

LIFE E-VIA

Electric **V**ehicle noise control by **A**ssessment and optimisation of tyre/ road interaction



Dissemination and participation photo album

By Vie en.ro.se. Ingegneria



EUROCITIES- Meeting in Oslo during the Environment Forum

Issued on: October 2019

By: Comune di Firenze and Vie en.ro.se. Ingegneria

MEETINGS OF THE EUROCITIES

Code: E_1

« E-VIA » Electric Vehicle noise control by Assessment and optimisation of Tyre/road interaction

PROJECT LOCATION: Florence Italy

BUDGET INFO:

Total amount: 1.797,030 €

55% EC Co-funding: 933,295 €



DURATION: Start: 01/07/2019 - End: 31/01/2023

PROJECT'S IMPLEMENTORS:

Coordinating Beneficiary: Florence Municipality

Associated Beneficiary(ies):

Continental Reifen Deutschland
Ifsttar
Ipool S.r.l.
University of Reggio Calabria
Vie en.ro.se Ingegneria S.r.l.

Eurocities Environment Forum
Oslo 23-25 Ottobre 2019

Arnaldo Melloni
Project Manager





LIFE 18 ENV and GIE Welcome meeting in Brussels

Issued on: November 2019

By: Comune di Firenze

MEETING



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control by Assessment and optimisation of
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University of Reggio Calabria

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LIFE18 ENV and GIE Welcome Meeting,
Brussels, 7-8 November 2019

Arnaldo Melloni
Project Manager





Development and launch of LIFE E-VIA website

Issued on: December 2019

By: Vie en.ro.se. Ingegneria

Deadline: 01/12/2019

LIFE E-VIA WEBSITE

Code: 3

<https://life-evia.eu/>

THE PROJECT LIFE E-VIA

Exposure data from the European Environment Agency (EEA) demonstrate that more than 100 million EU citizens are affected by high noise levels negatively impacting human health. Traffic noise alone is harmful to the health of almost every third person in the WHO (World Health Organization) European Region. 20% of Europeans are regularly exposed to night sound levels that could significantly damage health, especially in urban areas. As emerged in Noise in Europe Conference (April 2017) and in the WHO guidelines published in October 2018, the increased stringency of EU at source standards needs to be balanced against other effective measures such as road surface and/or tyre improvements and urban planning measures as well.

One of the solutions universally recognized as the best to reduce noise in urban areas, from both the point of view of noise and air quality, is the introduction of electric mobility.

Similar effects can also be observed for the contribution of the tyre rolling resistance to the vehicle's energy consumption.

Thus, for the changed requirements of Electric Vehicles (EVs) there is a need for in-depth investigations of tyre/road interaction. Last but not least, even for the application of the Directive 2002/49/EC, the coefficients to apply the CNOSSOS model (Directive 96/2015/EC) to new traffic spectra and new vehicles are completely missing.

Therefore, the project intends to:

- tackle noise pollution from road traffic noise focusing on a future perspective in which electric and hybrid vehicles will be a consistent portion of flow;
- combine knowledge of road optimization and tyre development in order to test an optimized solution for reducing noise in urban areas and Life Cycle Cost with respect to actual best practices.

[READ PROJECT](#)

News & Events

11 February 2020
WORKSHOP OF LIFE MONZA PROJECT
The Workshop "IL QUARTIERE LIBERTÀ: LA NUOVA ARSA A RIDOTTE EMISSIONI (I) RUMORE - L'ESPERIENZA DEL PROGETTO LIFE MONZA" will be on February 11 at the Terme Binaldi 7 in Monza. The event is FREE and will take place from about 9.30 to 12.30. Professional Training Credits for Architects, Engineers and Surveyors are expected. The [...]

Read More...

5 February 2020
LIFE MONZA PROJECT- Workshop and radio campaigns
OPEN REGISTRATIONS for the workshop: "L'area a ridotte emissioni di rumore nel quartiere Libertà (esperienza del progetto LIFE MONZA)" will be on February 5 at the Terme Binaldi 7 in Monza. The event is FREE and will take place from about 9.30 to 12.30. Professional Training Credits for Architects, Engineers and Surveyors are expected. The [...]

Read More...

1 February 2020
WORKSHOP "BEAUTIFUL SOUNDS: POSITIVE SOUNDS FOR HAPPY PLACES"
After the success of the initiative "NOISE AND THE CITY - L'ANIMA SORDA DELLE CITTÀ" and "A QUIET PLACE - UN POSTO TRANQUILLO", acoustic experts, doctors, designers and philosophers of sound are again meeting in Palazzo Vecchio in Florence to talk about how an environment can be considered of quality thanks to the presence of [...]

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7 January 2020
INTERNATIONAL YEAR OF SOUND
2020 will be the International Year of Sound. The International Year of Sound 2020 is a global joint initiative of sound and related sciences and technologies. It will be celebrated all over the world [...]

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20 December 2019
PAPER PUBLICATION
The paper "Tire/Road and Urban Road" [...]

Gallery

Meeting Florence September 2019

Meeting Oslo Eurocities Environment Forum October 2019

Official Welcome meeting Bruxelles November 2019

Comune di Firenze

Continental

iPOOL

Université Gustave Eiffel

Università degli Studi Mediterranea di Reggio Calabria

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Paper published on Sustainability 2020 about the sustainable pavement materials for the urban roads.

Issued on: January 2020

By: UNIRC

Deadline: 01/12/2022

ARTICLES FOR OPEN
ACCESS JOURNAL
Code: 20_1

<https://www.mdpi.com/2071-1050/12/2/704/html>



Article

Energy and Environmental Life Cycle Assessment of Sustainable Pavement Materials and Technologies for Urban Roads

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Received: 18 December 2019; Accepted: 16 January 2020; Published: 18 January 2020



Abstract: Recycled and low-temperature materials are promising solutions to reduce the environmental burden deriving from hot mix asphalts. Despite this, there is lack of studies focusing on the assessment of the life-cycle impacts of these promising technologies. Consequently, this study deals with the life cycle assessment (LCA) of different classes of pavement technologies, based on the use of bituminous mixes (hot mix asphalt and warm mix asphalt) with recycled materials (reclaimed asphalt pavements, crumb rubber, and waste plastics), in the pursuit of assessing energy and environmental impacts. Analysis is developed based on the ISO 14040 series. Different scenarios of pavement production, construction, and maintenance are assessed and compared to a reference case involving the use of common paving materials. For all the considered scenarios, the influence of each life-cycle phase on the overall impacts is assessed to the purpose of identifying the phases and processes which produce the greatest impacts. Results show that material production involves the highest contribution (about 60–70%) in all the examined impact categories. Further, the combined use of warm mix asphalts and recycled materials in bituminous mixtures entails lower energy consumption and environmental impacts due to a reduction of virgin bitumen and aggregate consumption, which involves a decrease in the consumption of primary energy and raw materials, and reduced impacts for disposal. LCA results demonstrate that this methodology is able to help set up strategies for eco-design in the pavement sector.

Sustainability 2020, 12, 704

10 of 15

all the scenarios. In detail, it accounts for more than 60% of the majority of environmental indicators, with the exception of EF_w , $HT-c$, $HT-nce$, and ME .

The negative values of $Ptox$ and $HT-c$ in Scenario 1 (addition of waste plastics in the bituminous mixture) are essentially due to the avoided impacts of virgin plastics.

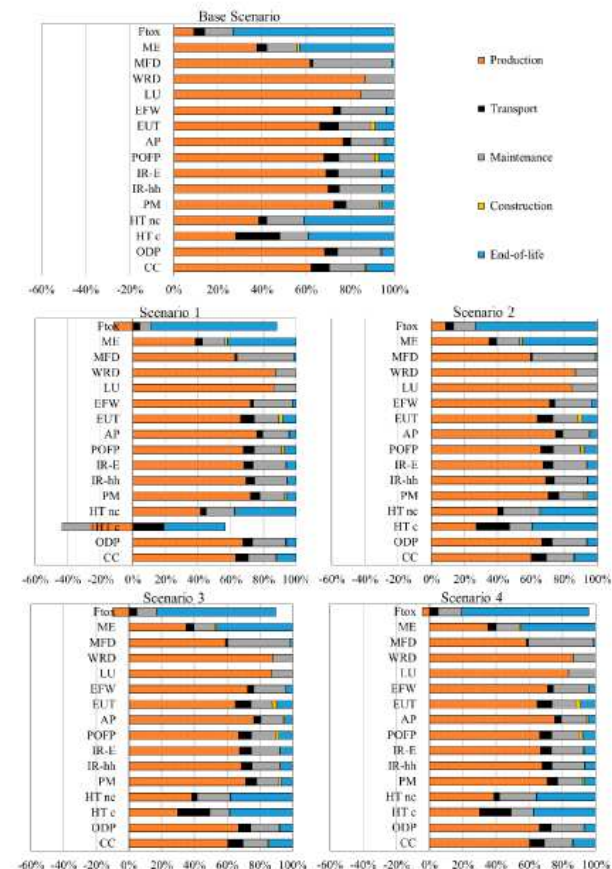


Figure 2. Contribution analysis of life-cycle environmental impacts.



LIFE E-VIA: objectives and actions

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Deadline: 01/12/2022

NOTICEBOARD IN
ENGLISH LANGUAGE

Code: 18_1



LIFE E-VIA

Electric Vehicle noise control by Assessment
and optimisation of tyre/road interaction



Background

Exposure data from the European Environment Agency (EEA) demonstrate that more than 100 million EU citizens are affected by high noise levels negatively impacting human health. Traffic noise alone is harmful to the health of almost every third person in the WHO (World Health Organization) European Region. 20% of Europeans are regularly exposed to night sound levels that could significantly damage health, especially in urban areas. As emerged in Noise in Europe Conference (April 2017) and in the WHO guidelines published in October 2018, the increased stringency of EU at source standards needs to be balanced against other effective measures such as road surface and/or tyre improvements and urban planning measures as well. One of the solutions universally recognized as the best to reduce noise in urban areas, from both the point of view of noise and air quality, is the introduction of electric mobility. Thus, for the changed requirements of Electric Vehicles (EVs) there is a need for in-depth investigations of tyre/road interaction. Last but not least, even for the application of the Directive 2002/49/EC, the coefficients to apply the CNOSSOS model (Directive 96/62/EC) to new traffic spectra and new vehicles are completely missing.

Objectives

- 1 To reduce noise for roads inside very populated urban areas through the implementation of a mitigation measure aimed at optimizing road surfaces and tyres of EVs. Two road surfaces, at least 5 different EV types, one reference ICE Vehicle (ICEV) and at least 3 types of tyres per vehicle type (including tyres specifically designed for EVs) will be tested
- 2 To estimate the mitigation efficiency and potential of tyres, pavements and traffic (traffic spectrum, speeds, loading conditions) at a higher and comprehensive level: a Life Cycle Analysis (LCA) and a Life Cycle Cost Analysis (LCCA) will be performed to demonstrate the individual and synergistic efficiency of pavement surfaces, tyres and vehicles (including the comparison between internal combustion vehicles, mixed traffic, and EV traffic)
- 3 To contribute to EU legislation effective implementation (EU Directives 2002/49/EC and 2015/96/EC), providing rolling noise coefficients within the Common Noise Assessment Method (CNOSSOS-EU), specifically tuned for EVs which are actually in need of data for practitioners, agencies, and departments aiming at developing future scenarios
- 4 To contribute to national and Italian regional policies, issuing guidelines about use and application of the methodology output of the project, which will be adopted, through the Regional Env. Agency (ARPA), supporting the project, by Tuscany Region, Calabria Region and CISA of Reggio Calabria also expressed their interest
- 5 To raise people's awareness of noise pollution and health effects explaining the opportunities provided by EVs through specific dissemination and promotional events, also investigating people perception regarding noise in terms of soundscape methodology and involving them in noise data acquisition
- 6 To demonstrate and promote sustainable road transport mobility (electric), reducing noise emission by 5 dB(A) at receivers' roadside and achieving also CO2 emissions reduction (21%), based on the Italian context (LPG, CNG, Hybrid, EV, petrol cars, diesel cars) and the concerned literature
- 7 To encourage low-noise surfaces implementation in further EU and extra-EU scenarios, demonstrating durability and sustainability, through in-depth LCA/LCCA

Actions

- A. Preparatory actions**
- A1 Electric vehicles and their noise emission
 - A2 Quiet pavement technologies and their performance over time
 - A3 Tyre role in the new context of EV and ICEV
- B. Implementation actions**
- B1 Tracks design
 - B2 Tyre-pavement coupling study and prototype implementation
 - B3 Pilot area Implementation, Replication and transferability
 - B4 Tyre efficiency tests in the pilot area
 - B5 Soundscape analysis
 - B6 Evaluation of EV noise emissions
 - B7 Holistic performance of tyres
- C. Monitoring of the impact of the project actions**
- C1 Monitoring of the impact of the project actions
 - C2 Life cycle analysis (LCA) and life cycle costing (LCC)
- D. Public awareness and dissemination of results**
- D1 Information and awareness raising activities
 - D2 Technical dissemination activities to stakeholders
- E. Project management**

Stakeholders



Project website: <https://life-evia.eu/>

LIFE E-VIA

Electric Vehicle noise control by Assessment and optimisation of tyre/road interaction





Roll-up

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**NOTICEBOARD IN
ENGLISH LANGUAGE**

Code: 18_2

LIFE E-VIA

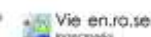
Electric Vehicle noise control by
Assessment and optimisation
of tyre/road interaction



Coordinating beneficiary



Partners





umr ae Journées Techniques Acoustique et Vibrations
Lille – France – 11-12 mars 2020



jt av JOURNEES TECHNIQUES ACOUSTIQUE ET VIBRATIONS

LIFE E-VIA : contrôle du bruit des véhicules électriques par optimisation de l'interaction pneumatique-chaussée

Julien CESBRON, Marie-Agnès PALLAS, Philippe KLEIN, Simon BIANCHETTI, Adrien LE BELLEC, Vincent GARY

Université Gustave Eiffel – UMRAE

Université Gustave Eiffel Cerema

umr ae Action B21 - Acoustical characterization of EVs




- Planned vehicles:
 - One ICE Vehicle (Renault Kangoo Diesel)
 - Several EVs (Renault Kangoo ZE, Renault Zoe, C-Zero, Nissan Leaf, BMW i3, Tesla Model 3)
- Already tested in August 2019:
 - Renault Kangoos (ICEV and EV) and Renault Zoe





JTAV 2020 – Lille – France 12 11/03/2020

umr ae Action B22 – Prototype construction



- Construction of a B1-based test track prototype:
 - Located on IFSTTAR reference test track in Nantes
 - Call for tender planned in April 2020 based on B1 recommendations
 - Construction planned in July 2020



B1-based prototypal test section
50 m x 8 m

JTAV 2020 – Lille – France 13 11/03/2020





PARTICULATE MATTER FROM NON-EXHAUST SOURCES

Praticò F.G., Briante P.G.

Abstract: Air pollution is an important issue worldwide. Solid components in air (particulate matter, PM) originate from a variety of natural or anthropogenic sources and have different morphological, physical, and chemical properties. Their presence in the air also depends on meteorological conditions, such as humidity, rainfall, and wind speed. PM pollution has adverse effects on environment and human health. Therefore, it is very important to address sources and processes involved in PM generation. Among the existing sources, a special attention must be paid to PM emissions from road traffic, i.e., exhaust sources (e.g., fuel combustion) and non-exhaust sources (e.g., road, tyre, brakes). These traffic-related sources contribute to PM concentrations in cities, and this calls for research into new possible systems and/or mitigation measures. In light of the facts above, the objectives of this study are 1) To evaluate the contribution to PM emission from traffic-related sources. 2) To evaluate existing mitigation measures and to identify new ones to reduce PM production. First results show that: 1) Non-exhaust sources have a different role in PM generation and they differently affect PM₁₀, PM_{2.5}, and PM_{0.1}. 2) Even if emissions-related regulations have led to reductions in exhaust emissions from road traffic, other mitigation measures could reduce the non-exhaust part of emissions (e.g., brakes wear, road wear, and tyre wear). 3) New technologies could be developed to reduce PM from non-exhaust sources.

Keywords: Particulate matter, Non-exhaust sources, Tyre wear, Road wear, Brake wear, Mitigation measures.



SMART ROAD INFRASTRUCTURES THROUGH VIBRO-ACOUSTIC SIGNATURE ANALYSES

Fedele R.

Abstract. Smart cities need “intelligent” infrastructures designed or managed bearing in mind crucial characteristics, such as sustainability, efficiency, safety, and resiliency. Several solutions can be adopted, but the key factor for the success of the solution selected is its ability of improving the management process. The objective of the study described in this paper is to develop a solution that can be used to make smarter the road pavement monitoring and maintenance. In particular, a Non-Destructive Test (NDT)-based method is presented and applied aiming at extracting crucial information about the Structural Health Status (SHS) of the monitored road pavement. Results show that the method is able to recognize the presence and the growing of induced cracks using meaningful features extracted from the vibro-acoustic signatures (acoustic signals) of the road pavement loaded by a light vehicle. The abovementioned features can be used to build innovative P-F curves able to improve the road pavement management process.

Keywords: Smart Roads, Sustainability, Vibro-Acoustic Signature.



ACOUSTIC IMPACT OF ELECTRIC VEHICLES

Praticò F.G., Briante P.G., Speranza G.

Abstract: Electric vehicles (EV) diffusion depends on many factors among which policies, people options, and economic factors. Their noise-related performance could appear favourable. This notwithstanding, despite partisan opinions, the analyses carried out suggest that research and industry will have to minimise the collateral issues posed by a quite probable EV diffusion. The objective of the study presented in this paper is to analyse the acoustic impact of electric vehicles (EV) and to set up an overall framework for an effective management of their diffusion. After the objectives, EV overall characteristics are analysed. EV acoustic performance are then analysed. In the final discussion, the main characteristics of the required holistic approach are highlighted. This can benefit both researchers and practitioners.