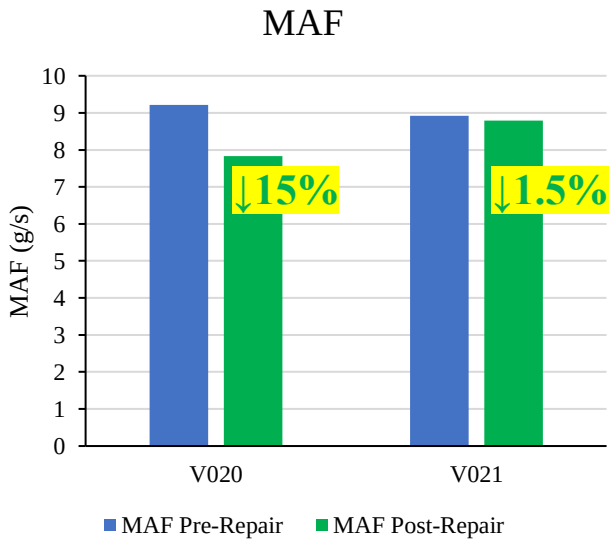
Repairing two vehicles – Drive Cycle

Drive cycle – mass emission rates



Drive cycle – average concentrations

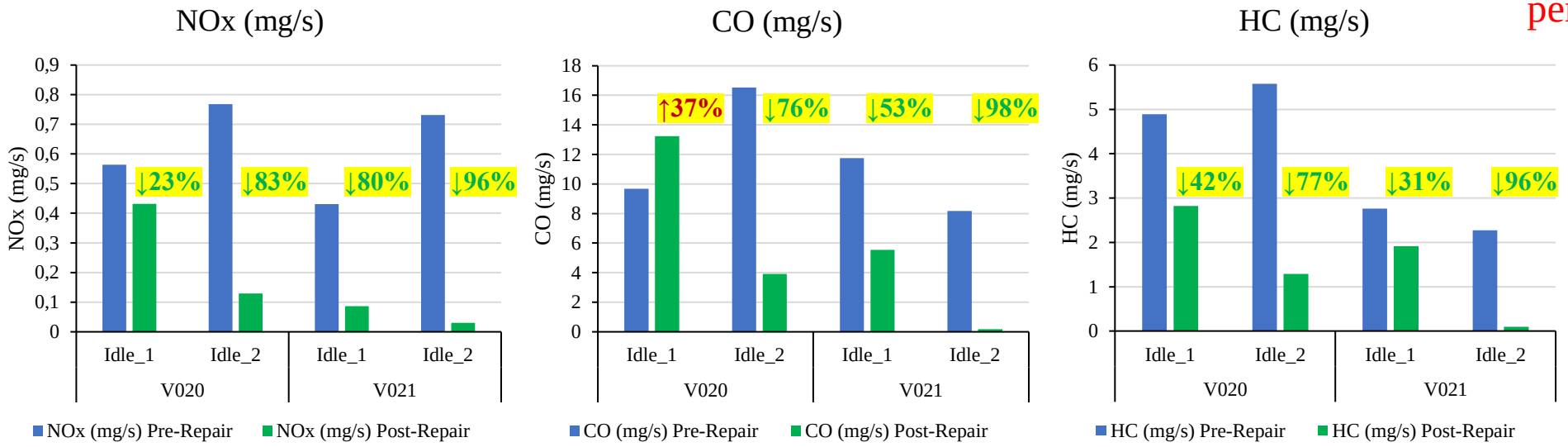




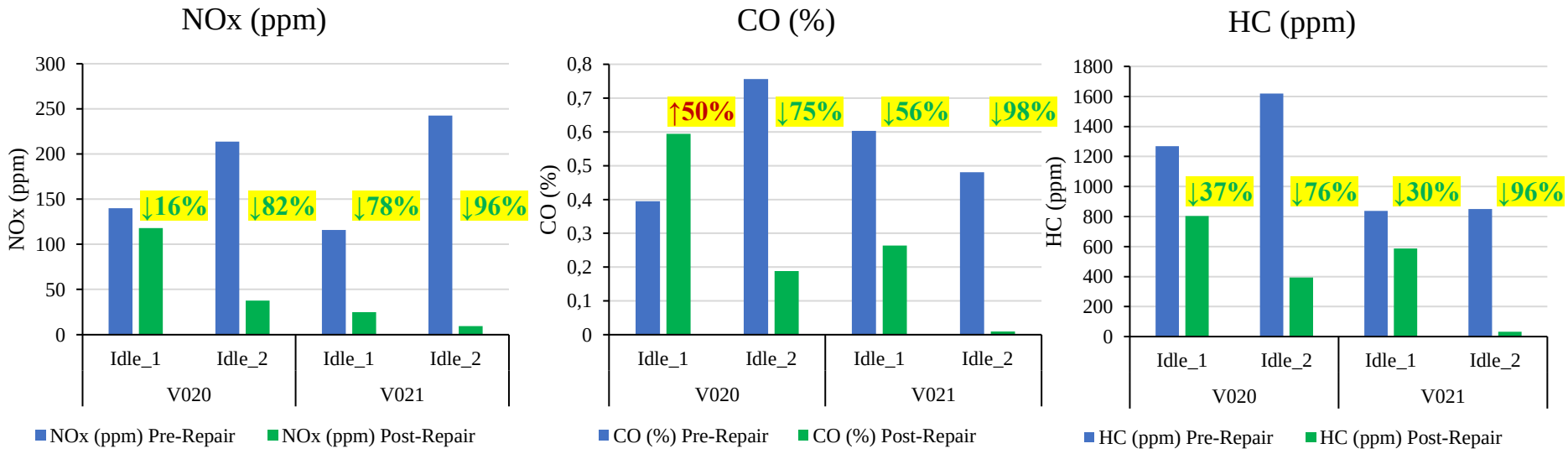
Repairing two vehicles – Idle Cycles

Significant impact per dollar spent

Idle cycles – Average mass emission rates



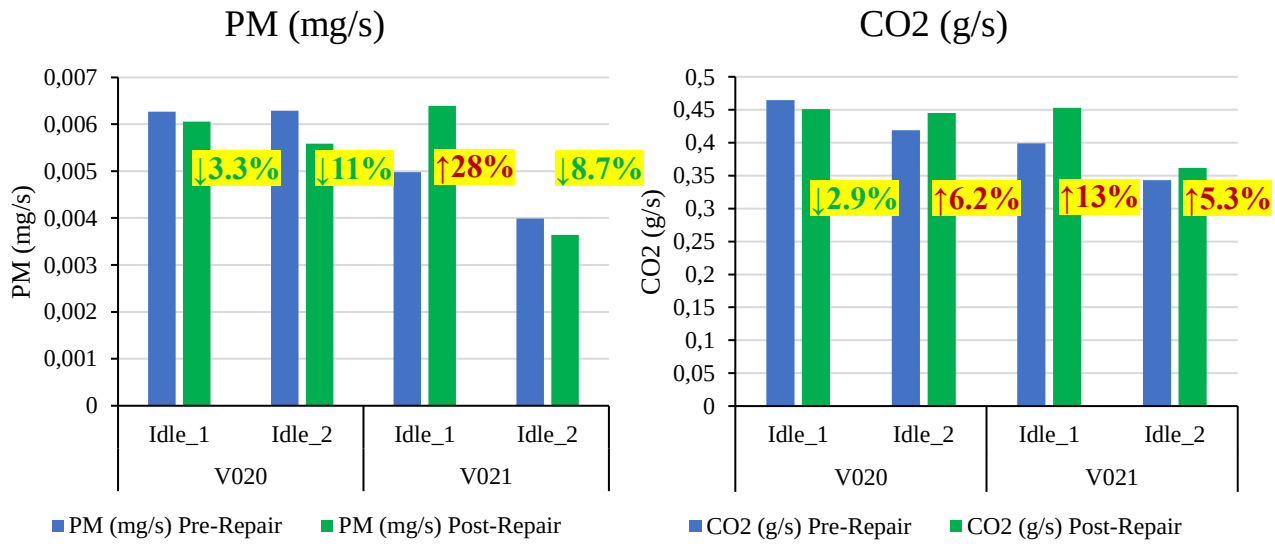
Idle cycles – Average concentrations



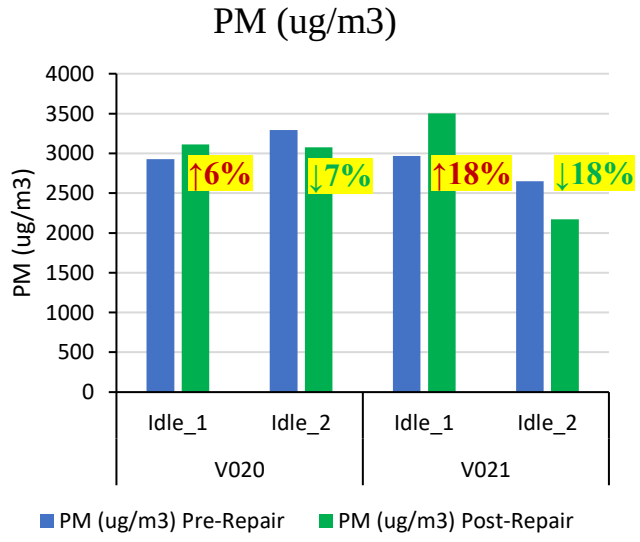
Results indicate that the TWC had not reached operating temp for all pollutants in Idle 1

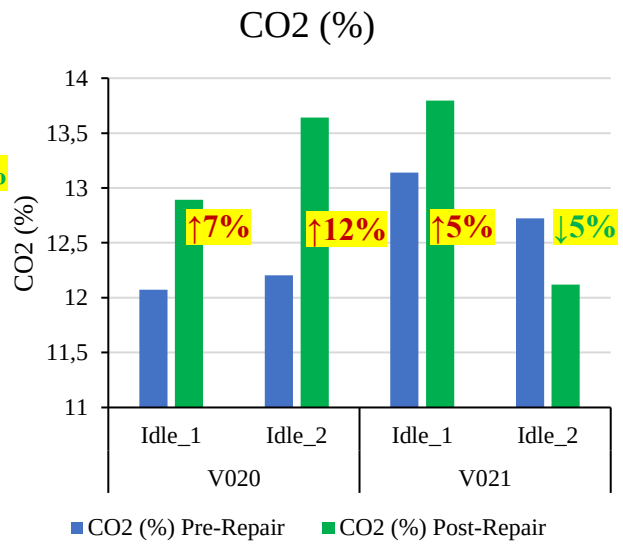
Repairing two vehicles – Idle Cycles

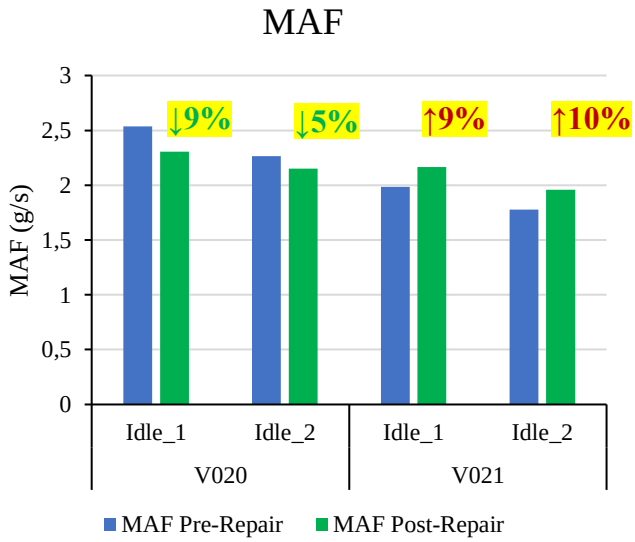
Idle cycles – Average mass emission rates



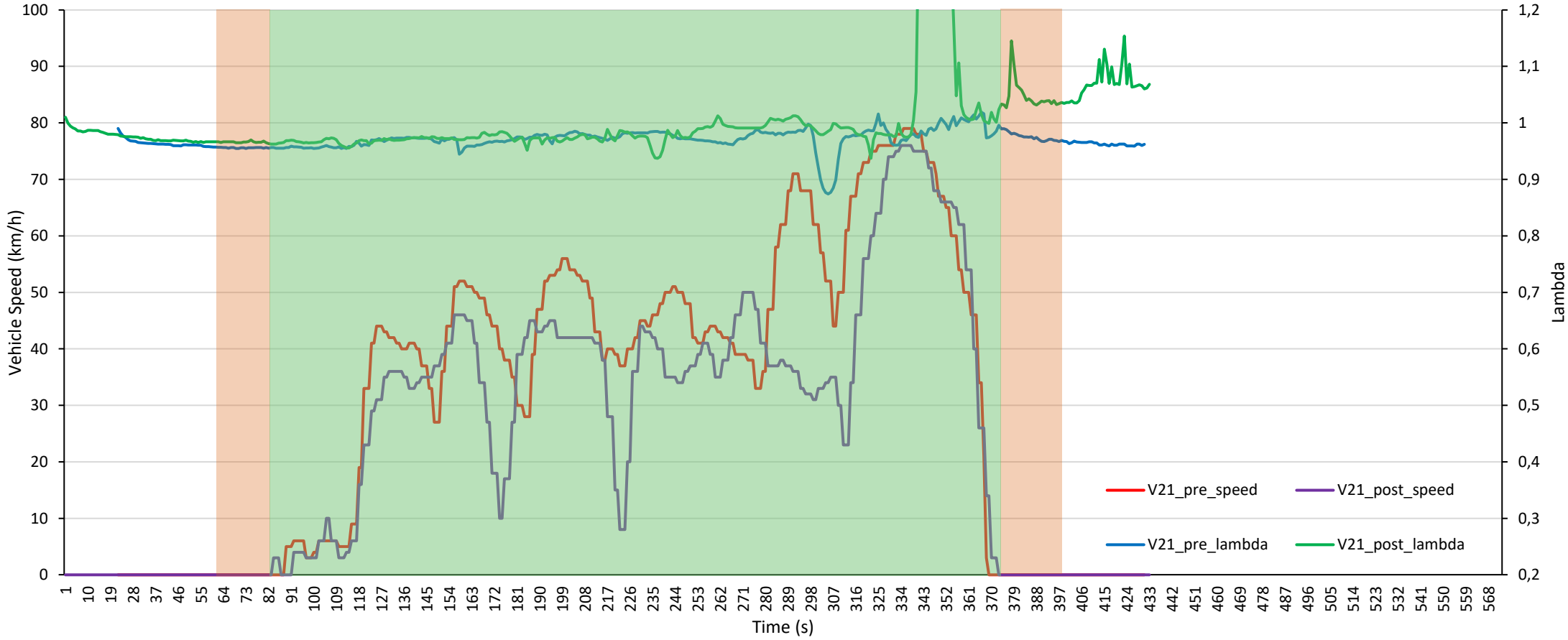
Idle cycles – Average concentrations



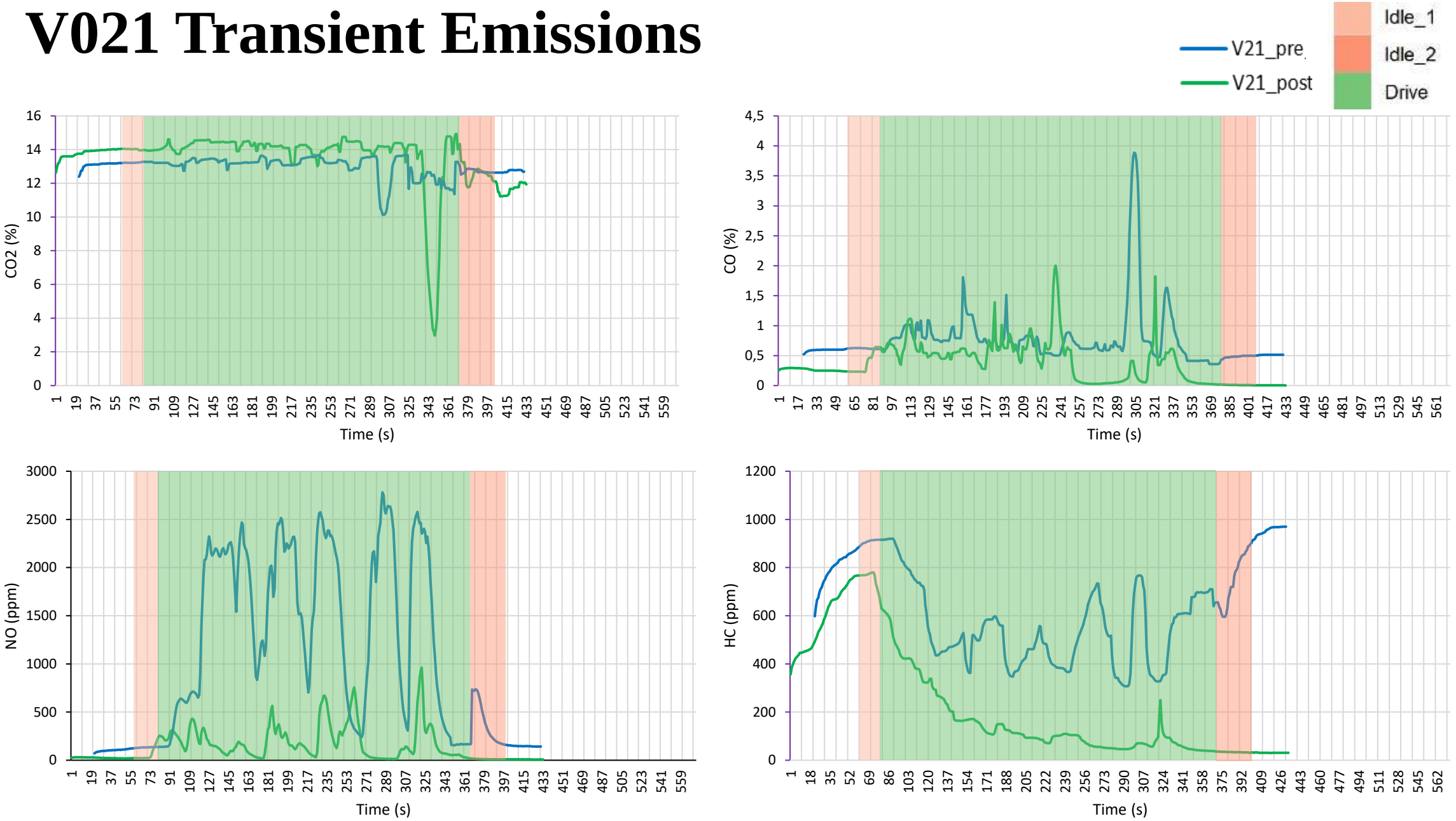




V021 Lambda values



V021 Transient Emissions



Generator Emissions Programme

Overview

- **Motivation:** Pollution from more than 20 million largely aging diesel generators over 10 kVA compensating unreliable grid power.
- **Trial objective:** Develop a viable testing procedure to ensure accurate in-situ/loaded generator emissions testing and data integrity.
- **Outcome:** Successful generator test made while powering an Abuja hotel.

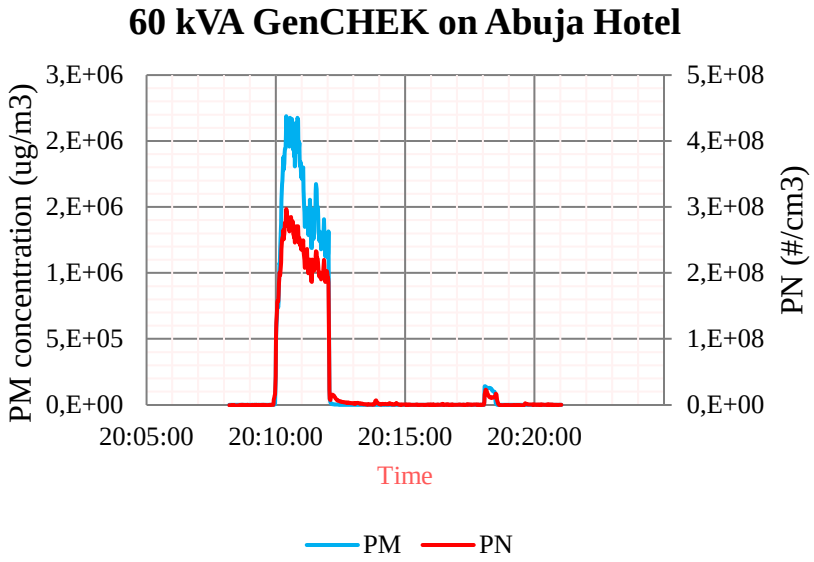
Test protocol followed for the GenChek

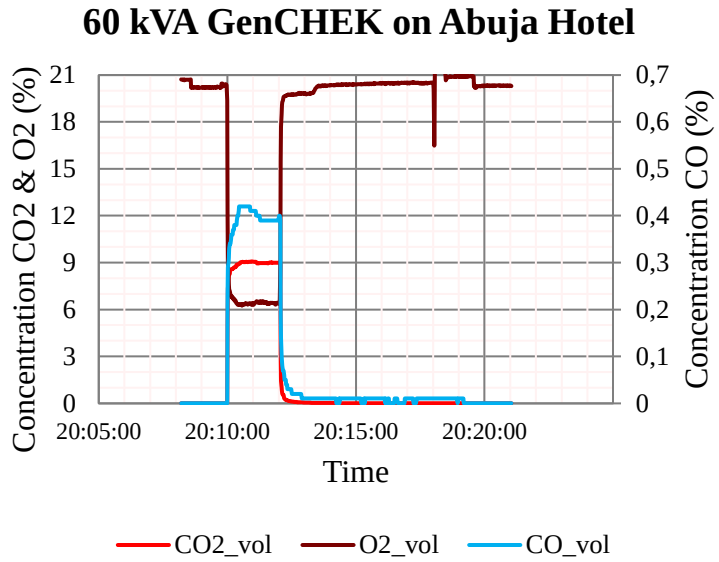
Phase	Objectives
1. Generator information	Obtain Generator Specification Plate Information Verify that Generator is Operating Under Normal Load
2. Generator Load Point Determination	Verification of Voltage and Measurement of 3-Phase Currents
3. Zeroing	Zero the parSYNC® FLEX instrument
4. Measure filtered air	Pre-verification of zero
5. Measure ambient air	Pre-check ambient conditions
6. Measure generator under load	Verify test generator emissions under load for 1 minute
7. Measure ambient air	Post-check ambient conditions
8. Measure filtered air	Post-verification of zero

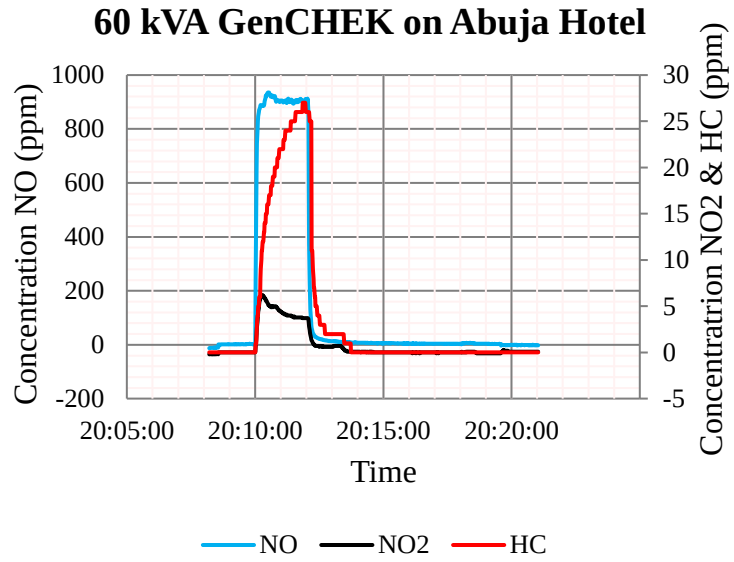
➢Test procedure performed in approx. 10 minutes at the generator site.

GenChek Methodology

- Diesel generator charts provide fuel consumption according to Power Rating and Load Point.
- At the generator operating point (must exceed 25% of load rating), CO2 measurement (%vol) allows determination of exhaust mass flow.
- Emission concentration measurements of CO, NOx, HC and PM are converted to mass emissions for comparison to Standards.







Generator Compared to Proposed Nigerian Standards

GenCHEK Mass Emissions Results			Proposed Emissions Standards for Engine Power (P) 50 ≤ P ≤ 176 kW			Result
CO2 mass/kWh	832	g/kWh	CO2	Not evaluated		
CO mass/kWh	23.01	g/kWh	CO	3.5	g/kW-hr	**Fail**
HC mass/kWh	0.23	g/kWh	HC	1.3	g/kW-hr	**Pass**
NOx mass/kWh	5.75	g/kWh	NOx	9.2	g/kW-hr	**Pass**
PM mass/kWh	7.28	g/kWh	PM	0.3	g/kW-hr	**Fail**

Note that measurement of SOx will be added.

Conclusions and future work

- Successful Demonstration for Vehicle Emissions Programme:
  - Take steps to engage a sustainable vehicle repair programme,
  - Continue to retest the two repaired vehicles (ensuring hot TWC).
- Ramp-up Vehicle Emissions Programme:
  - Write a data processing program to be used in large-scale deployment,
  - Expand the deployment,
  - Build up results database.
- Broader Goals:
  - Build on Proof of Concept for Generator Emissions Programme,
  - Integrate HGV and other non-road machinery,
  - Create carbon credit generation methodology.

Thank you for listening. Any Questions?

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We would like to thank the 3DATX-Africa team for their work performing the testing in Abuja, particularly Matthew Suleiman, Habeebullahi Ahmad Olaitan, Yusuf Khames Muhammed, Godspower Ibitayo, Thankgod Emmanuel.

17 - 18 October 2023 / Addis Ababa, Ethiopia

IMPROVING VEHICLES TO IMPROVE LIFE

- ECA - The challenge of E-vehicles
- CITA - RAG Africa Conference

CITA

United Nations
Economic Commission for Africa

Eva Morger

Consultant

CITA

United Nations
Economic Commission for Africa

AVIS Scoring ©

CITA RAG Africa Conference in Addis Ababa
October 17th, 2023

Eva Morger | eva@morger.se
Task Force Leader AVIS Scoring;
CITA Topic Area Leader Quality, Training & Confidence 2006-2023, Member of the CITA Bureau Permanent 2013-2022

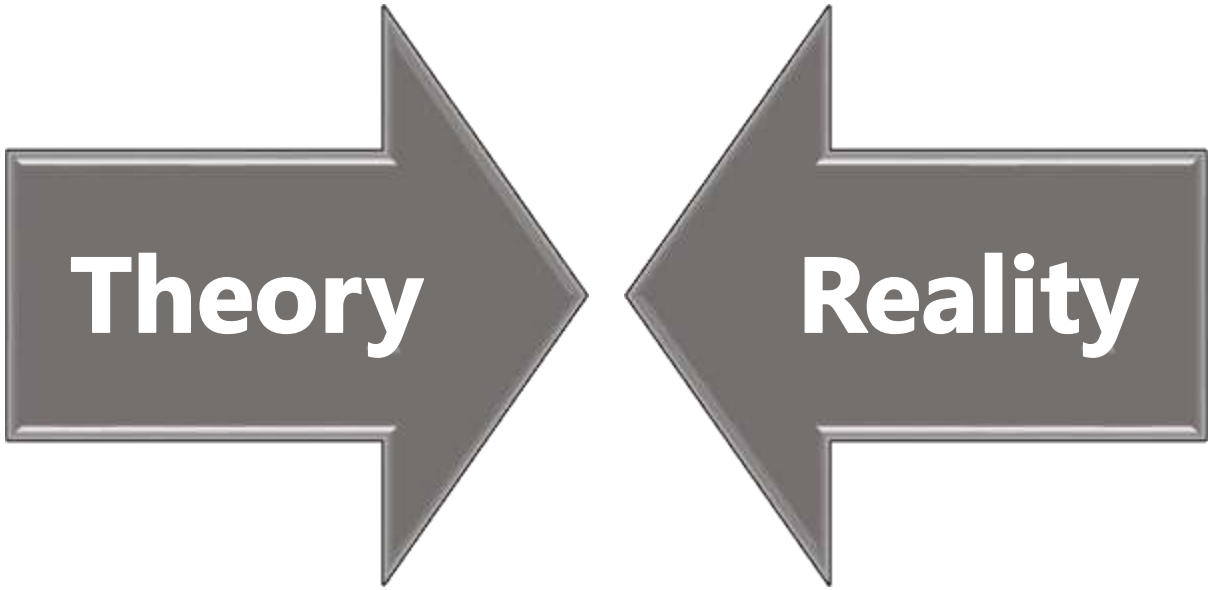
Assessment of **V**ehicle **I**nspection **S**ystems

AVIS projects	Performed by
Togo	CITA/WB
Kameroun	CITA/WB
Guatemala	CITA/IDB
El Salvador	CITA/IDB
Equador	WB
Honduras	CITA/IDB
Armenia	WB
Bangladesh	WB
Philippines	WB
Burkina Faso	WB
And more…	

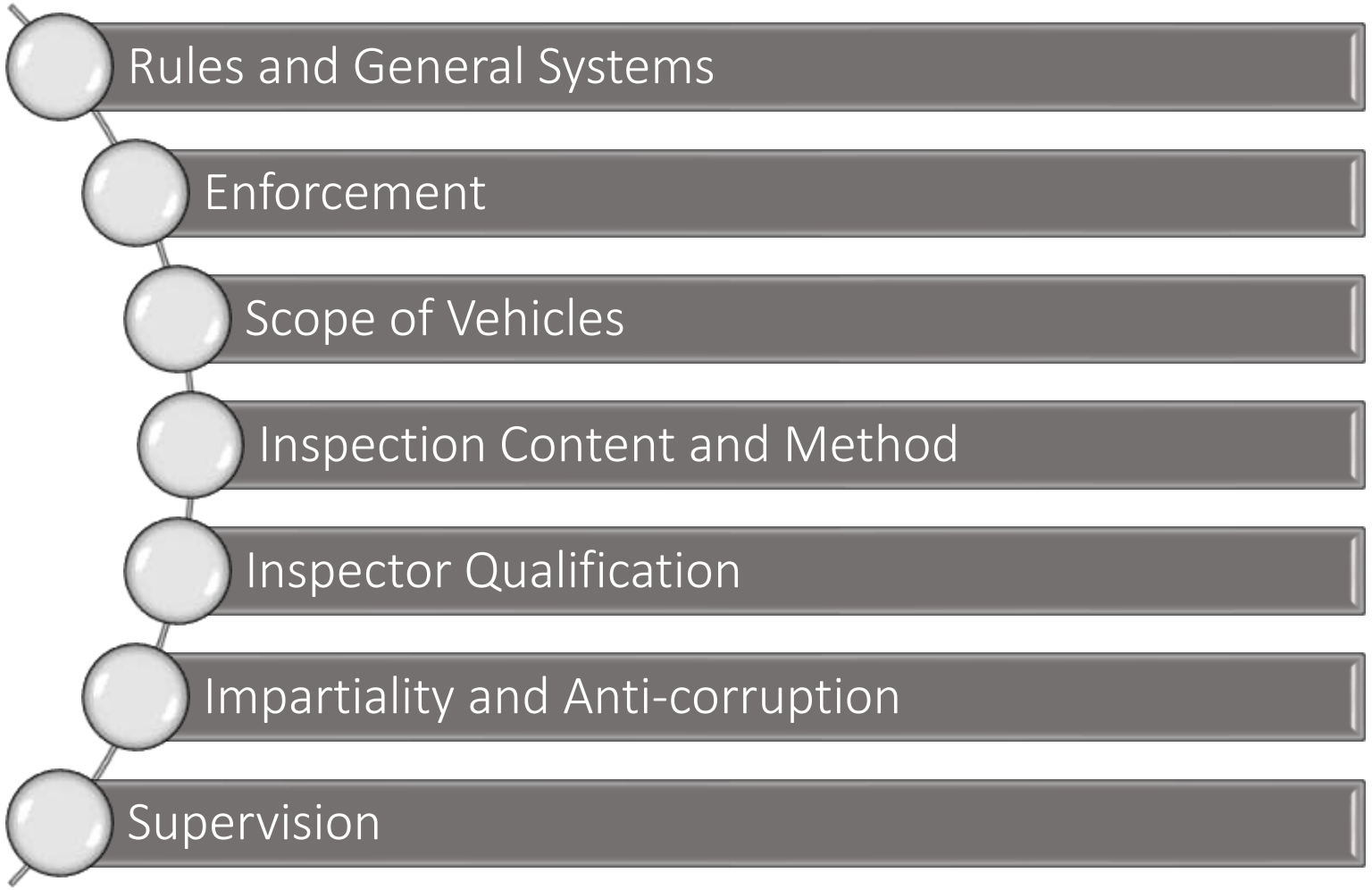
The AVIS Scoring is the step forward to facilitate the analysis of AVIS reports by using a star-scoring approach

Developed with the support of TRL

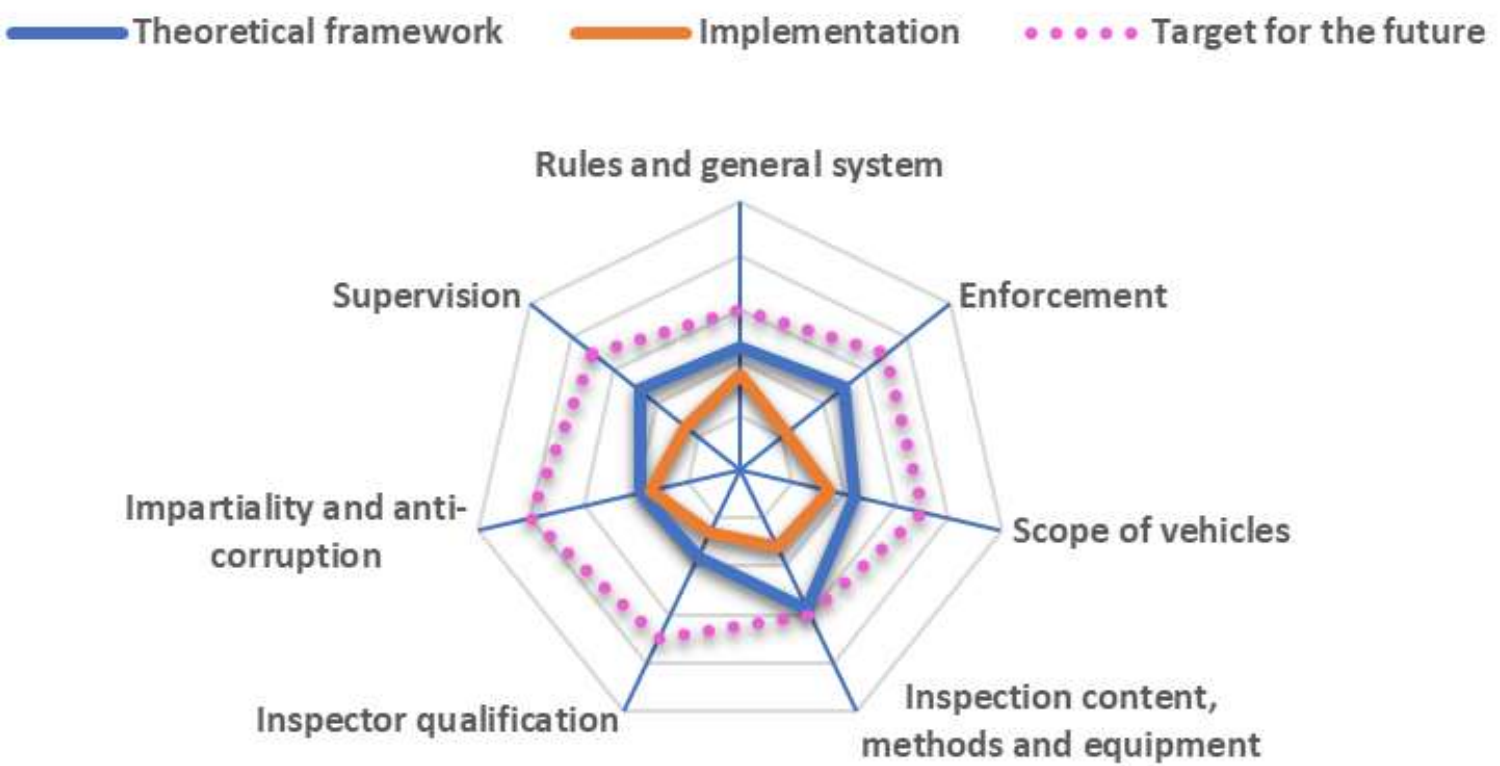
AVIS Scoring assesses the whole vehicle inspection system



In 7 different fields

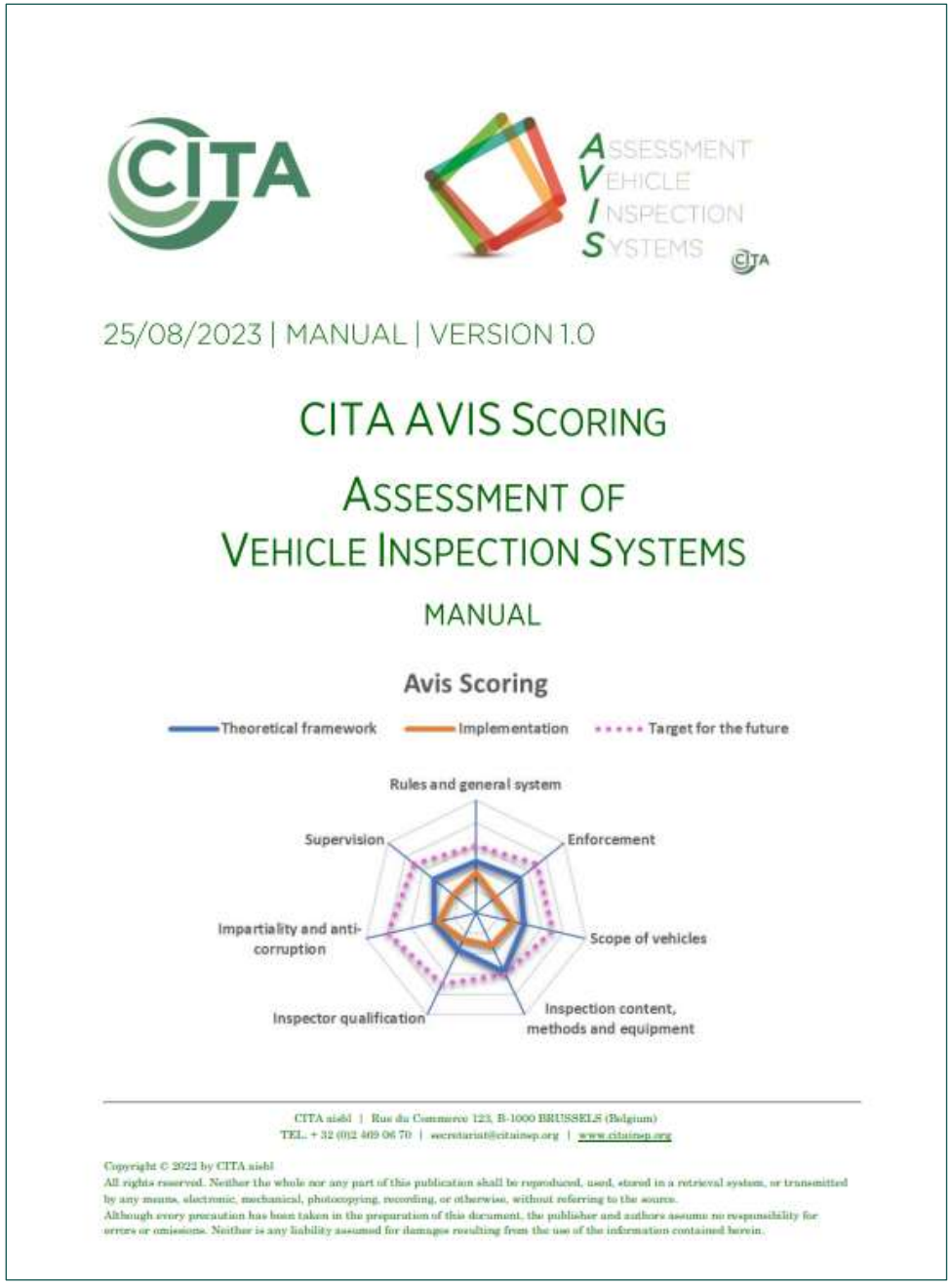


Avis Scoring



AVIS SCORING PRINCIPLES

- Applicable to all countries, but the first priority is low- and middle-income countries
- Scope: The whole system of vehicle compliance but focusing pti.
- Transparent evaluation of *both* the theoretical framework *and* its application / enforcement
- Applicable to score the legislation and its implementation, not primarily the operators
- Criteria to be updated over time, as vehicle technology and inspection systems develops, and in accordance with new needs



CITA AVIS SCORING

MANUAL

NOW AVAILABLE ON
THE CITA WEBSITE

AVIS SCORING RULES AND GENERAL SYSTEMS

Rules and general systems	
Item	**Subitem**
Legal framework for vehicles	technical requirements and approval systems to verify
Import restrictions	regulation for imported vehicles
	Port of entry inspection
Authorization scheme for pti operator	Authorization
Infrastructure of Authorized bodies	Public organization
	Monopoly
	Hybrid system (limited number of specialized operators)
	Competitive market (specialized PTI operators)
	Competitive market (repair shops)
Responsibility PTI programme	Responsibility that every inspection is performed well + responsiblity for the supervison system
Compliance and efficiency of PTI scheme / programme	Minimum service requirements and Key Performance Indicators for service and quality
Responsibility Roadsafety Policy and Programme	Responsibility for the roadworthiness system and its different parts and their improvements. Sometimes different stakeholders involved: transport authority, police, PTI organisation, insurance companies etc
Vehicle Database	Central database of vehicles, with data related to each vehicle

Assessment of overall structures, responsibilities and authorized parties for the vehicle inspection systems

EXAMPLE

Sub item	1*	2*	3*	4*	5*
Regulation for imported vehicles	Almost no rules on fitness of the vehicle	Some rules based on age or emissions levels	Certification of Conformity (CoC)	PTI prior to import or part of the import process	Anti-fraud measures (mileage, etc.)

EXAMPLE

1*: Operators are responsible for the inspections
2*: - Stations are responsible;
- Local authorities are in charge of supervision
3*: - Inspectors are personally responsible;
- National authority defines the supervision scheme
4*: Supervising body(ies) reporting to the central authority
5*: Accreditation scheme

AVIS SCORING RULES AND GENERAL SYSTEMS

Rules and general systems	
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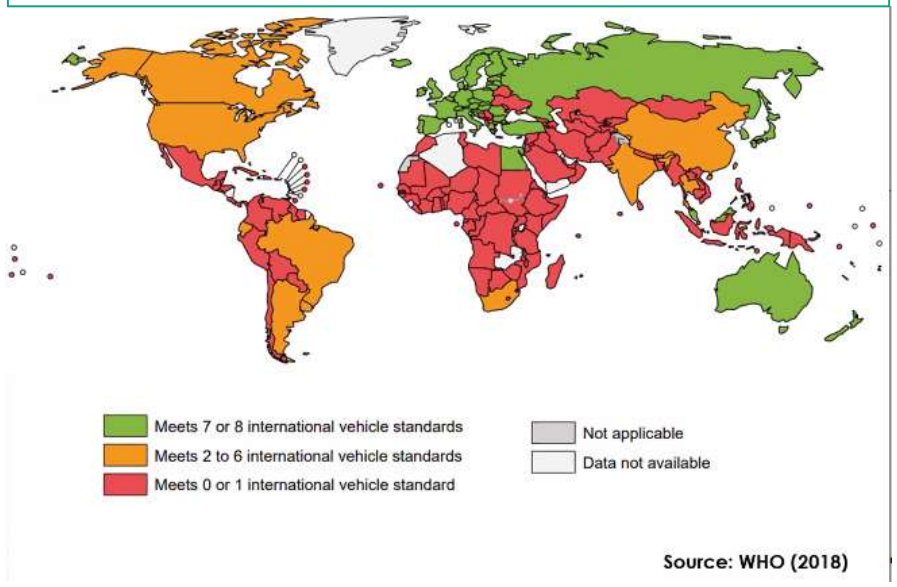
Vehicle Database	Central database of vehicles, with data related to each vehicle

The PTI context: different approaches on how to organize vehicle inspections, technical standards, vehicle fleet data etc.

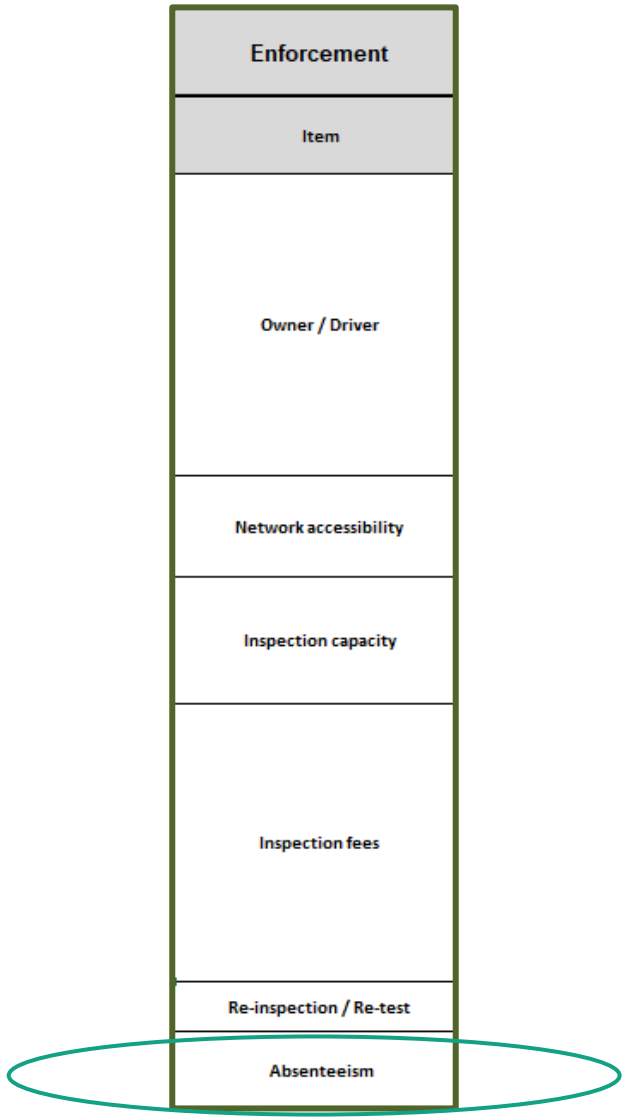
PART OF THE TECHNICAL CONTEXT



EXAMPLE

Sub item	1*	2*	3*
Public organisation	Enough capacity for the market fleet	Benchmark on quality and production system	De co te
Monopoly (other than a public organisation)	Selection process with clear requirements (competence, experience, financial, technical capacity, etc.).	Supervision from the authority; Benchmark on quality and production system	De co te
Hybrid system (limited number of specialised operators)	Area coverage rules	Supervision from the authority; Common inspection methods	De co Re
Competitive market (specialised PTI operators)	Limited set of rules about equipment and inspection content; Area coverage rules	Complete set of rules and common inspection methods; Basic supervision	De co me te Re
Competitive market (repair shops)	Limited set of rules about equipment and inspection content; Area coverage rules	Rules for impartiality (e.g. separate persons for inspection and repair) and common inspection methods	Ma of c ins Re

AVIS SCORING ENFORCEMENT



Assessment on how authorities enforce the system

EXAMPLE

Absenteeism

Aim: To encourage a greater attendance for vehicle inspections, and quantify the percentage that do not attend.

Description: Percentage of vehicles not submitted to the inspection process when obliged to. This is an average across all vehicle categories, and optionally can be derived from market fleet absenteeism in section S3 Vehicle Scope Part 1: Assessment of vehicle scope.

Requirements:

1*:	Absenteeism is 25 % or less
2*:	20 % > Absenteeism ≥ 15 %
3*:	15 % > Absenteeism ≥ 10 %
4*:	10 % > Absenteeism ≥ 5 %
5*:	5 % > Absenteeism ≥ 0 %

AVIS SCORING INSPECTION CONTENTS AND METHODS

Inspection content, methods and equipment	
Roadsafety	**Category**
Identification	All
Braking equipment	M1, N1 and L when applicable
	M2, M3, N2, N3, O2, O3, O4
	M1, N1 and L when applicable
	M2, M3, N2, N3, O2, O3, O4
Steering	ALL
Visibility	ALL
Lightning and parts of elect. System	ALL
	ALL
	ALL
Axles, wheels, tyres, suspension	ALL
	M1, N1
Chassis and chassis attachments	ALL
	Vehicules running on CNG, LPG, LNG and hydrogen
Other equipment	ALL
Add. insp. of veh. for commercial carriage of passengers	M2, M3
Environmental protection	Positives ignition engines
	Compression ignition engines
	All
	Noise
	Fluid leaks
	Electromagnetic interference suppression

To ensure minimum standards for vehicle safety and environmental protection

EXAMPLE

Table 17: Braking equipment inspection items

Vehicle category	Sub item	1*	2*	3*	4*	5*
M1, N1 and L when applicable	Mechanical and hydraulic condition and operation	Completeness and condition of basic features	Completeness and condition of installed features (ABS, etc.) even if non-mandatory	Additional correctness of settings	Additional correctness of settings for non-mandatory features, testing brake fluid for water content/ contamination; - ABS/EBS DTC's with OBD reader	DTCs ADAS brake related systems detected with an OBD reader
M2, M3, N2, N3, O2, O3, O4	Mechanical, hydraulic and/or pneumatic condition and operation	Completeness and condition of basic features	Completeness and condition of installed features (ABS, etc.) even if non-mandatory	Additional correctness of settings	- Additional correctness of settings for non-mandatory features, testing brake fluid for water content/ contamination; - ABS/EBS DTC's with OBD reader	DTCs ADAS brake related systems detected with an OBD reader
M1, N1 and L when applicable	Efficiency and performance	Function test brake system by driving test	Function test brake system by driving test using decelerometer	Brakes evaluated by roller brake tester (instead of decelerometer); checking brake forces, imbalance, fluctuation	Braking ratio with reference to the maximum authorised mass	Simulation of different situations for safety systems and assistance systems **or;** Regenerative braking test for EV/HV
M2, M3, N2, N3, O2, O3, O4	Efficiency and performance	Function test brake system by driving test	Function test brake system by driving test using decelerometer	Checking brake forces, imbalance, fluctuation	Braking ratio with reference to the maximum authorised mass following ISO 21069 or equivalent methods like road decelerometer method or Reference brake forces	Simulation of different situations for safety systems and assistance systems **or;** Regenerative braking test for EV/HV

AVIS SCORING INSPECTOR QUALIFICATIONS

Inspector Qualification
Item
Basic requirements
Training (initial and further)
Licensing

To ensure the appropriate staff competencies at any time

EXAMPLE

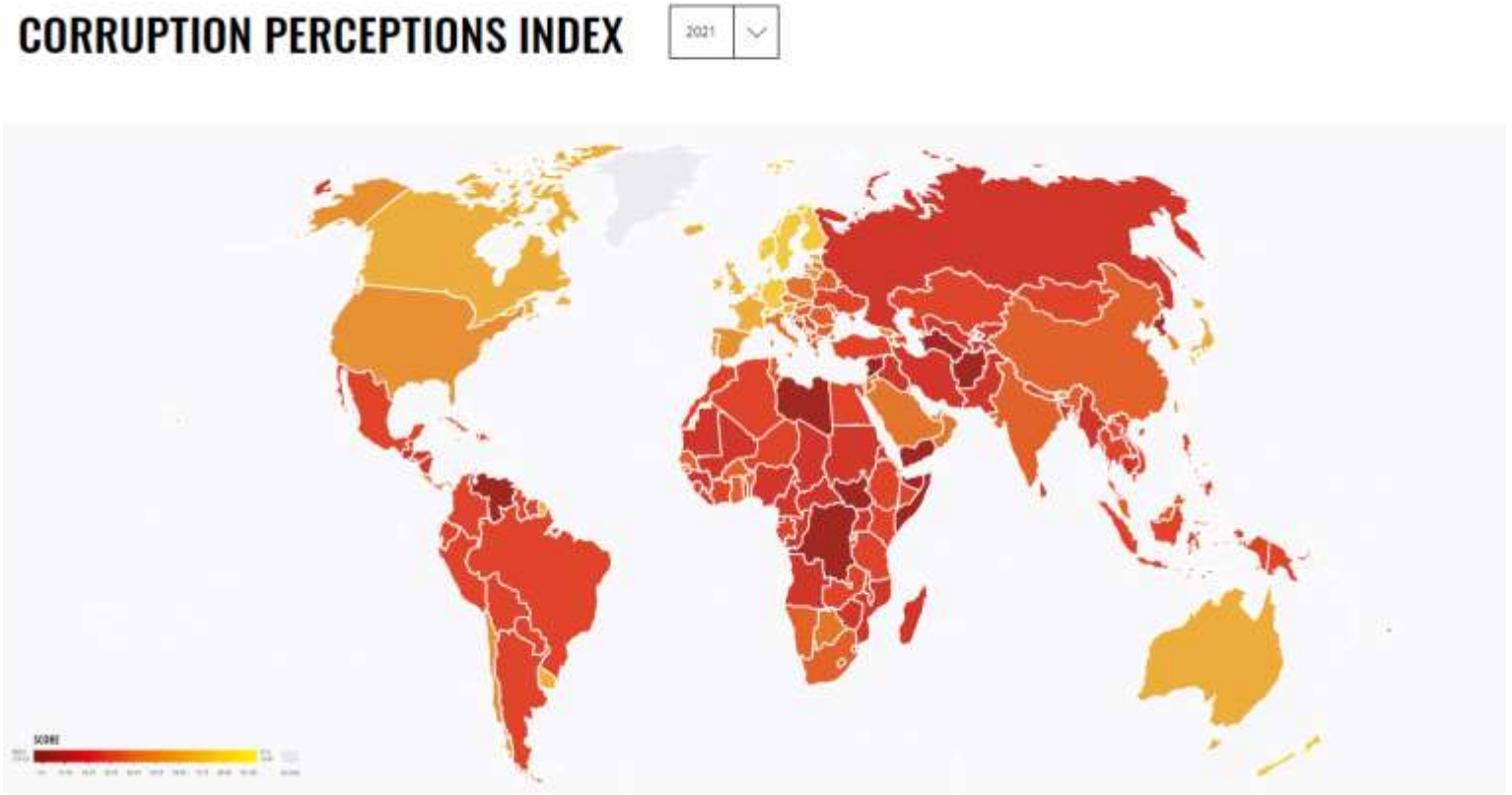
Table 23: Basic requirements for inspection qualifications

Sub-item	1*	2*	3*	4*	5*
Selection criteria	- Full reliable for actions, no criminal records, driving licence, able to communicate in relevant national language; - Good heath relevant for inspection; - Basic competences in reading and writing.	- Absence of any previous unrehabilitated bankruptcy record; - Relevant evidence of the income as a Vehicle Examiner being sufficient to support their living standard.	n/a	n/a	n/a
Experience & technical knowledge	Has graduated from a general school and a minimum proven technical experience.	Min 3 years of working related to any technical domain or any technical degree.	- Proven qualification in any vehicle related (practical) business or 3 years proven vehicle related technical experience; - During a written test, be able to display adequate technical knowledge.	Certified knowledge (ECE WP29 2017/ Directive 2014/45/EU Annex 4)	- Demonstrable experience of Directive 2014/45/EU; - Technical related, engineer experience
Impartiality	A check or a proof of the employer based on a self-statement, that the inspector is free from any conflict of interests.	<between>	Frequently renewed proof	<between>	Official certificate of checked impartiality, or positive result from very high frequency quality controls

AVIS SCORING IMPARTIALITY AND ANTI-CORRUPTION

Impartiality and Anticorruption
Item
Transparency for customer
Transparency for society
Transparency for authorised bodies
Conflict of interest
Payment of inspection fee
Motivation of inpectors
Consequences in case of fraudulent behavior
Quality assurance of Inspection report and inspection result
Fraud prevention Technological Tools
Fraud prevention Human-based Measures
Fraud prevention Organizational Measures

To encourage development of inspection systems that are independent and resistant to corruption



AVIS SCORING SUPERVISION

Supervision
Responsibility for supervision
Methodology for the supervision and quality measurements
(see CITA Rec Quality measurements for descriptions of direct/indirect methods)
Scope of quality measurements and supervision (Quantitative)
Capacity allocated and used for supervision (quantitative criteria for the frequency)
Consequenses in case of bad quality
Supervisor profile

To assess the suitability and implementation of the supervision techniques and capacity

EXAMPLE

Table 30: Supervision methodology sub-items

Supervision Methodology: sub-items	1*	2*	3*	4*	5*
Evaluating the inspections - indirect methods	Audits on site to approve the opening of the station (focusing on the vehicle inspection and inspector competence); After the opening: simple statistical analyses (only pass/fail, mean values of all inspection items etc) and/or analyses of inspection reports	<between>	Real time monitoring of inspections on site, focusing the vehicle inspection and inspector behaviour - All stations	1 method for **continuous monitoring** of inspections. Possible methods include: a) cameras (focusing on the inspector behaviour and the procedures/methods for vehicle inspection) b) advanced in-depth statistical analyses, taking vehicle age (or mileage) into account, for instance 6-sigma approach	Additional method to cover blind spots / weak points
Evaluating the inspections - direct methods	Re-inspections in stations, announced	<between>	Re-inspections as part of investigations after accidents or complaints	Re-inspections in stations, unannounced	Unannounced additional activities, such as re-inspections out of the stations, mystery shopping
Evaluating the quality management system	Audits on site to approve the opening of the station (includes all Quality Management System (QMS) items, both related to inspection and management)	Periodical audits, normally on site, announced in advance (not limited to the inspection, includes all QMS items both inspection and management)	Frequent periodical audits of all stations	Unannounced periodical audits, including all QMS items, normally on site	Additional audits (risk based, third parties)

IN A NUTSHELL

- ✓ **Methodology to assess processes**
- ✓ **Compares theory and reality**
- ✓ **Allows setting and follow up targets**

THANK YOU

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17 - 18 October 2023 / Addis Ababa, Ethiopia

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- CITA - RAG Africa Conference

- COFFEE BREAK

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