REPORT

Replicability of MONZA project results

ACTION B6

Life MONZA

Methodologies fOr Noise low emission Zones introduction And management

LIFE15 ENV/IT/000586

LIFE MONZA
Methodologies fOr Noise low emission Zones introduction And management

Technical Report

Deliverable	Replicability of MONZA project results
Action/Sub-action	Action B6/Sub action B6.5 - Replicability of project results
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Status - date	Final Version, 30/06/2020

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Sommario

1. Introduction

This report highlights the elements for the replicability of the experience carried out in the Life MONZA project as well as the actions and regulatory tools that the competent authorities at the various involved territorial levels, both national and international, will have to issue in order to define the national standards for the definition, implementation and management of the Noise Low Emission Zones (*NLEZ*).
A key aspect that arises from the realization of the project is precisely the possibility of being replicated and implemented in the various national and international territorial contexts, following up and taking inspiration from the results obtained in the pilot area - the Libertà district (NLEZ).
The repeatability aspects of the project, linked to the structure, contents and results of the actions that make it robusts and allow, as mentioned, to extend the implementation of the Noise LEZs to the different levels following the guidelines provided by the Guidelines drawn up under action B.6.

2. The replicability of the project Life MONZA

2.1 Repeatability of the project in the Action Plans pursuant to Directive 2002/49/EC

Among the interventions carried in the project there are ones of an infrastructural nature relating to the low acoustic emission paving. Considering the significant and considerable reduction in the noise level obtained by the adoption of low-emission asphalts, VIENROSE will propose the same technical specifications and the same structure in the next series of Action Plans, related to Directive 2002/49/EC. In the last session of transmission of the Action Plans provided for by the aforementioned directive (year 2018), VIENROSE implemented several Action Plans for the main Italian agglomerations (Milan, Venice, Florence, Ravenna, Rimini, Forlì, etc.), the main managers of main roads (Provinces of Monza Brianza, Bologna, Lecco, Siena, Livorno, Florence, etc.) in which, when the timing allowed it (Plan proposed after the post operam measures of the Life Monza project), it has already been proposed the design and construction standards adopted within the project.

This action to promote the solution successfully adopted in the LIFE MONZA project will also be proposed in the assignments that will follow, in the next round of Action Plans scheduled for the year 2023.

In some cases, as in the Municipality of Inzago, the interventions have already been successfully replicated.

In addition, the solution linked to the introduction of the Noise LEZs will be proposed, again in the context of the drafting of the Action plans, among the interventions of acoustic restoration that can be carried out in contexts similar to those of the project (densely populated urban areas, with the presence of sensitive, well-identified and characterized at local level with main fast-flowing roads) both at national and European level.

2.2 Noise LEZ Guideline transposition

A very important aspect of replicability concerns the adoption of the criteria and standards developed within the Life MONZA project for the introduction of the Noise LEZs as a choice of policy for the sustainable development of urban areas. At this scope, it is essential that the results and products of the project, in particular the NLEZ Guidelines, are implemented at both national and European level so that they represent regulatory standards and provide homogeneous guidelines for the introduction of LEZ Noise in the urban area. For this purpose, ISPRA, as an institutional

body, will act as promoter for the transposition of NLEZ Guidelines at national and European level involving the competent Authorities (Ministry of the Environment and European Commission) and interested stakeholders (ANCI, EUROCITIES, POLIS, CIVITAS, etc.), proposing them as a National Standard to be included within the sector regulatory framework, with very significant consequent political impacts.

2.3 The low cost smart noise monitoring system

Among the basic elements that lead a project to its replicability there is certainly the structure of the project itself, intended as a combination of context analysis and innovation opportunities that produce new opportunities for improving environmental quality, public health and social relations. . Among the elements of technological innovation of the project, there is the smart noise monitoring system consisting of a low-cost sensor network built in the pilot area of the Libertà district (NLEZ). The smart sensor network, effective and competitive also from an economic point of view, can easily be applied in other similar urban contexts in Italy and Europe, starting from the sensor specifications defined for the MONZA project (Action B3) and from the experience gained on the field in particular by the partner UNIFI (action B6)

In the next years MONZA will evaluate the opportunity to use the network smart monitoring system in other districts of the city, starting from the Viale Marconi area, where the introduction of a Noise LEZ is planned for the updating action plan, as foreseen in the project. In particular, in the case of activation of a new LEZ, the noise monitoring could be carried out using new sensors purchased in reference to what is provided by the actions B3 and B6, or moving part of the sensors of the network currently installed in the Libertà district.

Documents will be released for the training of the staff of the Municipality of Monza who will take care of the management of the monitoring network and which, however, will be disclosed and shared to be usable by anyone who wants to replicate a similar *smart* monitoring system for assessing the acoustic climate of its municipal territory.

2.4 The replicability of the air quality monitoring system

Evaluating the effect of an NLEZ on air pollution levels is a tough task due to several confounding factors: weather conditions, regional background levels of pollutants, other concomitant air quality planning measures. To assess the impact of NLEZs, taking into account confounding factors, it is therefore necessary to remove the influence of non-local sources of traffic pollution. Meteorology has a great impact on the annual and daily variation of PM levels in the air and therefore a statistical adjustment is generally necessary to remove the seasonal distortions present in long-term analyzes.

A three-phase strategy was therefore implemented which aims to:

- evaluates the concentration levels of the main regulated air pollutants and some components of the particulate material (organic carbon, elemental carbon, black carbon) to characterize the NLEZ and compare it with the rest of the urban area
- Evaluate the spatial and seasonal variability of pollutants by estimating in particular, through the use of empirical models, the distribution on the microscale (i.e. in the territory delimited by the NLEZ) of some tracing pollutants of the emissions of internal combustion engines
- Evaluate, on the basis of the results comparison between the campaigns conducted before (ex ante) and after (ex post) the implementation of the NLEZ, any tangible effects, at local level, on air quality

This strategy, implemented through the integrated use of measurements in fixed sites and by means of a mobile laboratory, samplings spreads in the interested area with passive samplers and statistical

models to evaluate spatial variability and take into account the confounding factors due to the concomitant sources of emissions. and meteorology, it can be replicated in similar situations.
In any case, adequate monitoring and analysis tools must be available. In this case the methods are standardized and therefore easily replicable. The related know-how is normally available from the managers of the regional/local air quality networks.

Statistical applications need staff with adequate background. The software tools and application packages are well documented and available for free in the open source software r and python libraries.

2.5 Public involvement

Among the public involvement activities provided by the project, with the aim of promoting and stimulating more sustainable habits and lifestyles, there is the implementation of bottom-up interventions including the activation of the "Freedom Pedibus" service for school years 2018/2019/2020, i.e. a 'school bus on foot' service, a participatory action that promotes walking mobility on the journey from home to school. As an element of replicability, the school at the end of the year 2019 recognized the educational and social value of the action by including the Pedibus in the Three-Year Plan of the Educational Offer

In the Life MONZA project, in order to evaluate the effects of the actions envisaged by the project (infrastructure, organizational and awareness raising measures) on the local social system, studies were conducted aimed to understanding the perception of noise and quality of life by the inhabitants of the Libertà district and the surrounding areas. For this purpose, a diachronic sample survey was carried out, through two surveys (pre-test and post-test, ante operam and post operam) with separate samples, extracted from the population residing in the Noise LEZ, as well as a *qualitative survey* based on discursive interviews to qualified witnesses operating in the same territory. As regards the sample survey, the *pre-test* and *post-test questionnaires* (downloadable from the Life MONZA project website), used for data collection, were divided into two sections: the first, including questions regarding socio-personal data, housing, the perception of the quality of life in the neighborhood, air pollution and noise, health, mobility and knowledge of the MONZA project and its possible impacts on some aspects of the system local; the second section, consisting of a health and quality of life test with questions taken from the WHOQOL-Bref standard.

The adopted methodological scheme, combining qualitative and quantitative procedures, it was useful both for the analysis and evaluation of local social changes, and for the purpose of recording stimuli and indications from citizens to guide and refine the action of administrations in the areas subjected to intervention, and in this sense can represent a reference model for similar studies replicable in other similar urban areas.

2.6 Indicators as useful tools for the replicability of the project

In the final stage of the project, specific indicators were defined for the assessment of environmental impacts for the various sectors interested by the Life MONZA project. These indicators, collected in the C1.1 report, can constitute a bibliographical reference for multi-criteria impact assessments in which various environmental variables are at stake.

In particular, a global "GI" index is being defined based only on the indicators that proved to be more robust, chosen from those defined at the beginning of the project. In the composition of the GI index, the indicators relating to the "noise" component will be considered with a greater weight, given the primary objective of noise reduction of the interventions carried out in the Noise LEZ. In addition, a significant weight will be given to the component related to subjective perception, that

is, to the data acquired through the quality of life questionnaire. Finally, as environmental control indicators, the indicators relating to air quality will be considered, although with a lower weight.

In addition, a simplified "SGI" index is being defined, considered useful for long-term monitoring, which will be based on the "noise" component only and will be determined with reference to the data acquired by the low-cost sensor network.

The proposed indicators are structured in such a way that they can be used for the *ex-ante* and *ex-post* evaluation of the interventions implemented in eventual brand new Noise LEZs.

2.7 Update of the Life MONZA website

In order to keep the public information updated on the Noise LEZs diffusion at national and European level, as well as whenever the methodology and technical specifications used in Life MONZA will be replicated in other territorial contexts, the website of the Life MONZA project (http://www.lifemonza.eu) will be updated accordingly and the materials produced that will remain at disposal and downloadable for 5 years from the end of the project.