



# FORUM ACUSTICUM EURONOISE 2025

## EUROPEAN PROJECTS FOR NOISE QUALITY IN FLORENCE

**First author** Arnaldo Melloni<sup>1</sup>

**Second author** Gessica Pecchioni<sup>1</sup>, **Third author** Raffaella Bellomini<sup>2</sup>

<sup>1</sup> Municipality of Florence

<sup>2</sup>Vie en.ro.se.Ingegneria srl, Florence Italy

### ABSTRACT

The city of Florence has promoted and participated in numerous European projects (LIFE and HORIZON 2020) on the topic of environmental noise in cities. Over the last 10 years, the topics of quiet areas, sound-absorbing asphalt, noise produced by tramways and roadside noise control methods have been addressed. The presentation will illustrate the main results obtained and the practical applications in urban areas.

**Keywords:** European projects, cities, environmental noise

### 1. INTRODUCTION

The municipality of Florence programs and plans activities for the control of environmental noise using the tools provided for by European directives: strategic noise map and action plan. The main activities are concentrated on the reorganization of city mobility, with the creation of a tram system spread throughout the urban area. The reorganization of private and public mobility is being developed around the tram system, favoring cycle and pedestrian mobility. The goal is to make the city more sustainable, reducing air and noise pollution. The European projects that the municipality of Florence uses to experiment with innovative and replicable activities in the field of sustainability fit into this general framework. Below are presented the results of some European projects on the topic of environmental noise containment and the positive effects on the territory of our city.

**\*Corresponding author:** first.author@email.ad.  
**Copyright:** ©2025 First author et al. This is an open-access article distributed under the terms of the Creative Commons Attribution 3.0 Unported License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

### 2. LIFE HUSH

The H.U.S.H. project moves from the evidence that harmonization of noise action planning methods is needed, not only in Italy but also in all the European countries where a former Legislation about noise planning was present at the moment of END Directive adoption. Among particular project's objectives, one is to define a new development system (procedures and database) for action planning, by testing it in two pilot cases, in the city of Florence. In each selected area a qualitative analysis phase besides a quantitative standard analysis phase is carried out, by means of surveys on sensitive areas, hotspots and quiet areas, as well as through inquiries about people's opinion regarding the disturb perception. In this paper methodological approach for the collection of non-acoustic data, procedures adopted for sample selection, methods for building up and analysis of questionnaires, in the frame of a participatory planning approach, are described. The results of non-acoustic surveys already carried out on a significant sample of people are reported. Expected outcomes are a collection of information that can be used to plan the actions and the community involvements.

### 3. LIFE QUADMAP

Quadmap Project has met the challenge of defining a methodology to select, analyse and manage Quiet Urban Areas (QUAs) which has been tested in 10 Pilot Areas located in Florence (6 schoolyards), Bilbao (a square and a green corridor) and Rotterdam (2 public parks). The methodology is thoroughly illustrated in the Guidelines which can be considered one of the Project's main final. The methodology proposed by the QUADMAP Project is based on a new definition of QUA. END definition: "quiet area in an agglomeration" shall mean an area, delimited by the competent authority, for instance, which is not exposed to a value of Lden or of another appropriate noise indicator greater than a certain value set by the Member State, from any noise source. QUADMAP definition: a QUA is an



11<sup>th</sup> Convention of the European Acoustics Association  
Málaga, Spain • 23<sup>rd</sup> – 26<sup>th</sup> June 2025 •





# FORUM ACUSTICUM EURONOISE 2025

urban area whose current or future use and function require a specific acoustic environment, which contributes to the well-being of the population. The QUADMAP project focused on the problem of noise in urban areas, not only considering the legal limits on noise pollution and taking into account that noise is one (and not the only one) of the sources of pollution that cause discomfort. The main objective of the QUADMAP project was to develop a harmonized methodology for the selection, evaluation (combining quantitative and qualitative parameters) and management (noise attenuation, increase in usability of the areas and user satisfaction) of the Areas Urbane Quiet (QUA), with the aim of overcoming the regulatory and procedural impasse. These objectives were achieved, leaving each responsible entity free to produce its own Action Plan, evaluating and addressing both territorial specificities and political priorities. The validated results of the project facilitated urban planners to apply standard procedures for the identification, delimitation and prioritization of QUAs. A significant part of the project was dedicated to the development and testing of methods for determining the relative weight of concomitant sources of discomfort, considering various factors and acoustic indicators. • Another important topic was the systematic use of soundscape analysis in qualitative acoustic analysis and in the general collection of stakeholders' opinions on the present and desired characteristics of the selected QUA.

## 4. LIFE E-VIA

Reduce noise on the streets of highly populated urban areas through the implementation of a mitigation measure aimed at optimizing road surfaces and electric vehicle tyres. Three road surfaces (and one test area), at least 5 different electric vehicles (including tires specially designed for electric vehicles) will be tested; The holistic soundscape approach will be used to evaluate the performance of EV vs ICEV in the new scenario (also qualitative evaluation). Awareness campaign: 20,000 people reached. The estimate was based on the experience of previous LIFE projects and on the various initiatives that are expected to be organized during the project. Noise level reduction: noise level reduction Lden and Lnight -5dB (A). The estimate of noise exposure is made taking as reference the side of the road of the receptors. 5 dB (A) reduction compared to the current situation. Improvement of the soundscape: acoustic perception and comfort of an

optimized asphalt compared to the standard one. The estimate of the improvement in perception will be verified based on the questionnaires that will be collected. Number of people benefited from noise reduction: 2000 people. The estimate is based on the evaluation of the number of residents in a buffer of 50 m from the road axis.

## 5. LIFE SNEAK

The general objective is to reduce noise from roads in densely populated urban areas, where noise and vibrations from trams and road traffic overlap, using low noise/vibration surfaces and retrofitting solutions with life cycle costs comparable to those of standard surfaces. The following solutions will be tested in the pilot area: Sound-absorbing asphalt, sound-absorbing panels, miniskirts and mixture of water and oil on the tram to reduce squeel noise when cornering. Furthermore, the psychoacoustic parameters will be evaluated to evaluate the annoyance of citizens before and after the interventions. A contribution will be made to Directive 996/2015/EC regarding the noise assessment method (CNOSSOS).

## 6. HORIZON NEMO PROJECT

NEMO aims to create a complete (and therefore replicable) solution through which new systems are integrated into existing infrastructures to empirically measure the emissions and noise emitted by individual vehicles. The new measurement systems, together with the implementation of new mitigation solutions, form a comprehensive and modular approach to improve air quality and reduce noise impact in EU cities. Thanks to standardization, the systems will represent a tool for applying limitations to polluting media in low-emission zones and other sensitive areas. The first dimension of the project includes a new and advanced autonomous remote sensing system that identifies noisy and polluting vehicles in existing traffic and makes this information available for possible tolling or access systems. The system can be fully integrated into the road/rail infrastructure and will have the tools to communicate with the existing data structure of both vehicle/train operators and road/rail authorities. The second dimension develops a holistic solution to mitigate noise and emissions from passing vehicles. This integral approach involves the optimization of road structures, green barriers, photocatalytic materials and



11<sup>th</sup> Convention of the European Acoustics Association  
Málaga, Spain • 23<sup>rd</sup> – 26<sup>th</sup> June 2025 •





# FORUM ACUSTICUM EURONOISE 2025

the collection of microplastics in the pores of the asphalt layer.

## 7. CONCLUSION

The description of the activities and results obtained thanks to the European project aims to provide an example of how the experimental and replicable activities carried out thanks to this funding can offer innovative and effective operational tools for the planning and programming activities of the Local societies. In particular, they can contribute to the drafting of Noise Mappings and Action Plans within which medium and long-term strategies for the containment of environmental noise are defined - even punctually.



11<sup>th</sup> Convention of the European Acoustics Association  
Málaga, Spain • 23<sup>rd</sup> – 26<sup>th</sup> June 2025 •

