

# Smart Sensing System for Water Service and Urban Mobility

## DETAILS

**SECTOR** | Transport, Water

**STAGE** | Operations and Maintenance

**TECHNOLOGIES** | 5G, Internet of Things, Blockchain, Artificial Intelligence

## SUMMARY

Sometimes, public goods and services can experience mismanagement issues deriving from imperfect information, coordination problems and market failures. Considering public transport inefficiencies possibly faced by public authorities may include sub-optimal supply, inadequacy, high infrastructure maintenance costs, longer commuting, environmental impacts and energy consumption. Similarly, the water service sector needs to deal with billing accuracy, data access and security, over-consumption, lack of quality.

This use case aims at creating a distributed, secure, reliable and smart sensing system in urban and suburban areas capable of collecting information and data to be shared with local governments and public authorities to improve management, quality and provision of public services.

The monitoring system can be applied to different sectors. One is tested to mobility, where sensing devices are placed in specific areas of the city and suburbs, as well as public transports, to collect information on flows of people in certain situations and events (e.g. when disembarking tourists from ships, city festivals, events). The purpose is to determine environmental features starting from the analysis of images and sounds captured in the surrounding environment. Another system is tested for managing and planning of urban water service, to allow both citizen and public providers to precisely monitoring consumption and quality. Detecting devices systems and smart metering are installed in private houses' drainpipes to gather information.

The following technologies are required for this use case: IoT (Internet of Things) for the development of applications needed for the realization of the project; Blockchain, to ensure a secure and decentralized system for the exchange and storage of data; AI (artificial intelligence) for data analytics; finally, everything is implemented through the 5G technology network.

Considering all the above, developing advanced, replicable and efficiency-driven monitoring systems could provide useful tools for both public authorities and private companies to increase efficiency in service management and planning, energy consumption and quality of both public goods and resources. Moreover, the use case represents a significant testing ground to implement new smart city solutions improving environmental sustainability and citizens quality of life.

In January 2020 SIP won approval to receive public funding from the Italian Ministry of Economic Development following a public invitation to tender. The use case testing and implementation has recently started in a pilot city.

***This use case is a contribution from the Government of Italy, with some adaptations from the Global Infrastructure Hub.***

## VALUE CREATED

Improving efficiency and reducing costs:

- Increase public sector planning and management abilities in both public services and utilities provision
- Reduced costs resulting from water wastage by precisely monitoring resource consumption and needs
- Improved and well-managed urban mobility
- No need of additional capital expenditure as sensing systems can be applied to existing infrastructure

Enhancing economic, social and environmental value:

- Improved quality of public water supply in houses and buildings
- Reduced emissions by better planning and managing of urban traffic, increasing sustainability
- Optimization of people's flows in specific situations and events, reducing crowdedness and improving safety
- Creation of replicable and scalable sensing system that can be applicable to other contexts and sectors

## POLICY TOOLS AND LEVERS

**Legislation and Regulation:** the installation of sensing systems in public spaces requires municipal authorities to be willing to take an active role in providing permissions and allowing access to supporting local equipment (sites, antennas) needed. Also, private Telcos should be willing to provide access to their broadband services.

A more flexible approach on sharing of data will be required in order to foster the replicability of the new developed model in other contexts and sectors.

**Contract management:** sensing systems in private housing might require residents' permission by establishing contracts or private agreements. In this sense, also an effective communication and/or public incentives might be also useful to encourage uptake.

## IMPLEMENTATION

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<b>Cost</b>	The use case received an initial total amount of approximately 1 million euros to start testing and implementation. However, the project is still at an early stage at need to be fully tested to evaluate full scalability and replicability at a larger scale and assess specific additional costs.
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## RISKS AND MITIGATIONS

**Technological maturity:** sensors and related technologies needed for data analysis already exist. However, 5G technology is still under testing in many areas and countries.

**Cybersecurity:** sensing systems are at risk of cyberattacks resulting in increased infrastructure vulnerability.

**User Acceptance:** there is a need to prove collected data, especially in private houses, won't be used beyond this specific use case. Communication with the public about the service and its role for the community can be an effective way of capturing user expectations and encouraging uptake.

## EXAMPLE

### ["Smart, Secure, Reliable and Distributed Monitoring through 5G"](#) – University of Cagliari

The project was developed by the University of Cagliari in collaboration with the Italian Telcos Linkem and Tiscali, together with the National Institute of Nuclear Physics and two Italian innovative SMEs (GreenShare and FossaLab). The idea has received public funding from the Ministry of Economic Development following a public invitation to tender. It is currently being firstly implemented and tested in the urban and suburban areas of the city of Cagliari (Sardegna).

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