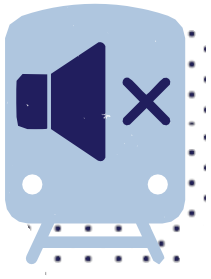
PROCHAIN ARRÊT

THE PROSPECTIVE SERIES BY KEOLIS



A streetcar named silence

Transport noise, a pollution long ignored

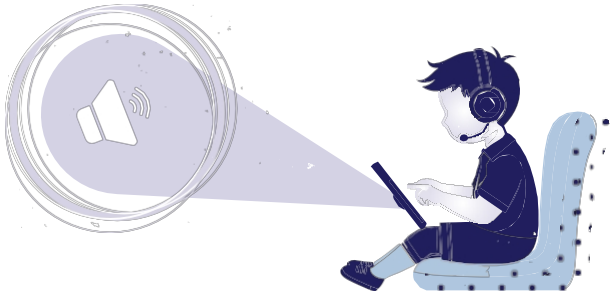
In 2017, according to the European Environment Agency, nearly 100 million Europeans were exposed to noise levels exceeding 55 dB, the threshold at which the WHO considers noise to be a health risk. In France, road noise was the number one environmental nuisance perceived by residents, ahead of air pollution and waste. Nearly 7 million French people live in so-called "acoustically saturated" zones, mainly located along major roads, around airports and railway stations.

In major cities such as Bordeaux, Paris and Lyon, average noise levels often exceeded 70 dB at peak times, with peaks of up to 85 dB - equivalent to the noise of an industrial vacuum cleaner or a metro tunnel - particularly around major junctions, streetcars making tight turns or articulated buses accelerating. This noise level was not exceptional, but daily, constant, perceived as the price to pay for mobility.

Yet, noise has a cost. In 2016, the French National Noise Council estimated the social cost of noise in France at 57 billion euros a year, over 80% of which was attributable to transport. Among the effects identified were loss of quality of life, sleep disorders, hypertension, cognitive disorders in children and an increase in cardiovascular risk. Prolonged exposure to a noise level of 60 dB increases the risk of sleep disorders by 10%; at 70 dB, the risk of hypertension rises to +15%.

Yet for a long time, transport noise pollution was not considered a priority for public action.
There was no obligation to progressively reduce noise levels, as is the case for CO_2 emissions. Noise was a tolerated externality, often deemed unavoidable. It was even part of the imaginary of the modern city: engines, sirens, screeching, audible announcements - a soundtrack to urban life.

It's also a question of social justice: working-class neighborhoods are often the most exposed, with poorly insulated housing and noisy infrastructures nearby. Silence thus becomes a marker of inequality. Where residents can't escape or protect themselves from noise, it becomes a daily burden, invisible but noxious.



The story

April 7, 2044. Leo, aged 12, is running to his private classroom, where his virtual teacher is waiting for him for his half-hour contemporary history lesson. Longer classes were abolished in the 40s to accommodate students' attention spans. Today's topic is entitled*: "Silent transitions".*

His interface offered him a documentary immersion. He accepts. The image opens on an on-board camera in an old diesel bus driving up a narrow road in Bordeaux. The engine coughs and whirs, a horn sounds, the brakes screech on the asphalt. The background sound is dense, stifling, almost oppressive. A voice-over comments: "In 2017, road noise was the number one environmental nuisance perceived by the French. In major cities like Bordeaux, average noise levels exceeded 70 decibels. An invisible standard, integrated, suffered, rarely questioned."

Leo frowns. He's not sure he understands. The educational avatar is immediately activated, with Benevolence: "70 decibels is about the sound level of a dog barking. If it's a continuous noise, it's loud enough to cause stress, fatigue or sleep disturbance. At 80 decibels, we enter the risk zone. Road traffic sometimes reached 85 dB during rush hour.

A sound collage features the passage of a regional train over the Eiffel bridge, the screeching of a tramway and the braking on Stalingrad Square and an articulated bus accelerating on the embankment. Leo grimaces. The AI takes over the lesson. "Before 2030, almost all transport was noisy. Combustion engines, iron-railcontact, air-conditioning compressors, repetitive audible announcements... Noise was a kind of by-product of mobility. And since we moved around a lot, it was constant."

The screen shows archive images of a pedestrianization project in the center of Bordeaux around 2020. Work around Gambetta Square : Cables, rails, concrete. The commentary states: "We were closing certain roads, we electrified a bus line, but the streetcars were still noisy: squealing, vibrations, noisy junctions... They launched a massive electrification plan. By 2030, Bordeaux has joined the national Silent Mobility Plan. No more internal combustion engines in the city centre. Then came the infrastructure: sanded rails, magnetic braking, auditory directional signage, absorbent coatings. Noise has become a parameter to be optimized, like CO_2 before it. Prolonged exposure to more than 55 db means a 10% greater risk of hypertension or sleep disorders. Seven million French people live in "acoustically saturated" areas.

Leo cuts the video and looks at his virtual teacher at the bottom right of the screen:

— "But why did it take them so long to realize it?"

— "Because they thought noise was part of progress. It meant life, activity, modernity. It was even, at times, a reassuring noise... Until a contrast emerged."

— "What contrast?"

— "The first electrified districts were a surprise. That's when residents first heard... Silence. Their footsteps on the cobblestones. A bird. A conversation. For example, they were much more bothered by the noise of their neighbors, all the little noises you couldn't hear because of the traffic. They targeted at residual noise: air conditioners, heat pumps, noisy signs, excessively rough pavements. Noise has become a marker of inequality. And we fought it as such. It all started with transport. By eliminating engine noise, Bordeaux was transformed. As Leo struggles to concentrate, the virtual teacher decides to put an end to the noise and end class earlier. With the screen barely turned off, Leo dashed outside. He walked aimlessly along the slender buildings of the old Docks. Once an area of industrial transition, today a model of fluid urbanity, crisscrossed by airy alleys, resilient flooring and suspended transport modules that glided along without a sound.

On the embankment, he paused to observe the passage of a new-generation tramway, suspended from a discreet monorail, skimming the treetops. All that emanated was a faint murmur, an almost vegetal movement of air. All around him, not a sound of engine as in the documentary he had visualized. Continuing on his way, Léo crossed a small linear park. In the shade of the mulberry trees, children were playing without raising their voices. The atmosphere was so peaceful that one might have thought it was a frozen scene, yet everything was in motion: balls were bouncing, bicycles were passing by, autonomous delivery modules were moving along the nearby resilient lanes.

Leo walked down towards Stalingrad Square. He remembered what he'd seen in the documentary: a congested crossroads, jammed with horns and impatience. On this day, nothing like that. The square was almost meditative. The flow of pedestrians, cyclists and slow-moving vehicles formed some kind of silent choreography.

He thought about what the professor had said: the noise had been an inequality. It was strange to conceive, but it was becoming obvious. Working-class neighborhoods, main roads and railways had been the most exposed. Where people didn't have the means to isolate themselves, they suffered. At first, silence had been a privilege. Now it had become a right.

Leo headed back towards the narrow alleys of the old city. There too, the transformations were profound. Micro-filtering lanes replaced the old streets, and mobility flows adapted to pedestrian traffic. Noise-absorbing glazing was no longer needed. Facades were open, windows large, terraces full, with no barrier between inside and outside. Noise was no longer a boundary.

The scenarios

BEST CASE SCENARIO

A calmer city, regulated noise

By 2044, France has fully integrated noise into its public policies. All major urban areas have Local Noise Environment Plans, based on WHO standards. Silent mobility has become widespread: all combustion-powered vehicles have been banned from urban centers, and public transport uses low-noise technologies. technologies, and urban planning incorporates sound-absorbing materials. Noise is no longer a nuisance, but a variable to be controlled.

Sound sensors adjust the frequency of voice announcements, streetcar bells and warning devices in real time. Infrastructures have been redesigned, with silent rails, sonorous asphalt and vibrating pedestrian lights. Result: in most neighborhoods, the average noise environment has fallen below 50 dB. This new-found silence has become a marker of urban well-being and even a criterion of residential attractiveness. Noise has become a public health issue treated with the same rigor as air pollution twenty years earlier.

MODERATE SCENARIO

Partial progress, noise inequalities

In this scenario, technological and regulatory advances exist, but are applied unevenly. Wealthy city centers benefit from new-generation streetcar networks, absorbent pavements and fleets of silent electric buses. On the other hand, outlying neighborhoods and suburban areas are still subject to major nuisances: thermal buses at the end of their life cycle, degraded roadways, lack of acoustic treatment of infrastructures. Noise is becoming a brutal indicator ofsocial and territorial inequalities. Telecommuting has only accentuated this divide: those who remain exposed to noise are also those who have the fewest levers to protect themselves. Litigation is emerging around the right to silence, with some residents demanding compensation for excessive noise exposure. Noise is better documented and better understood, but all too often it is suffered by the most vulnerable.

WORST CASE SCENARIO

The great din

Here, the noise transition has failed. After a decade of accelerated energy transition, efforts have focused exclusively on CO_2 emissions, relegating noise to the background. The massive development of new autonomous mobilities (capsules, delivery drones, robotized urban logistics) has produced an unexpected abundance of sound. Vehicles drive alone, but their horns, engines and voice interfaces create a permanent cacophony. The hyper-centralization of flows around logistics and trade hubs amplifies the phenomenon. In densely populated areas, noise levels often exceed 75 dB. In the absence of binding regulations, operators compete with marketing sounds and personalized sound signals. Residents, overexposed, suffer in silence: sleep disorders, chronic fatigue, sensory burn-out. In any case, almost all citizens wear earpieces or active noise-reduction headphones. The noise environment is becoming anxiety-inducing and cities are losing their quality of life.