

Re

Silence

S+T+ARTS

**S+T+ARTS residencies
Retune the Soundscape of future cities
through art and science collaboration**

**RESILIENCE
POLICY
BRIEF**

S+T+ARTS



Beyond Decibels: Towards Sonic Urbanism

Policy Brief • ReSilence Consortium • 2025



PARTNERS

9



EUROPEAN CITIES

6



PROGRAMME

DURATION

2022–2025

INTRODUCTION

ReSilence is a European S+T+ARTS research and innovation project that explores urban challenges through art-driven experimentation, foregrounding sound as a way of understanding and reimagining the city. The project is grounded in scientific research, experiential listening, and participatory processes, brought together in a shared and evolving framework that connects artistic research and technological innovation. This framework resulted in the ReSilence Toolkit, comprising 20 artistic, methodological, and technological tools.

The toolkit was developed through 15 art–technology projects carried out as artistic residencies, which engaged with diverse urban sound contexts such as participatory musical practices, sound and mobility, urban soundscapes, and multisensory approaches. Through these residencies, artists and researchers explored key relationships—such as sound–body, sound–architecture, and sound–environment—and imagine future cities as interconnected sound ecosystems. This policy brief synthesises empirical findings, methodological insights, and stakeholder feedback from ReSilence residencies and demonstrations. It translates them into targeted policy recommendations for European, national, and municipal decision-makers.

HIGHLIGHTS

- 1 Urban sound policy must evolve beyond decibel limits to include soundscape quality.
- 2 ReSilence artistic–scientific experiments show how mobility, architecture, neurodiversity, and creative methods can inform next-generation sound policy.
- 3 Emerging research shows that the question is no longer "How loud is the city?" but **"How do we listen the city?"**
- 4 National and EU actors can strengthen this transition through frameworks for noise, mobility, accessibility, and cultural participation.

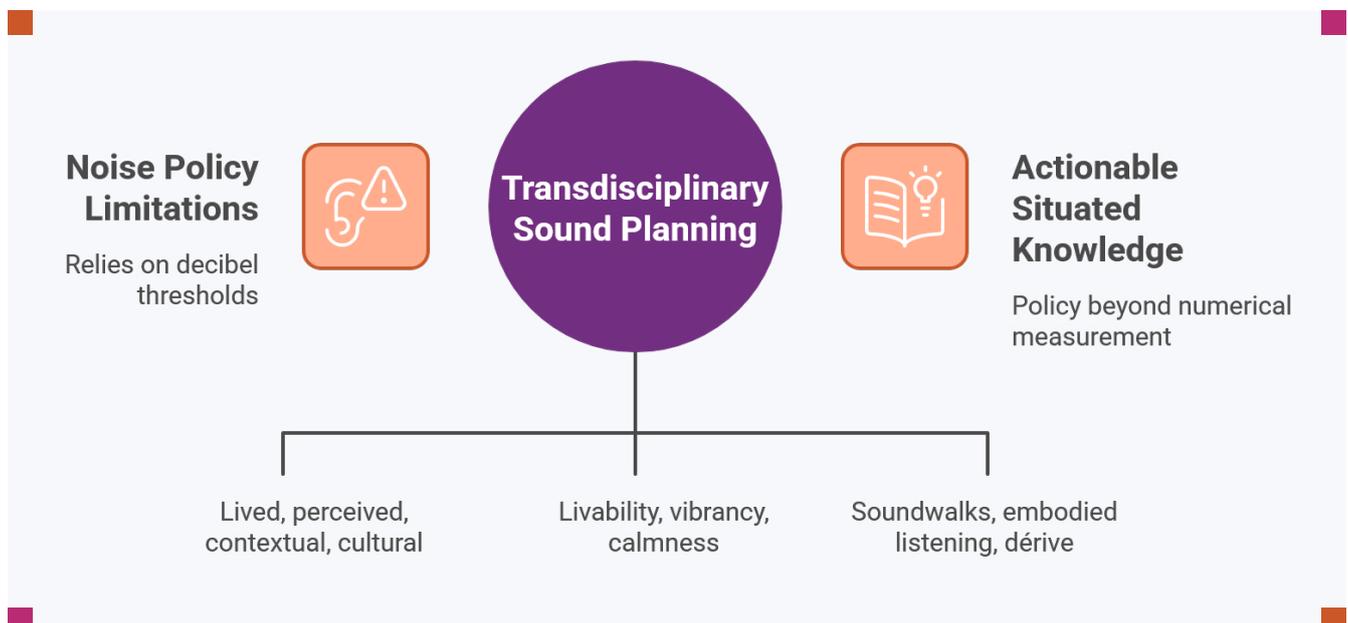
Why Urban Sound Policy Must Evolve

Current noise regulation and sound planning are shaped by a strong geographic and cultural bias in how sound environments are understood, largely reflecting research traditions and standards developed in a limited set of contexts. European cities now face increasing pressures related to population density, mobility transitions, climate adaptation, and public health, with noise remaining one of the most persistent urban stressors. Yet policy responses continue to rely primarily on decibel-based thresholds, as codified in Directive 2002/49/EC on environmental noise.

However, noise levels alone do not explain why certain urban spaces feel hostile while others feel restorative. Emerging research and practice emphasise that the acoustic environment must be understood as lived, perceived, contextual, and cultural, rather than solely as a physical quantity. In response, urban planning is increasingly moving toward transdisciplinary sound planning and community knowledge.

Evidence shows that perceived intrusiveness depends on timbre, rhythm, texture, and meaning, not only on loudness. People evaluate sound environments through perceptual and affective qualities such as pleasantness, coherence, vibrancy, or calmness, which can remain positive even at moderate or relatively high sound levels. This shifts attention from assessing "how loud" a place is toward understanding how it feels to listen there, recognising that acoustic comfort and quality are socially and culturally embedded.

Within this context, creative and participatory methodologies—including soundwalks, embodied listening, participatory mapping, and prototyping—offer insights that extend beyond numerical measurement. These approaches reveal behavioural, emotional, and social dynamics that decibel metrics cannot capture, generating situated and actionable knowledge capable of informing more inclusive, flexible, and context-sensitive sound policies.



Key Gaps in Current Sound Policy

1

Noise policy focuses almost exclusively on sound pressure level (dB)

Current EU and municipal noise regulations rely on loudness-based metrics (dB, LAeq), ignoring timbral factors (roughness, sharpness, spectral centroid) that strongly affect perceived intrusiveness.

2

Weak integration of mobility planning and soundscape policy

Mobility decisions shape acoustic environments, yet mobility and soundscape policies are rarely coordinated.

3

Lack of acoustic policies addressing sensory diversity and neurodivergent needs

Regulations assume a uniform listener and overlook sensory hypersensitivity and non-linear auditory processing.

4

Urban planning lacks tools for analysing affective or experiential sonic quality

Planning instruments do not capture how densification, mobility, and land-use changes alter the affective experience of the city.

5

Lack of flexible, collaborative, and culturally grounded sound planning frameworks

Participatory and artistic methods remain underused, cross-sector collaboration is weak, and uniform standards (shaped by strong geographic and cultural bias) restrict local flexibility in how sound environments are understood and regulated.

"Sound planning should leave space for flexibility and creativity."

Tarlao et al., 2024



POLICY RECOMMENDATION

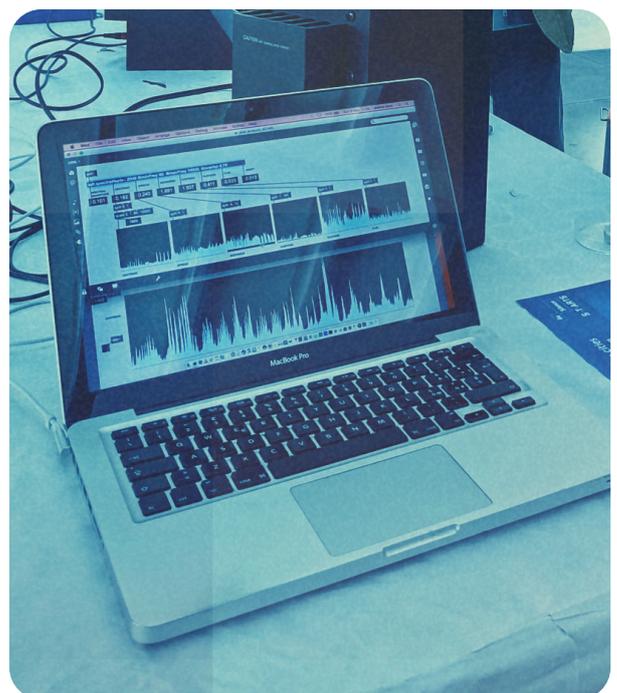
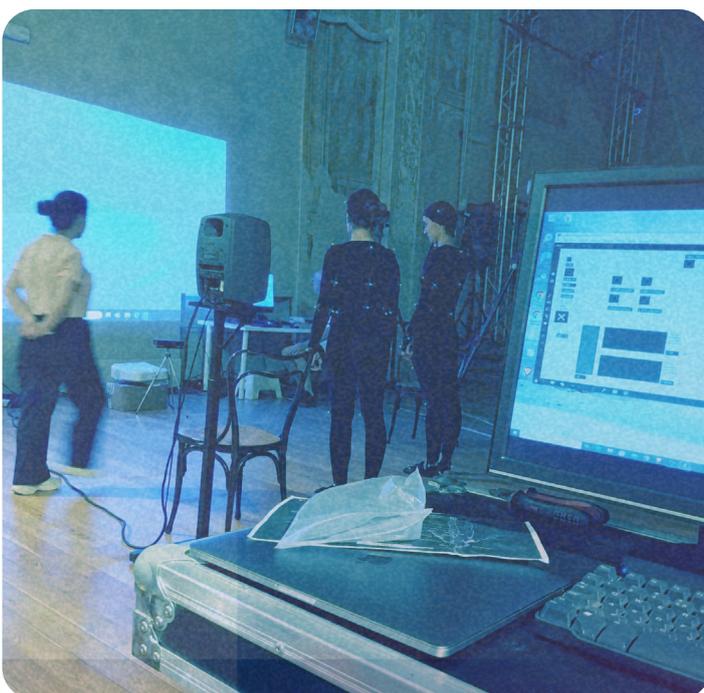
The European Commission should revise the Environmental Noise Directive to incorporate psychoacoustic and timbral descriptors—such as roughness, sharpness, and spectral centroid—into official acoustic assessment methods, ensuring that municipalities evaluate not only loudness but also perceived intrusiveness. To support this transition, the EU should establish a dedicated research funding line for developing human-centric acoustic metrics and provide technical standards through CEN/CENELEC for designing low-salience acoustic alerts and adaptive sound environments.



EVIDENCE

Noise impact depends on timbre, not only loudness

The ReSilent / Moving Soundscapes project shows that perceived intrusiveness is strongly shaped by timbral factors—roughness, sharpness, spectral centroid—rather than decibel levels. Participants identified certain spectrally unbalanced sounds as disturbing even at equal volume.





POLICY RECOMMENDATION

Member States should integrate soundscape criteria into Sustainable Urban Mobility Plans and coordinate mobility and acoustic planning. The European Commission should update AVAS regulations to enable context-adaptive, nature-inspired sound cues for electric vehicles—adjusting to speed, proximity, and environment to reduce stress while ensuring safety. Cities should also establish cross-department protocols linking transport, acoustic experts, and public health authorities to co-design mobility soundscapes.



EVIDENCE

Mobility soundscapes influence comfort and culture

The B:N:S biomimetic sound network demonstrates that harmonically structured soundscapes produce more positive emotional responses than chaotic or congested ones. In VR testing, "Symbiosis" soundscapes were consistently rated more pleasant than "City" or "Pollution" conditions. The D.RIVE prototype shows that adaptive EV sound cues can be treated as shared cultural resource.





POLICY RECOMMENDATION

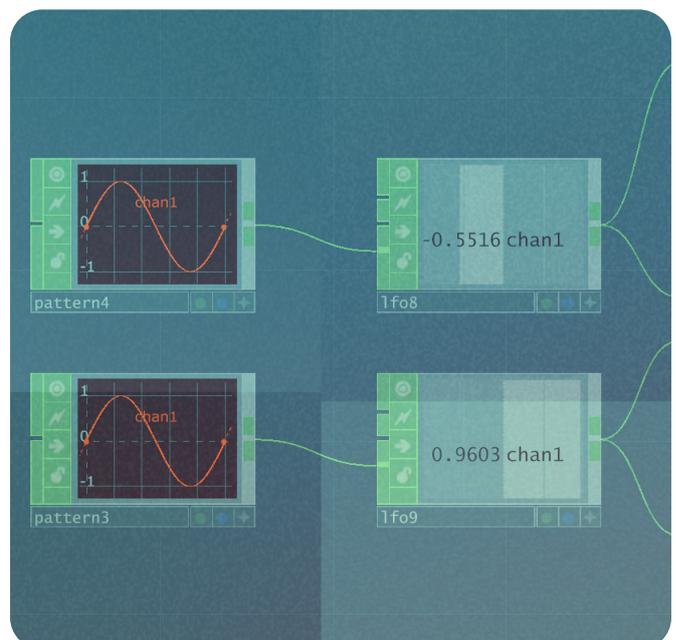
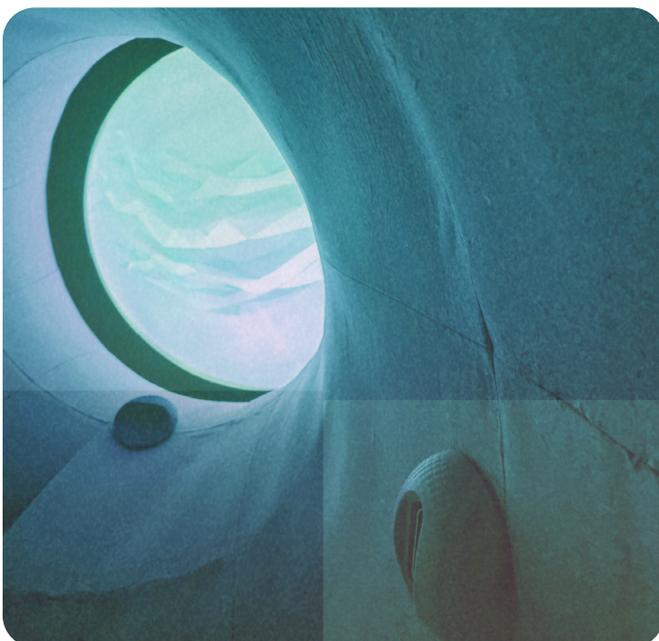
National and municipal governments should embed sensory-friendly and neurodiversity-inclusive design across public spaces and services, including sensory-friendly hours, sensory indicators, noise-reducing materials, and predictable sound environments, to reduce sensory overload and support equal participation. The EU should establish a Design for Neurodiversity Framework co-developed with neurodivergent communities, while funding research on adaptive, sensor-based environments that support self-regulation for autistic and hypersensitive individuals.



EVIDENCE

Sensory diversity and neurodivergent needs demand explicit attention

The ECHOES project highlights that neurodivergent listeners experience overload in fluctuating, high-frequency, or unpredictable environments. Sensory mapping and embodied listening sessions reveal how these soundscapes hinder participation in public life. Movement-analysis tools from UNIGE (PyEyesWeb) show that expressive motion changes under sonic overstimulation.





POLICY RECOMMENDATION

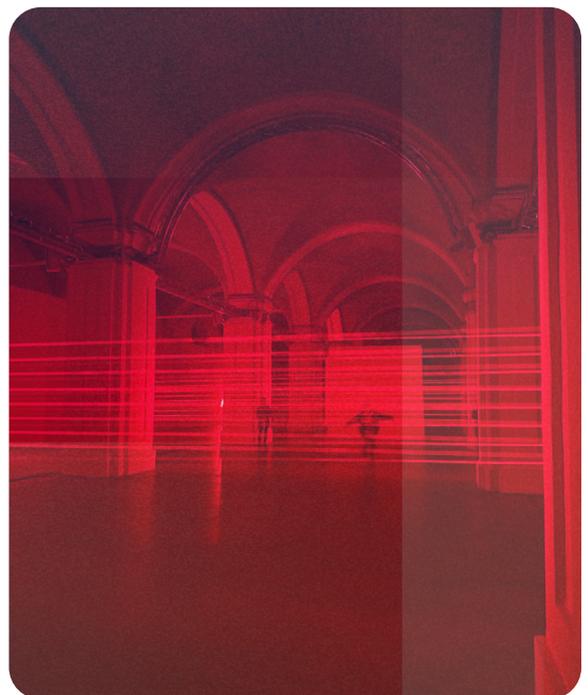
Cities and regions should develop an Urban Sound Experience Toolkit that, following the ReSilience approach, supports municipalities in assessing affective and experiential sound qualities through pluralistic, non-extractive methods. This framework should complement traditional noise mapping with context-sensitive indicators of comfort, livability, and social interaction. To support its implementation, Horizon Europe should fund research on multimodal approaches to assessing sound-related experience.



EVIDENCE

Urban planning requires new indicators for sonic experience

Sonic Drift demonstrates that neighbourhoods undergo experiential "Sonic Space Shifts" that influence comfort, attention, and social behaviour but remain invisible in traditional noise maps. The Coloropera project shows how sound perception is deeply shaped by personal history, emotional memory, and cultural context through interviews with war-affected Ukrainians.





POLICY RECOMMENDATION

National governments should establish Local Sound Governance Hubs that bring together planners, artists, technologists, scientists, and communities to collaboratively design urban sound policies. Municipal planning procedures should include structured participatory listening practices and the EU should promote art-driven practices, following the S+T+ARTS model, for fostering citizen engagement in urban planning.



EVIDENCE

Collaborative and culturally grounded methods strengthen sound governance

ReSilence shows that artistic and community-based methods uncovered aspects of the soundscape that citizens had not previously noticed or understood, providing new perspectives on how sound shapes daily life. Feedback from participants engaging with the S+T+ARTS ReSilence residency outcomes indicates that these experiences "changed how I listen to and interact with my urban environment." Sonic Urbanism Framework and Toolkit translates these research findings into actionable templates, workflows, and assessment frameworks. It may support cities and regions in applying experiential, inclusive, and context-sensitive sound policies.



Research methodology

Evidence was gathered through VR experiments (MPIEA, MU), sensory workshops (Moving Soundscapes, ECHOES), expressive movement analysis (UNIGE), dérives (Sonic Drift, CERTH), participatory sound installations (Invisible Choir), and algorithmic prototyping (B:N:S, D.RIVE), providing robust triangulation across disciplines.

References & Contacts

A total of 28 references, including EU policy and legislative instruments, international ISO standards, technical guidelines and deliverables, peer-reviewed academic publications, online tools, and three European research and innovation projects (Sound-Frameworks, SONORUS, and SONINURB), were reviewed.

The corpus addresses urban soundscapes, noise regulation, sustainable mobility, and sound-aware urban planning, combining regulatory perspectives (e.g. SUMP and AVAS), methodological approaches (soundscaping, quiet areas, noise mapping), and participatory and research-driven practices.

Overall, the corpus frames sound planning not as a fixed regulatory exercise, but as a flexible and creative process that allows adaptation, experimentation, and contextual sensitivity in urban environments.

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