L-vehicles Emissions and Noise mitigation Solutions

D2.1 Minutes of first Stakeholder Event

WP2 Communication, Dissemination, and Exploitation

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101056777

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Approved by	Leonidas Ntziachristos (EMISIA)	28.03.2023

Revisions table

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Executive summary

The LENS consortium organised its first stakeholder event to launch cooperation with a community of experts and interested stakeholders on L-vehicle emissions challenges. The event was successful, with 30 participants representing diverse stakeholder types and providing rich insights to the discussion. Great first step promising a productive work.

List of abbreviations

LENS	L-vehicles Emissions and Noise mitigation Solutions
HEU	Horizon Europe
LVs	L-vehicles
OEMs	original equipment manufacturers
GHG	Greenhouse Gas
TA	Type-Approval
CARES	City Air Remote Emissions Sensing

List of figures

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1 Introduction

1.1 What is LENS?

LENS (L-vehicles Emissions and Noise mitigation Solutions) is a 36-month project funded by the Horizon Europe (HEU) Research and Innovation Programme with approximately 5 million EUR. It aims to assist law enforcement, cities, and regulatory authorities to reduce the contribution of L-category vehicles – LVs (mopeds, motorcycles, tricycles, and quadri-mobiles) to noise and air pollution. The project, which started in September 2022 and will finish in August 2025, brings together a multidisciplinary group of 15 partners from ten different EU Member States, including five R&D providers, four academic institutes and four LVs original equipment manufacturers (OEMs).

LENS seeks to examine emissions of greenhouse gases (GHG), including CO_2, and health-relevant pollutants, including fine particles, from LVs to meet the 2030 Agenda goals and enhance the liveability of urban and rural neighbourhoods. LENS works on developing and promoting interventions and best practices to solve the problem of noise and emissions, suggesting solutions to improve the performance of future vehicles and minimise the impact of existing vehicles.

The project will apply techniques to monitor the noise and emissions of LVs, provide recommendations on how to control the contribution of current and future LVs, examine emissions and noise performance under real driving conditions and deploy methods to identify tampered vehicles. Furthermore, it will conduct detailed pollutant and noise characterisation of 150 vehicles in the lab and on the road. This new information will help improve emission factors, assessment methods, and air and noise pollution assessment tools. The research results will provide information on different policy options for regulators, cities and authorities, including the improvement of test procedures for type approval (TA).

Flanders, Paris, and Rome have been preliminarily selected as field survey and vehicle specification locations but this does not preclude selecting other locations in the course of LENS. The project will build up on the City Air Remote Emissions Sensing (CARES) project, during which remote sensing measurements were conducted in the cities of Milan and Prague in 2021 and 2022.

1.2 Purpose of this deliverable

This deliverable presents the minutes of the first discussion with stakeholders regarding noise and emissions from L-category vehicles. It details the launch of LENS engagement process with external stakeholders, and summarizes the inputs gathered during that meeting, which will be useful information on the first needs to satisfy with the project activity.

These minutes will be used in different ways:

- Report of the process used to gather relevant stakeholders on the topic
- Summary of the discussion approach adopted by LENS partners and the participants
- Identification of interested stakeholders and their key points
- Promotion of the outcomes of the discussion for further exploitation

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2 LENS First Stakeholder Meeting

2.1 Objectives & Approach

The first LENS stakeholder meeting had both a **promotional** and a **functional** role.

- On one side, it was a first occasion to communicate on the project to external stakeholders and showcase its intended role in adressing the challenges associated with L-vehicle noise and emission.
- On the other side, it represented a first meeting gathering stakeholders from various organisations, cities and institutions, shaping a comprehensive overview of different interests on this topic, and enabling a productive exchange from which potential solutions and collaboration opportunities could emerge.

In this regard, **key stakeholder groups** were invited, based on the categories established in the LENS communication, dissemination, and exploitation plan (D2.2).

- Above all, this meeting targeted cities so they would be informed of the opportunity to join the LENS City Platform for which the call was launched at the meeting. For this reason, it was organised at POLIS offices with a hybrid option, to facilitate access, and in connection with POLIS Air Quality & Clean Vehicles' working group.
- Next to cities, partners' networks covering other authority levels but also vehicle manufacturers and suppliers, as well as vehicle certification organisations, were invited. Finally, affected citizens' representatives joined the audience to complete the range of perspectives brought to the discussion. They were targeted by the launch of the LENS Stakeholder Group call.

2.2 Agenda

The workshop took place in Brussels and online on March 15, 2023, at 12:00-13:30 CET. Interactive polls were used to feed the discussion parts as well as to introduce the audience in an anonymised manner to all.

Time	Item	Speaker
12:00	Welcome & introduction	Antonios Tsiligiannis, POLIS
12:05	LENS introduction	Leonidas Ntziachristos, EMISIA
12:20	LENS Stakeholder engagement	Antonios Tsiligiannis, POLIS
12:30	Discussion 1: LV challenges	All – moderation by POLIS
12:50	Discussion 2: Current practices	All – moderation by POLIS
13:10	Discussion 3: Expectations from LENS	All – moderation by POLIS
13:20	Closing remarks	Antonios Tsiligiannis, POLIS
13:30	End: Bon appétit!	Antonios Tsiligiannis, POLIS

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2.3 Participants

30 stakeholders attended the hybrid meeting. The list below highlights the diversity of actors in an anonymised way.

Employer	Stakeholder category
Onsite	
London Government	Public authorities
Ile de France Region	Public authorities
Province of Gelderland	Public authorities
Online	
Metropolitan Region FrankfurtRheinMain	Public authorities
Stuttgart Region	Public authorities
City of Stuttgart	Public authorities
City of Stuttgart	Public authorities
City of Prague	Public authorities
Gemeente Amsterdam	Public authorities
Ayuntamiento de Hospitalet de Llobregat	Public authorities
CEREMA	Public authorities
CEREMA	Public authorities
UBA	Public authorities
Ministerie van Infrastructuur en Waterstaat	Public authorities
Bruitparif	Research
SINTEF	Research
CDV - Transport Research Centre	Research
TNO	Research
EMISIA	Research
EMISIA	Research
KU Leuven	Research
IVL	Research
RWTH	Research
Dutch Federation of Environmental Noise Motor Vehicles	Concerned Citizens
Montaplast	Private sector
KTM	Industry
FIM	End users
POLIS	NGO
POLIS	NGO
POLIS	NGO

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3 Meeting Minutes

3.1 Presentation of LENS and its stakeholder engagement strategy

3.1.1 LENS Introduction

After a short introduction to the meeting by Antonios Tsiligiannis from POLIS Network, Leonidas Ntziachristos from EMISIA, the LENS project coordinator, gave an overview of the project.

He started with the motivation behind the project, showing the results of studies conducted for the European Commission in 2016 and 2017:

- A questionnaire on L-vehicle noise reflected many concerns from different stakeholder groups – sometimes difficult to reconcile;
- An analysis of L-vehicles' emissions in relation to their Euro standard highlighted the environmental impact of progressive standards' improvements.

The emissions' analysis report of 2016 was confirmed by the results of another study focused on Euro-4 Motorcycles in 2019.

Leonidas finally showed graphs revealing the large extent of tampering practices on L-vehicles in several European countries.

Ntziachristos provided an overview of the project, including the objectives, consortium partners and the chosen methodology based on a state of the art establishement and the conduction of tests in lab, on road and on track, and remotely. Additionally, planned outcomes, which include demonstrations of tampering detection techniques, test results on 150 L-vehicles, and policy recommendations to decrease noise and emissions in cities were explained.

3.1.2 LENS Stakeholder Engagement

Antonios Tsiligiannis from POLIS, as responsible for the project dissemination and in particular the LENS City platform, presented the LENS approach to involve key stakeholders in its activities and ensure comprehensive and exploitable results.

After an explanation of why stakeholders are needed to participate in the project, he identified and detailed who is needed and for what, as well as their potential benefits in engaging with the project.

He then presented the two main structures for stakeholder engagement set up by the LENS partners:

- The **LENS City platform** is a group of ten external cities and regions who will gather input, provide information, and guide project activities. They will receive capacity building and customized feedback on their local situation. They are expected and will be financially supported to join two workshops and the LENS final event.
- The **LENS Stakeholder Group** is composed of up to 20 external members belonging to the project's target groups, who will provide requirements and/or feedback to the project. It will take the form

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of a mailing list and a closed Linkedin group for specific and targeted exchange, as well as semi-annual gatherings at other key events or online (with a basic or more active involvement levels possible). Its members will have a first-hand access to the L-vehicle community of practice, share and value their work, influence the project outcomes, and exchange with the city platform too.

The call to join these two structures was launched during the presentation, with the provision of a link to the registration form.

3.2 Discussions

The meeting was aimed at promoting interaction with the participants, to collect insights from the audience, and involve them in a discussion launching the community that LENS intends to create and maintain all along the project – and beyond. For this reason, a series of Mentimeter polls was used to obtain and share inputs from all participants in an efficient and easy way.

A first poll at the start of the meeting showed a majority of the audience consisted in public authorities.

A second poll illustrated the diversity of acquaintance levels with the L-vehicle challenges.

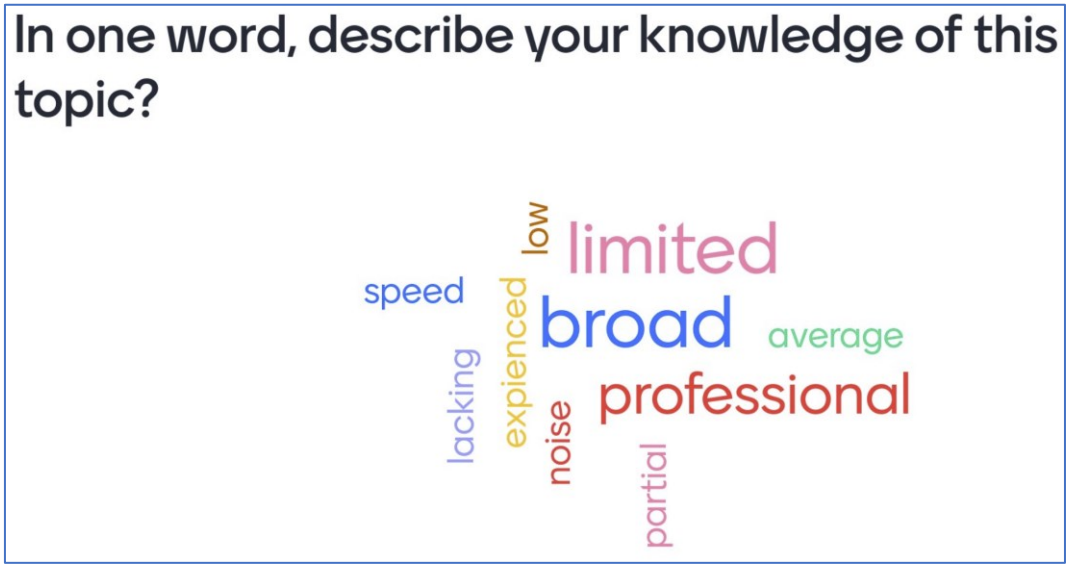

Figure 1 - Poll Question 1 Results

3.2.1 L-vehicle challenges

Participants highlighted noise as the most important issue related to the use of L-vehicles, though they underlined in the discussion that the context (urban, rural, quiet or loud area) and the perspective (user, pedestrian, family, tourist) clearly influenced this ranking.

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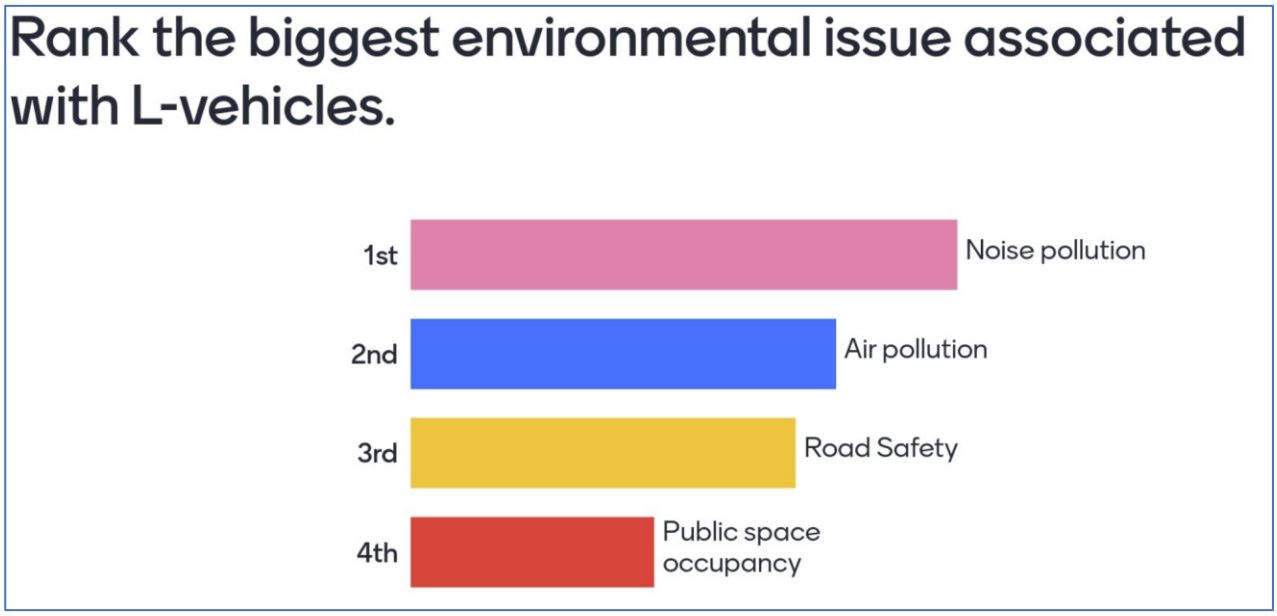

Figure 2 - Poll Question 2 Results

3.2.2 Current practices

The discussion on current practices revealed that remote sensing is already used by a minority of cities to monitor noise and air pollution. Authorities were collectively recognised as the stakeholder responsible to manage this challenge. Vehicle inspection and maintenance occurences were considered not frequent enough to well serve the monitoring purpose, though they must support it as well.

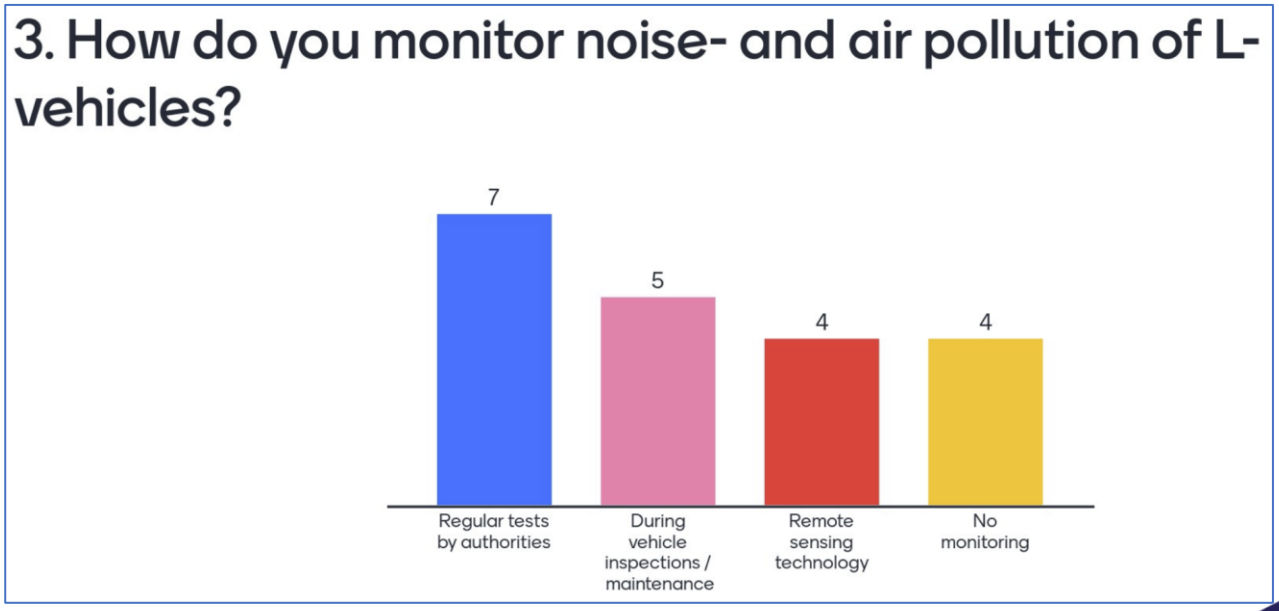

Figure 3 - Poll Question 3 Results

3.2.3 Expectations from LENS

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Enforcement of monitoring, penalties, and vehicle requirements and usage rules was clearly highlighted as the missing link in the improvement process of L-vehicles' noise and air pollution. Furthermore, rural monitoring of L-vehicles was highlighted by stakeholders, as potential impacts are significant due to higher speeds of the vehicles, which are sometimes used for recreational activities, and in areas were the population is even more looking for quiet.

Expectations expressed towards the LENS partners mainly concern practical guidelines and policy recommendations, based on the tests conducted and the stakeholders consulted.

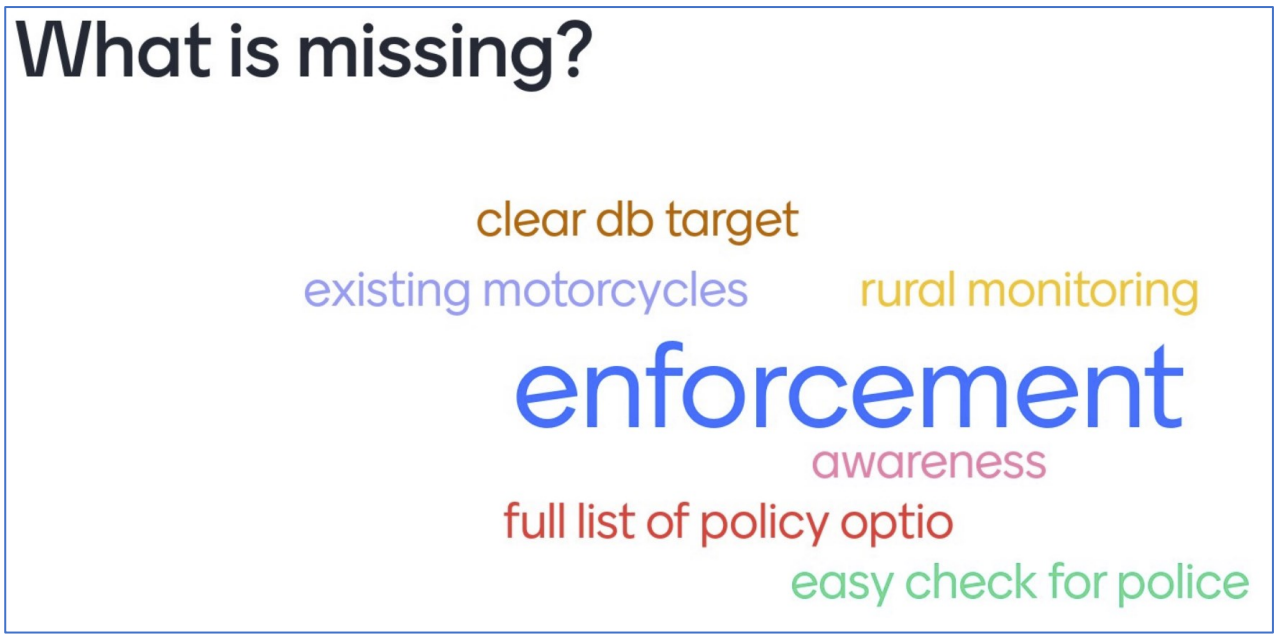

Figure 4 - Poll Question 4 Results

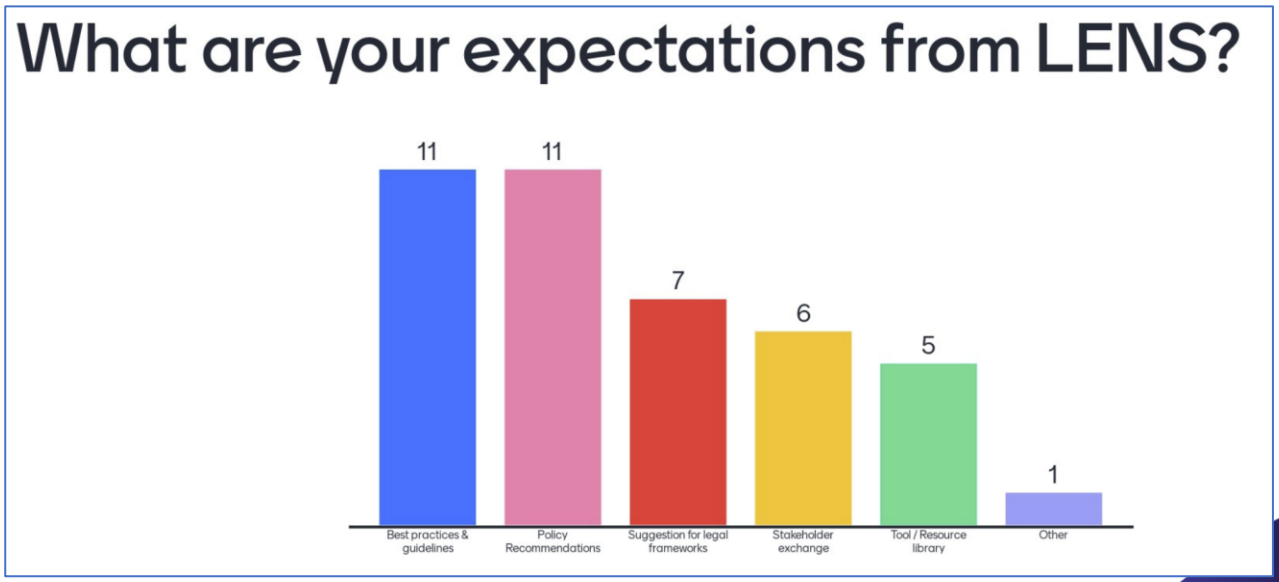

Figure 5 - Poll Question 5 Results

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3.3 Conclusions

After all these rich exchanges, LENS partners thanked their audience and reminded of the further engagement opportunities in the city platform and the stakeholder group. Some registrations already came in.

Antonios Tsiligiannis from POLIS summarized the discussion outputs and concluded the meeting, opening the LENS L-vehicle community bright future.

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Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Commission or CINEA. Neither the European Commission nor CINEA can be held responsible for them.

Annex 1 – Slides of the presentations

What is LENS?

EU-funded project on L -Vehicles' noise & emission challenges

Innovation engineering companies

Research

Manufacturers

Network

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What is this meeting?

- Launch of LENS community

Objectives

Exchange
Transfer
Uptake
} Mutual learning → Innovative real-world analysis → LV Challenges

Participants

Authorities, R&D, Manufacturers, Suppliers

Agenda

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Welcome to the LENS 1st Stakeholder Event

- Niklas Schmalholz, POLIS

Go to menti.com and type in the voting code 1279 0530

LENS Introduction

Leonidas Ntziachristos, EMISIA, Project Coordinator

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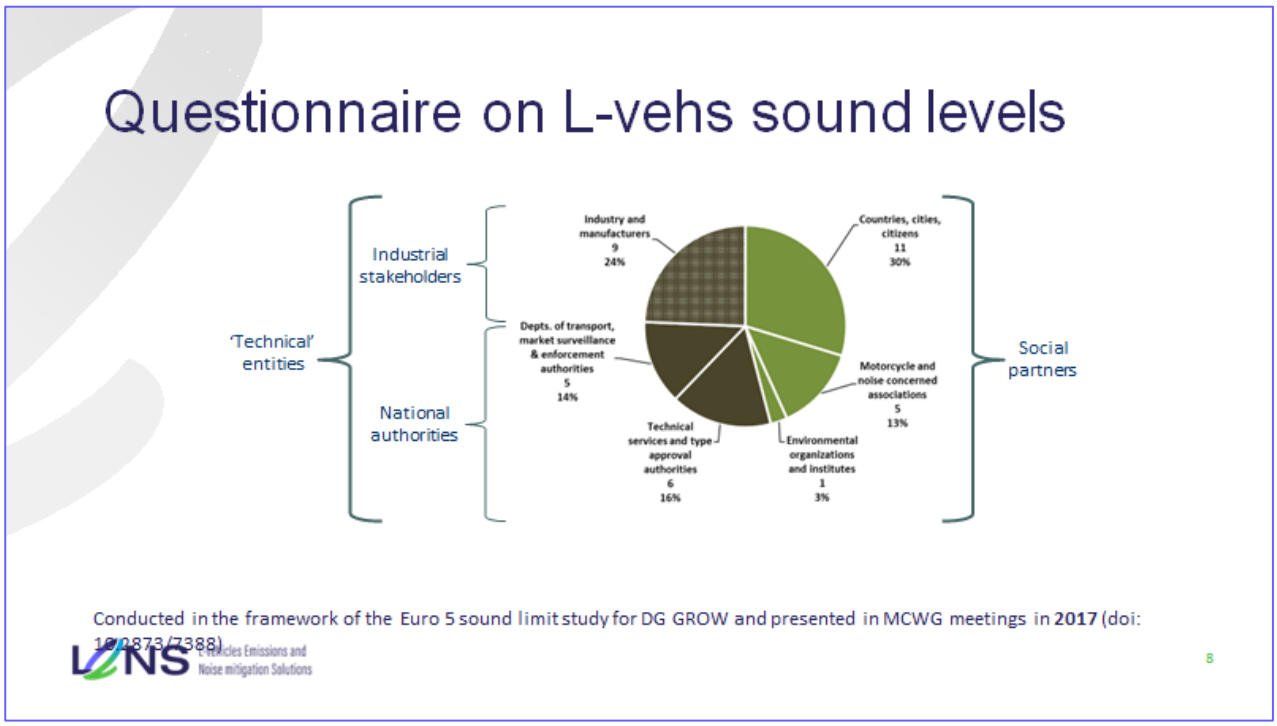

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Key takeways of questionnaire

Social partners

The majority of social partners (**~94%**), especially non-bikers and environmental organizations, want a **significant** decrease in sound limits. However, this percentage is interpreted as a general requirement to reduce the excessive sound emissions (noise) produced by the **inappropriate** usage of vehicles and rider **behaviour** (i.e. illegal aftermarket exhaust, tampering, aggressive riding, etc.).

Industrial stakeholders

Manufacturers have significant **concerns** about lowering sound limits, as this measure alone is **not** considered sufficient, if not combined with better **enforcement** of regulations, countermeasures against **illegal** aftermarket mufflers, and **anti-tampering** measures. Furthermore, it entails the **risk** to drive even more customers to purchase illegal aftermarket systems to **increase** the sound.

National authorities (TSs, TAAs, etc.)

They express an intermediate position (in-between social partners and industry), suggesting a **moderate** reduction in sound limits, depending on the vehicle type and (possibly) **excluding** some categories. This reduction should be combined with specific technical **improvements** in the test procedure (**ASEP**) in order to be more representative of real-driving conditions.

Reducing the noise from L-vehicles **does not only** depend on lowering the type approval sound limits

Conducted in the framework of the Euro 5 sound limit study for DG GROW and presented in MCWG meetings in **2017** (doi: 10.2873/7388)

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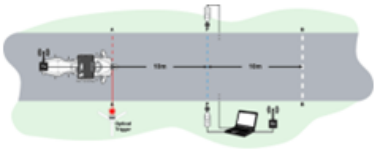
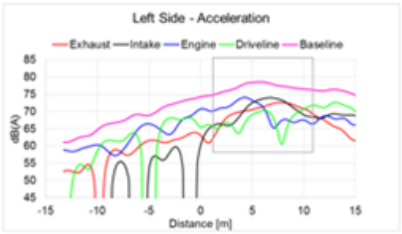
NSR Results Scooter 125cc 25<PMR≤50

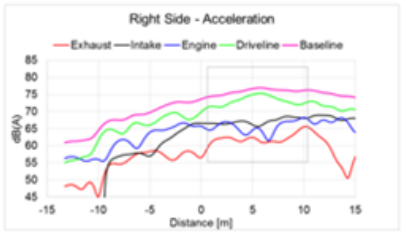
Maximum pass-by area

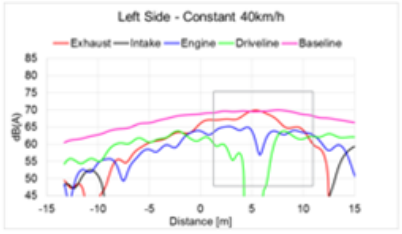
Contributions of:
- Exhaust
- Intake
- Engine
- Driveline

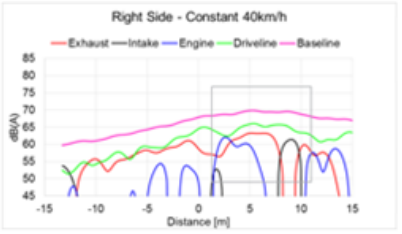
Baseline sound level in original configuration, also equivalent to the total of all contributions











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NSR Results Motorcycle 800cc PMR>50

Maximum pass-by area

Contributions of:
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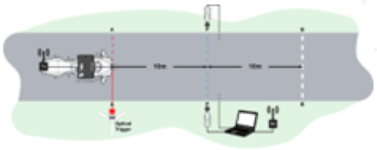
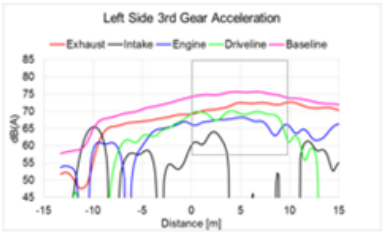
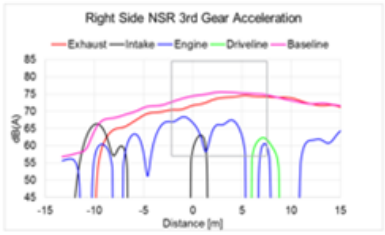
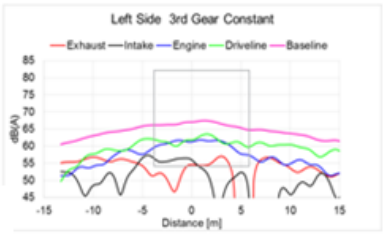
- Intake
- Engine
- Driveline

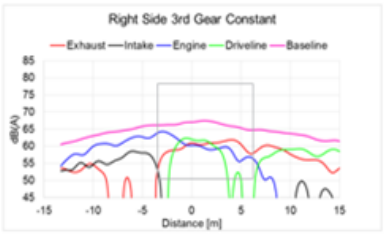
Baseline sound level in original configuration, also equivalent to the total of all contributions











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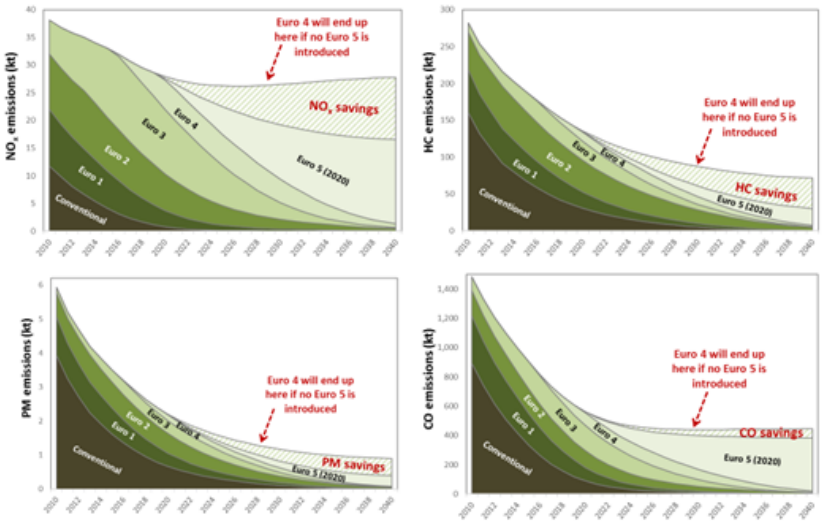
Evolution of total emissions from LVs



Conducted in the framework of the Euro 5 environmental effect study for DG GROW and presented in MCWG meetings in **2016** (doi: 10.2873/397876)

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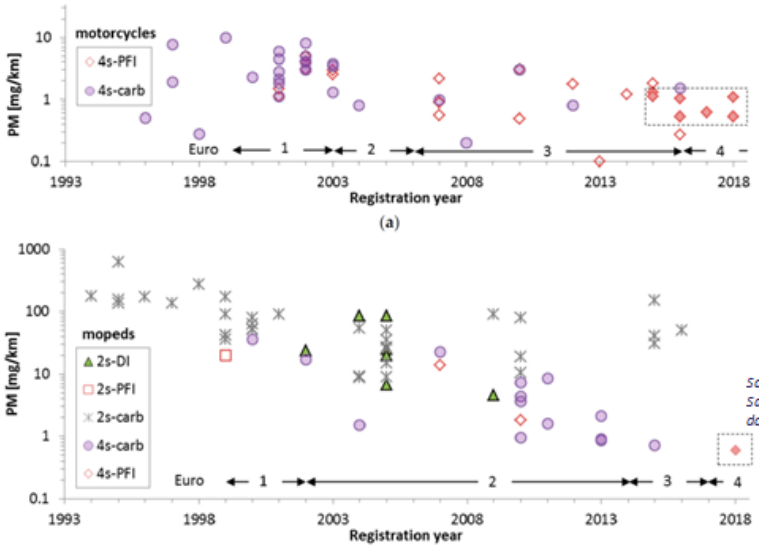
PM EF Evolution per LV standard



Source: Particulate Emissions of Euro 4 Motorcycles and Sampling Considerations, Atmosphere 2019, 10, 421; doi:10.3390/atmos10070421

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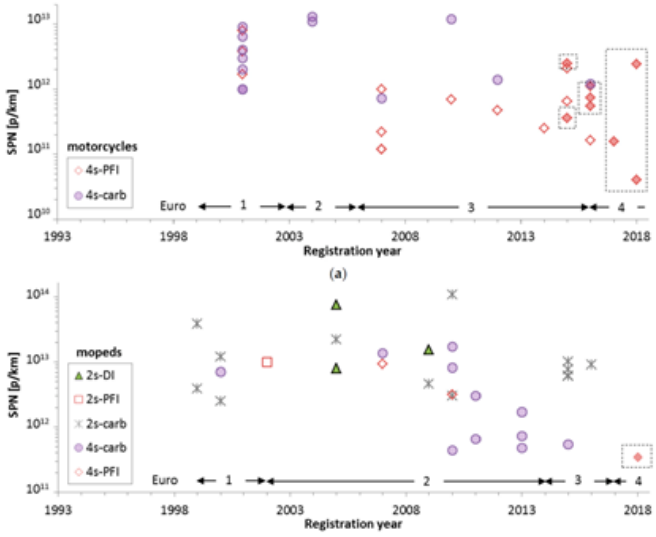
SPN EF Evolution per LV standard



Source: Particulate Emissions of Euro 4 Motorcycles and Sampling Considerations, Atmosphere 2019, 10, 421; doi:10.3390/atmos10070421

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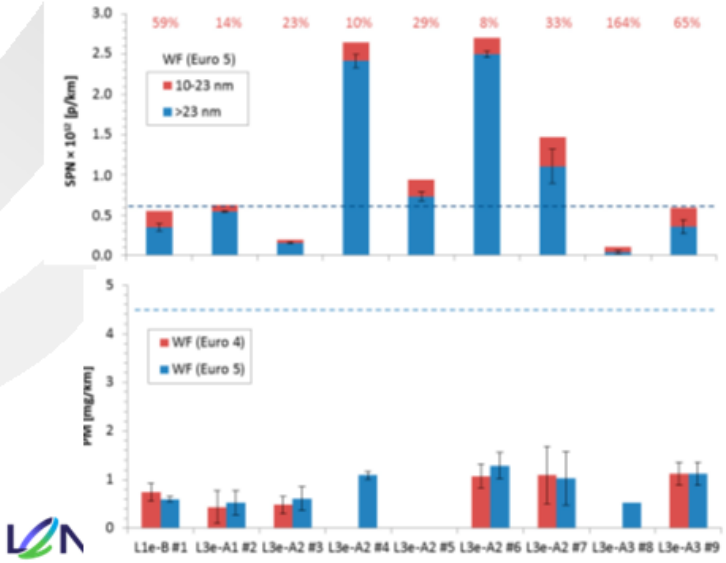
SPN and PM Emissions of Euro 4 vehicles



Source: Particulate Emissions of Euro 4 Motorcycles and Sampling Considerations, Atmosphere 2019, 10, 421; doi:10.3390/atmos10070421

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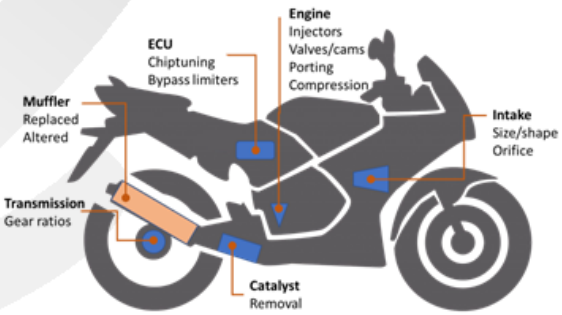
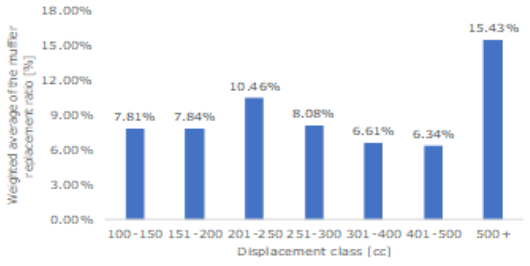
Tampering methods and overall ratio of muffler replacement





Source: EMISIA Campaign on Replaced Mufflers. Study for an OEM

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Muffler replacement ratio per country

Source: EMISIA campaign on Replaced Mufflers. Study for an OEM

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Project Fiche

Grant Agreement number	**101056777**
Framework Programme	**HORIZON Europe**
Call	**Clean and competitive solutions for all transport modes (Topic ID: HORIZON-CL5-2021-D5-01-16)**
Type of action	**Research and Innovation Action**
Duration	**36 months**
Budget	**4 995 098 €**
Total partners	**15**
Coordinator	**Emisia S.A.**

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Consortium

emisia · Applus IDIADA · TU Graz · ivl Swedish Environmental Research Institute · ika RWTH AACHEN UNIVERSITY · KU LEUVEN · CZU Czech University of Life Sciences Prague · TNO innovation for life · IFP Energies nouvelles · KTM · BMW GROUP · DUCATI · HORIBA · PIAGGIO · POLIS CITIES AND REGIONS FOR TRANSPORT INNOVATION

LENS L-vehicles Emissions and Noise mitigation Solutions

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LENS Main Objectives

	What	Why
O.1	Beyond state-of-art LV emission and noise measurement techniques	To be able to measure emissions and noise under real world conditions, cost-effectively
O.2	Characterise noise and pollutant emissions performance of LVs	Understand latest status of fleet emissions, identify LV subcategories that may be an issue, understand emission levels of non-regulated pollutants, feed air pollutant emission inventories and policy decision tools
O.3	In-field identification of tampered LVs	Understand the extend of the problem, identify tampering methods, provide tools and methods able to capture tampered vehicles in the field (to enforce regulations)
O.4	Recommendations and expected impact of decreasing noise and pollutants from LVs	Policy recommendations for various stakeholders, including regulators, national, local authorities, NGOs, etc on how emissions and noise from LVs can be decreased in the field

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LENS aims

Assist enforcement authorities, cities and regulators to decrease the contribution of L-category vehicles (LVs: mopeds, motorcycles, tricycles and quadri-mobiles) to noise and air-pollution

by

developing and promoting interventions and best practices that can address the noise and pollutant emissions of current fleet vehicles and by making suggestions for regulations to improve the performance of future vehicles.

LENS L-vehicles Emissions and Noise mitigation Solutions

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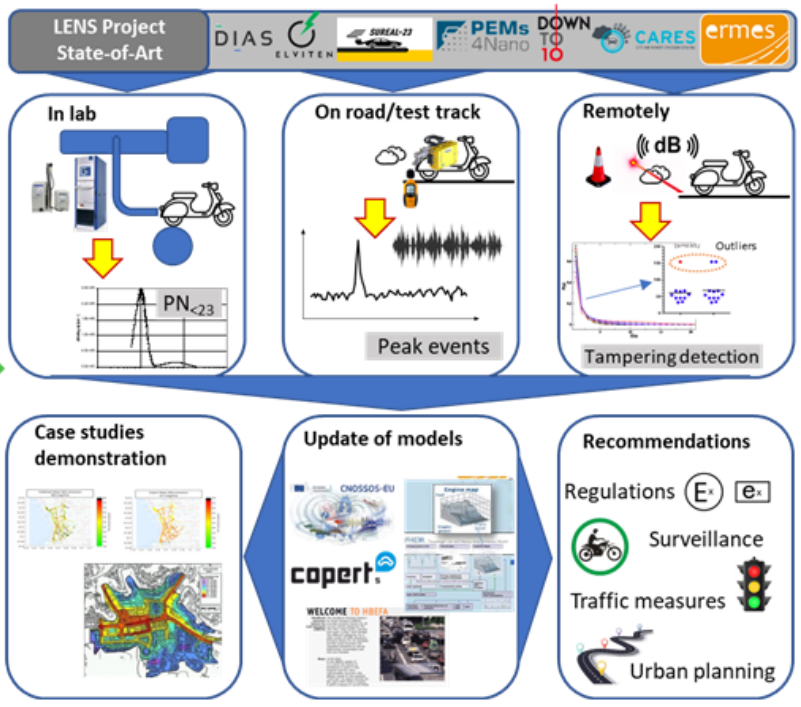
LENS overall methodology



LENS L-vehicles Emissions and Noise mitigation Solutions

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101056777

LENS outcomes – 1(2)

- Demonstration in 3 case studies of tampering detection techniques with the potential to decrease HC, CO, NOx and other pollutants emissions, including nanoparticles.
- Proposals for regulatory improvements that can lead to 50% NOx emission decrease and similar reductions for other pollutants from new LVs in real world operation.

LENS L-vehicles Emissions and Noise mitigation Solutions

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LENS outcomes - 2

- Detail emissions and noise characterisation of 150 L-Vehicles.
- Remote screening for tampering of actual vehicles (3,000 LVs) and roadside inspections in three EU cities with different fleet characteristics.
- Recommendations that can decrease the number of highly annoyed people by 50% and peak noise events by 10 dB at local hotspots. Demonstrate benefits with simulation in actual city locations.

LENS L-vehicles Emissions and Noise mitigation Solutions

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Thank you!

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L-vehicles Emissions and Noise mitigation Solutions

LENS Stakeholder Engagement

Antonios Tsiligiannis, POLIS, Project Communication

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Why do we need stakeholders?

L-Vehicles' noise and air pollution is a multidisciplinary problem

- Inform LENS work with diverse knowledge sources
- Support LENS activities with tests & implementation
- Ensure the broad applicability of LENS results (! regulations & standards !)
- Raise awareness on & ensure the most efficient exploitation of LENS results (during & beyond lifetime)
- Transfer knowledge to relevant stakeholders & Maximise impact

LENS First Stakeholder Event, March 15, 2023, 12:20 12:30 CET 27

Whom are we targeting?

Stakeholder type	What for	Benefits
Public authorities Enforcement bodies	• Tests & field data • Feedback for applicability • Exploitation	• Increased knowledge & understanding • LENS tools & recommendations
Technology suppliers & industry (OEMs)	• Tests & field data • Knowledge & know-how sharing • Awareness & exploitation	• Knowledge on potential future trends • Awareness on LENS outcomes
Private sector (retailers, parts suppliers)	• Knowledge & know-how sharing • Awareness & exploitation	• State-of-the-art research • Knowledge on potential future trends • Awareness on LENS outcomes
Academia & researchers	• Knowledge & know-how sharing • Synergy with other initiatives/projects	
End-user organisations (neighbourhoods, road safety, motorcycle clubs) Riders & concerned citizens	• Knowledge sharing • Feedback for applicability	• Quality of life • LENS tools & recommendations

LENS First Stakeholder Event, March 15, 2023, 12:20 12:30 CET 28

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LENS City Platform

For whom?

Local authorities (cities & regions)

What for?

- Share local LV information & experience
- Define requirements
- Provide feedback & exploit results

→ Interviews, field tests, 2 workshops and 1 final event

Why join?

- Understand the issue
- Access assessment tools & policy options
- Reduce tampering & Improve new LVs

Join the LENS city platform → Complete the form

LENS L-vehicles Emissions and Noise mitigation Solutions LENS First Stakeholder Event, March 15, 2023, 12:20 12:30 CET 29

LENS Stakeholder Group

For whom?

- Other authorities
- Enforcement bodies
- LV industry
- Research
- End-user/citizens
- Riders

What for?

- Improve state of art & requirements
- Provide feedback
- Ensure synergies & maximise exploitation

→ Semi-annual calls, targeted emails & Linkedin group, written feedback, 2 workshops & 1 final event

Why join?

- Access an expert community
- Exploit your own knowledge & capacity
- Be aware of tools & future trends

Join the LENS Stakeholder Group → Complete the form

LENS L-vehicles Emissions and Noise mitigation Solutions LENS First Stakeholder Event, March 15, 2023, 12:20 12:30 CET 30

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Discussion 1: LV challenges

- Niklas Schmalholz, POLIS

Go to menti.com and type in the voting code 1279 0530

Discussion 1: LV challenges

Antonios Tsiligiannis, POLIS, Project Communication

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Discussion 2: Current practices

- Niklas Schmalholz, POLIS

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Discussion 2: Current practices

Antonios Tsiligiannis, POLIS, Project Communication

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Discussion 3: Expectations from LENS

- Niklas Schmalholz, POLIS

Go to menti.com and type in the voting code 1279 0530

Discussion 3: Expectations from LENS

Antonios Tsiligiannis, POLIS, Project Communication

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Closing Remarks

Antonios Tsiligiannis, POLIS, Project Communication

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