# Smart cities and urban environmental monitoring: the sustainable future starts from Borgo 4.0



## The Borgo 4.0 project: innovation at the service of the territory

In the context of the digital transformation of Italian cities, the **Borgo 4.0** project represents a virtuous example of integration between technology, sustainability and quality of urban life. It is an advanced technological platform promoted by **ANFIA Automotive**, created in partnership with **53 companies**, **3 public research centers**, **5 Campania universities** and the **CNR**, involving approximately 200 researchers. The experimentation takes place in the municipality of **Lioni (AV)**, where urban and extra-urban infrastructures have been transformed into open-air laboratories for intelligent mobility. The **Campania Region** supports the project with **funds POR Campania FESR 2014–2020** and the **Development and Cohesion Plan**.

**Alfano Luce S.r.l** is among the six beneficiary companies directly involved in the experimentation of the **C-Mobility sub-project**, in partnership with companies such as STMicroelectronics, NetCom Group, Innovery, IVM and CeRICT. In this context, Alfano Luce is involved in the **development and testing of smart light poles**, equipped with traffic sensors, weather sensors and adaptive lighting systems, essential for smart roads.

At the same time, **LSI LASTEM** contributes to the project as a **specialized supplier**, offering an **advanced range of ALL-IN-ONE sensors** for measuring wind speed and direction, pressure, temperature, relative humidity and **particulate concentration sensors**, in addition to the Alpha-Log data logger. These technologies represent a fundamental component for integrating urban environmental monitoring within a smart and interconnected ecosystem.

## Why monitor the urban environment? Motivations and objectives

The growing impact of air pollution, combined with climate change, has pushed institutions and companies to promote smart solutions to improve urban liveability. In this context, **monitoring environmental parameters** such as **air quality**, **wind speed**, **humidity**, **temperature** and **particulate matter concentration** becomes essential to prevent public health risks, optimize energy management and support urban planning decisions based on real data.

## Cutting-edge technology: smart sensors for smart cities

For the Borgo 4.0 project, Alfano Luce installed **smart light poles** equipped with traffic sensors that can **adjust** the **light flow** in real time based on the presence of vehicles or pedestrians. A solution that reduces **energy consumption** and **improves urban sustainability**.

But smart lighting is not enough; it is also necessary to **know the surrounding environment**. For this reason, Alfano Luce involved LSI LASTEM, a supplier of cutting-edge tools for **environmental monitoring**. The lamp posts were therefore equipped with **ALL-IN-ONE sensors** – for the detection of temperature, relative humidity, atmospheric pressure, wind speed and direction with ultrasonic sensors – and with **particulate matter concentration sensors** (PM10, PM2.5). All data is acquired and processed via the **Alpha-Log datalogger**, installed in the electrical panel of the public administration.

## Environmental data: collection, analysis and use

The heart of the project is the **collection and analysis of environmental data** in real time. Thanks to the integration of LSI LASTEM sensors, the data is transmitted directly to the **control room of the Municipal Police**, which can constantly monitor the state of the environment and intervene promptly in case of critical situations, such as floods or pollution peaks. Furthermore, the data is also accessible to the Municipality and Research Institutes for assessments on **agriculture**, **crops** and **biodiversity** in an area with a high green vocation.

## Concrete benefits for citizens

**Urban environmental monitoring** has a direct impact on the **well-being of the population**. Knowing weather conditions and pollution levels in advance allows for **preventive measures, improving public health and reducing emergency management costs**. Citizens also benefit from a safer, more efficient and sustainable environment, where lighting is adaptive, mobility is connected and decisions are driven by real-time data.

## Smart cities and smart roads: an interconnected evolution

The project fully aligns with the vision of **smart cities** and **smart roads**, in which infrastructures and vehicles communicate with each other in real time. The combination of **intelligent mobility**, **energy saving** and **environmental monitoring technologies** makes Borgo 4.0 a pilot project that can be replicated in other Italian and European urban areas.

## Future vision: towards a smart and sustainable urban network

The official inauguration of the project took place in November 2024 and **Borgo 4.0 is still in the experimental phase**. The next few years will be crucial to test the implemented technologies, optimize the data collection and use systems, and measure the impact of the project on the quality of life of citizens. In a context in which global **attention** towards **smart cities and environmental monitoring** is growing, initiatives like this represent a concrete step towards a more sustainable, resilient and collectively well-being-cantered urban future.