SMARTCITY EXPO WORLD CONGRESS

7 - 9 NOV 2023
BARCELONA & ONLINE

Agenzia per la Coesione Territoriale

UNIONE EUROPEA
Fondi Strutturali e di Investimento Europei

Cagliari Connect:
The intelligent platform at city service

SmartCity Expo World Congress| Barcelona 7-9 nov 2023

Cagliari

Scenario

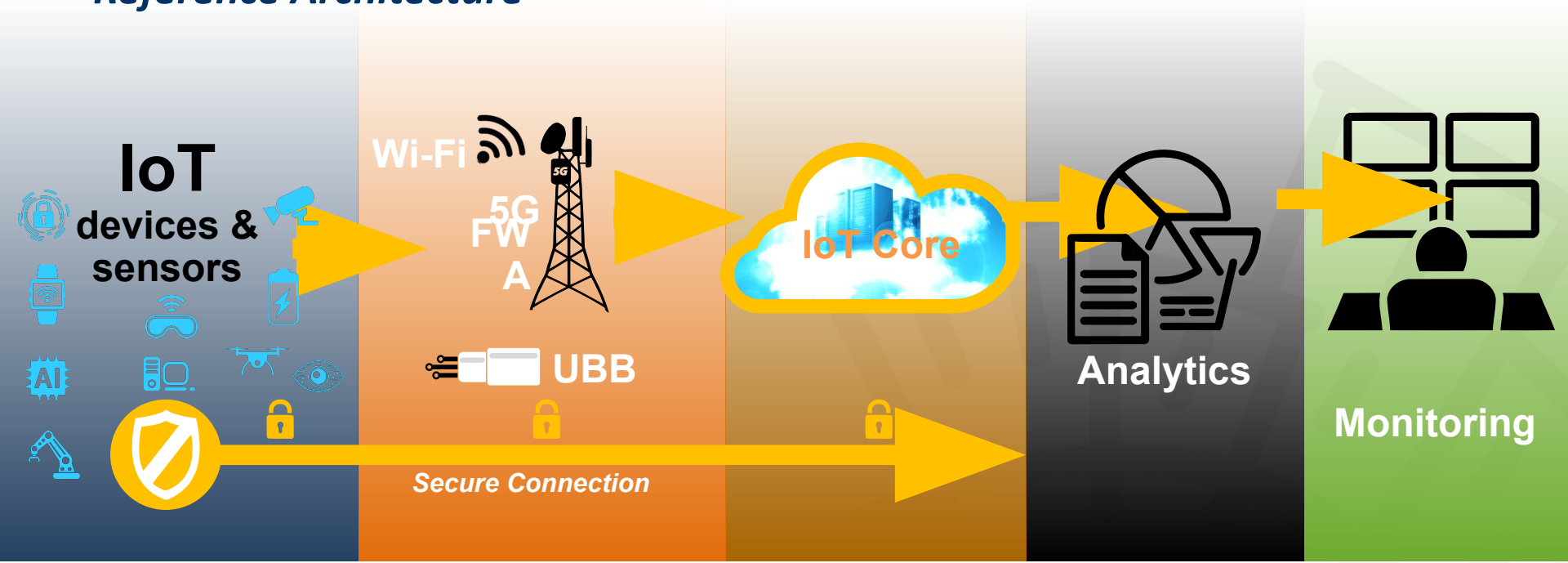
The evolution of smart cities is constantly developing.

Climate change and environmental sustainability are at the center of global attention.

The growing environmental concerns and the demand for a sustainable and efficient use of energy, as well as need to reduce polluting emission, are leading a change in Public Entities and Companies mentality and approach

Cagliari Administration with the support of Fastweb has identified the following interventions:

Reference Architecture



The components of the project

The human

The (*intelligent*) Application Layer

The Big Data & IoT Infrastructure

The Networking Architecture

Implementation of a dedicated **Fiber MPLS VPN backhaul** for data transport

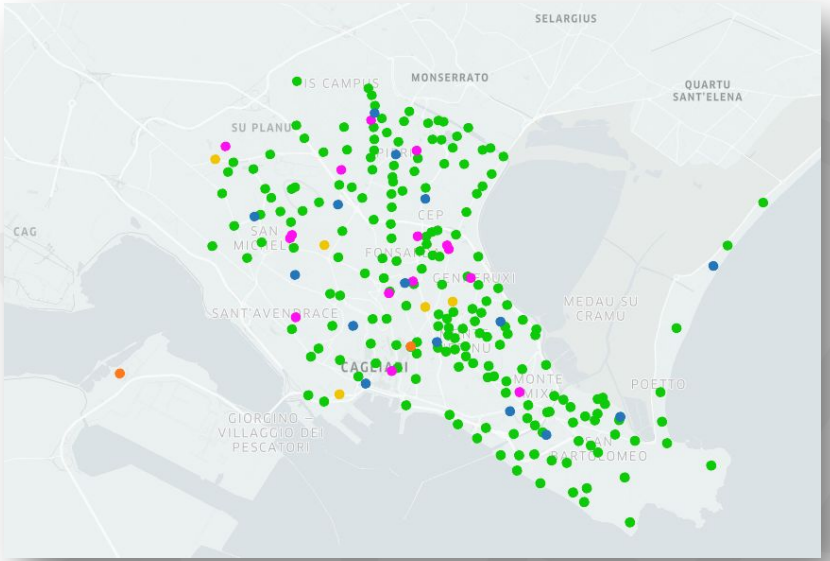
The LoRaWAN infrastructure

Approx. 200 base sensors active on lighting poles:

- Green: Basic sensor (sensors with physiological abnormalities)
- Celeste: GW + VDS
- Purple: VDS only
- Orange: People Counter

15 active advanced sensors (at GW)

15 Active Gateways (Bound all in OF on Control Room)



Air Quality Sensors

Sensors (cases, hardwares, connectors) must offer a guarantee of **durability** and **reliability**

abinsula

Air Quality sensors installation

on roofs and lighting poles

connected by **LoRAWAN**

Video Surveillance “Sens

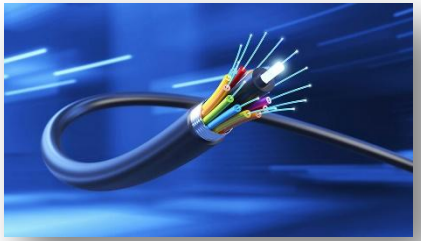
High Quality Video Cameras

Expansion of video surveillance to around **50 nodes**
(**15** schools & **32** movida’s point of interest
on urban/existing lighting
or, where necessary, new poles.

Connected via **MAN/OF**

Public WiFi Extension

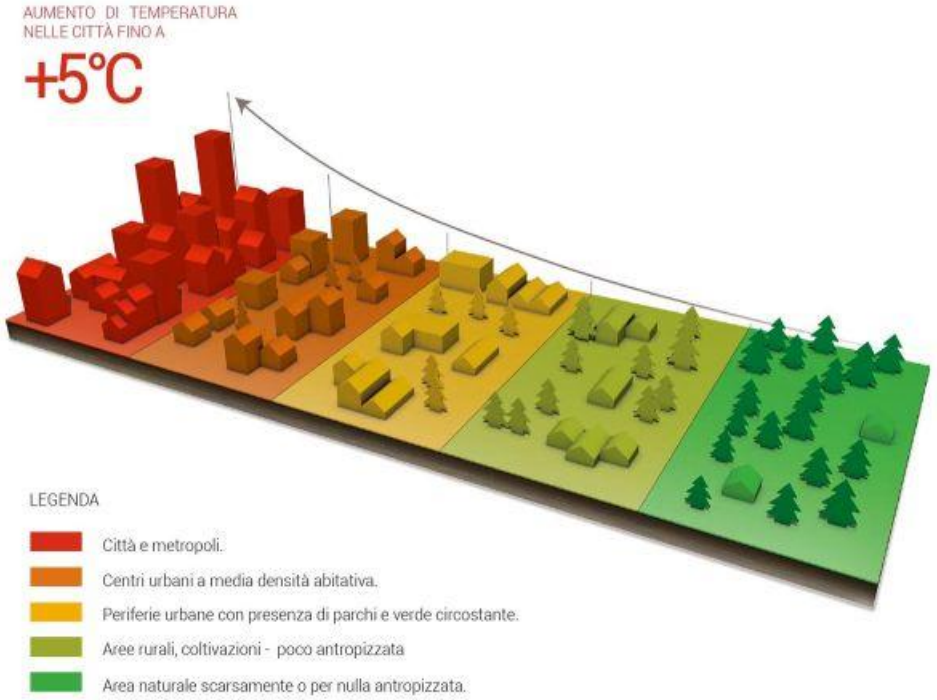
Performance always guaranteed thanks to the dedicated network



Urban microclimate monitoring

The Heat Map

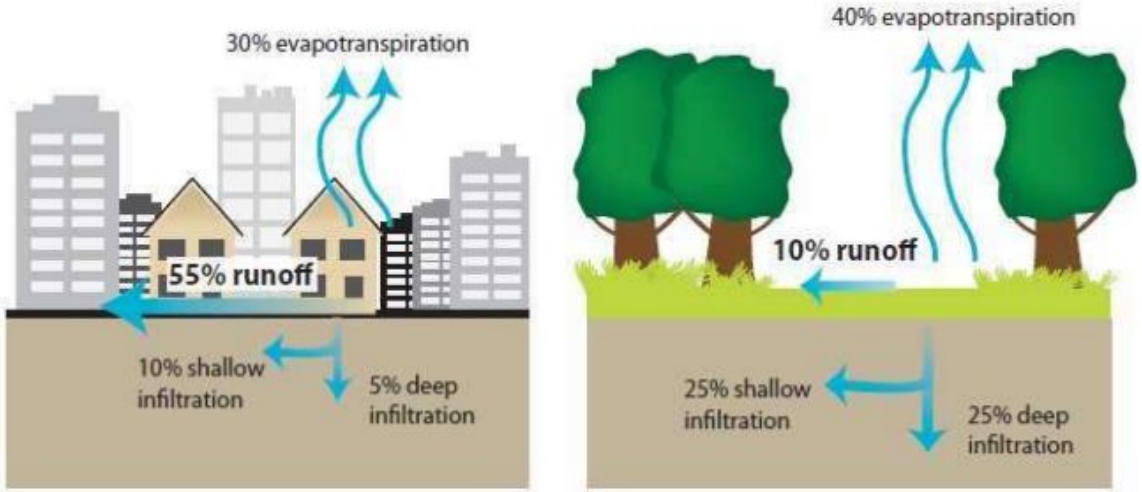
- The Heat Map refers to the **temperature increase** moving from rural areas to the city center.
- **Up to 5 degrees warmer** microclimate within urban areas than the peripheral ones.
- This phenomenon is also determined by a **progressive elimination of green areas**
- It can generate various negative consequences that can be reflected on **human health**



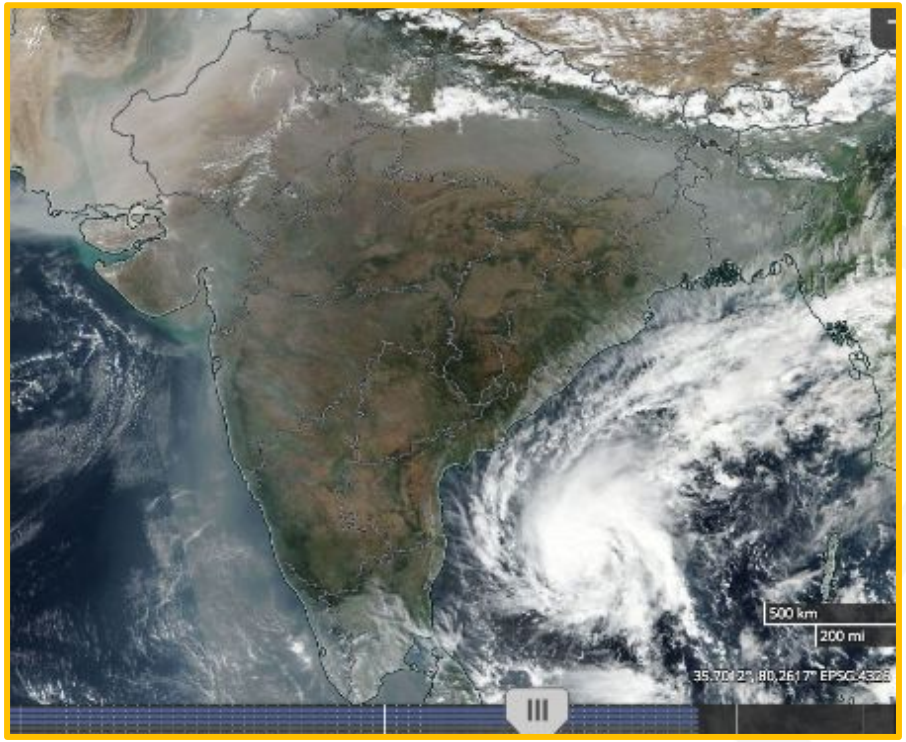
The different controllable variables

Controllable diversity are:

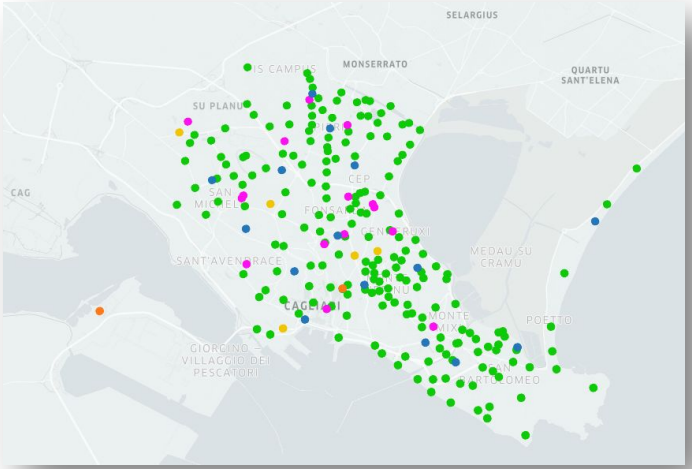
- Waterproof surfaces and reduction of vegetation
- Different properties of materials
- Urban Geometry
- Air pollution
- Anthropogenic Heat

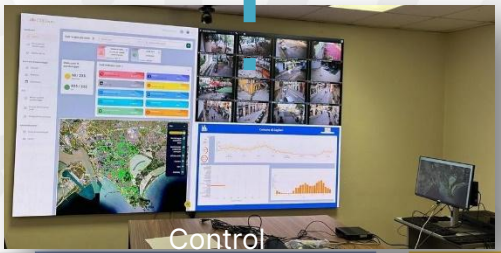


Air quality and presence of pollutants



Urban Microclimate Monitoring

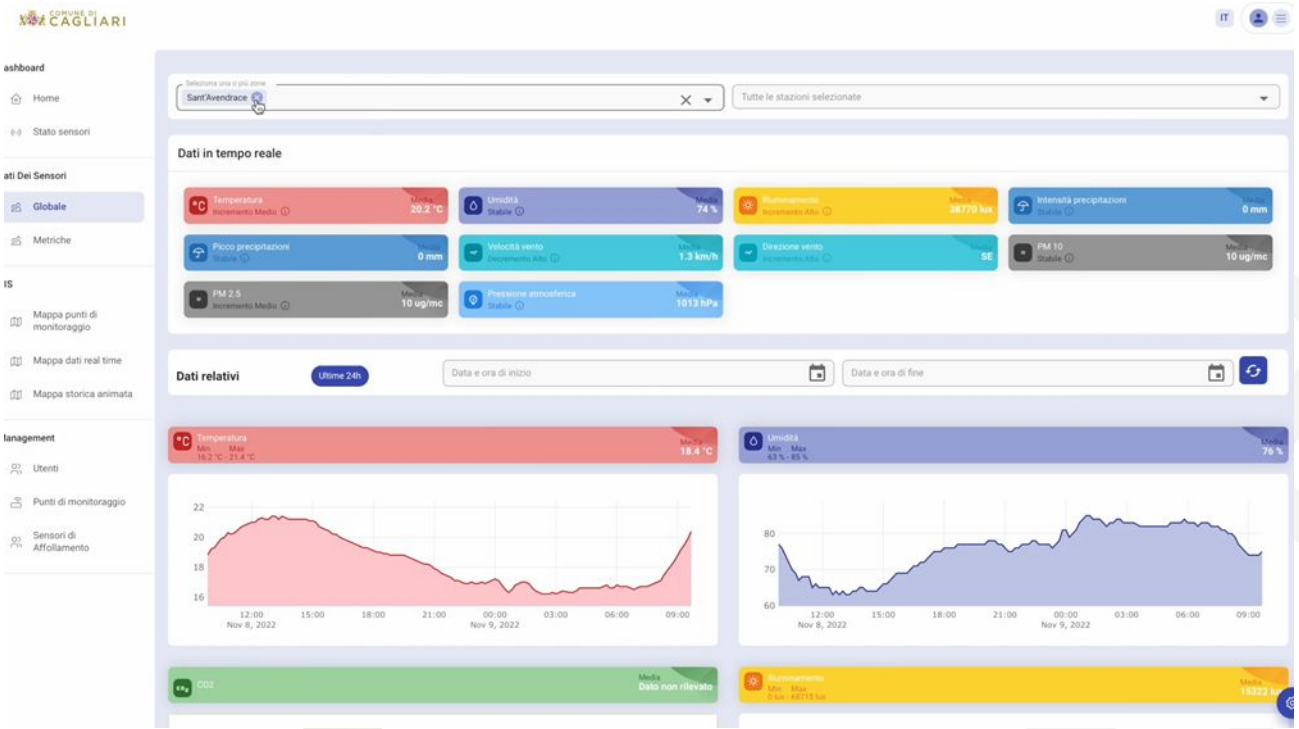




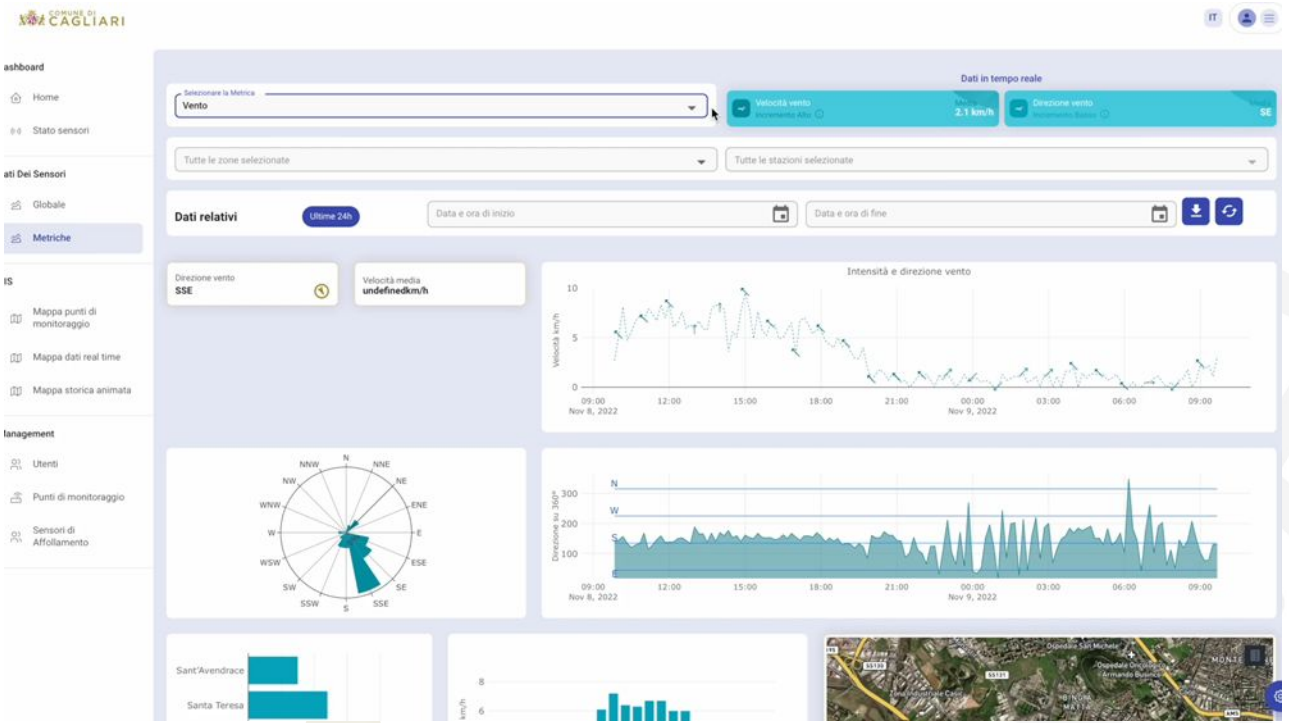
Control Room

Green: base sensor
Blue: GW + VDS
Violet: only VDS
Orange: people counting

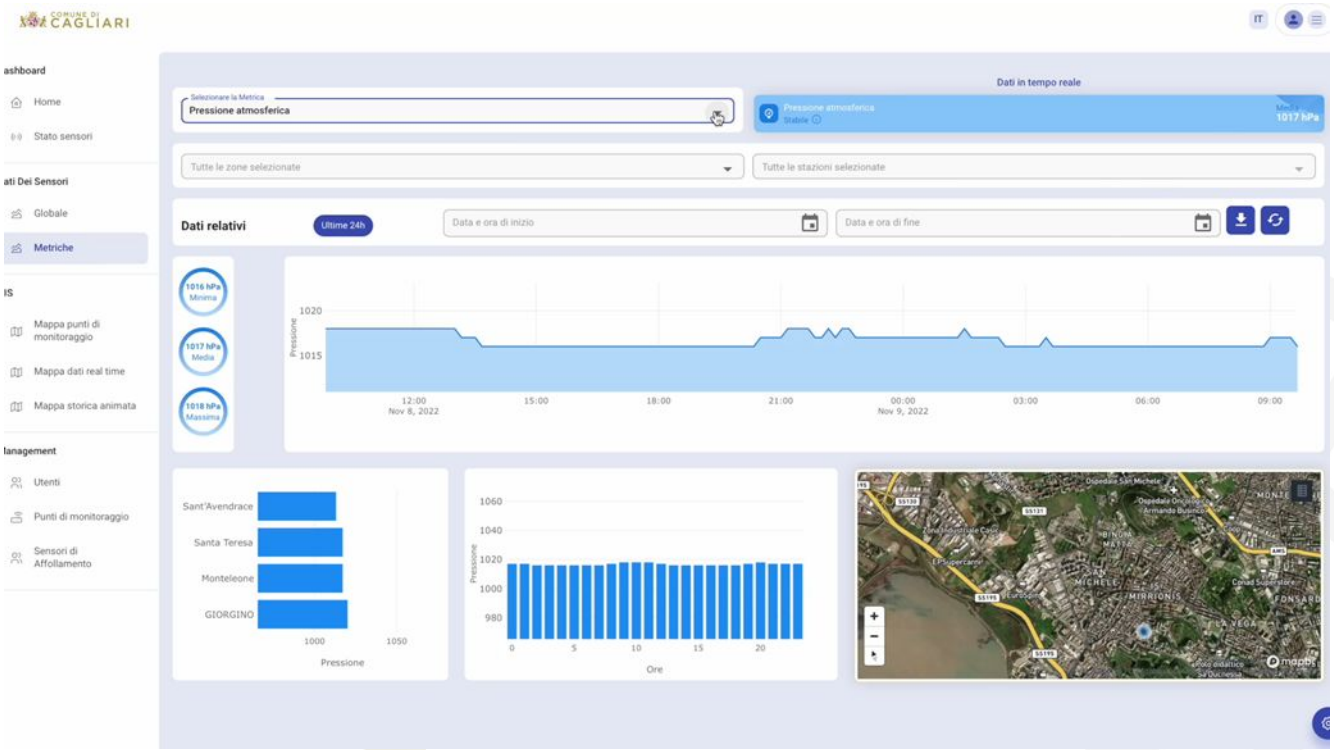
Temperature metric



Air quality metrics

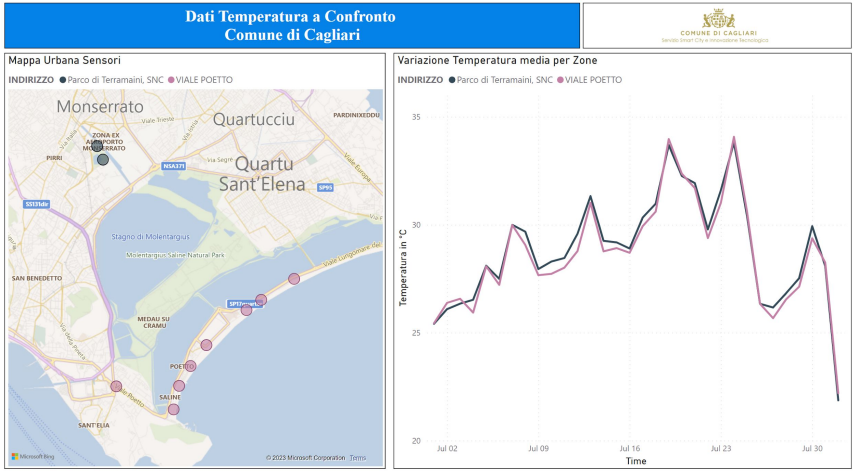


Wind and rainfall metric

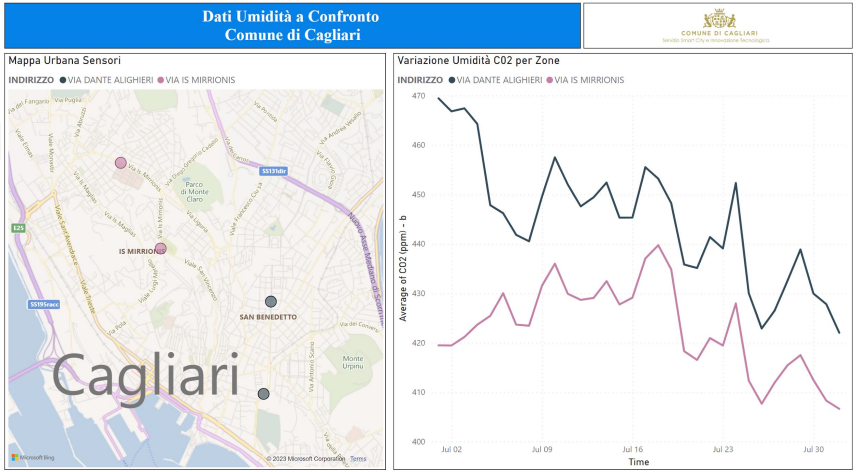


Data correlation

TEMPERATURE

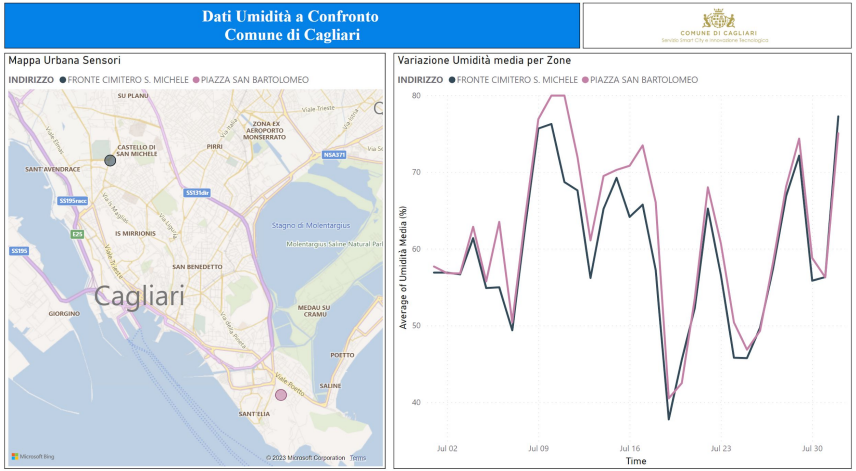


UMIDITY VS. CO2

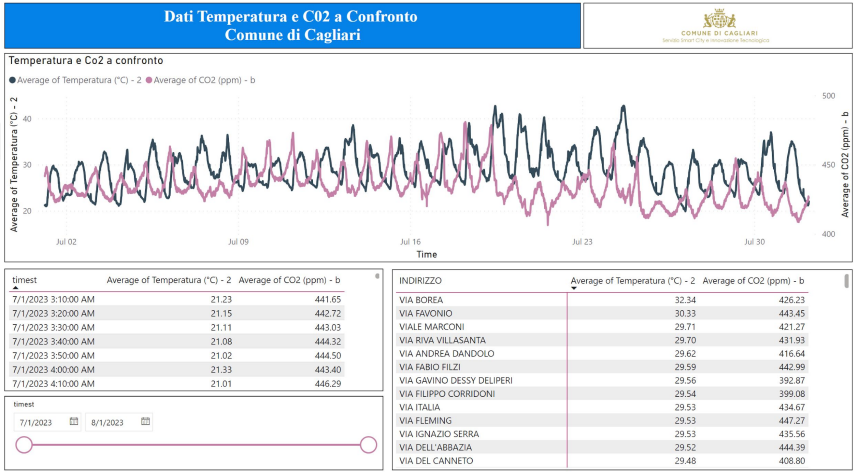


Data correlation

UMIDITY



TEMPERATURE VS CO2



Expansion of the city video surveillance

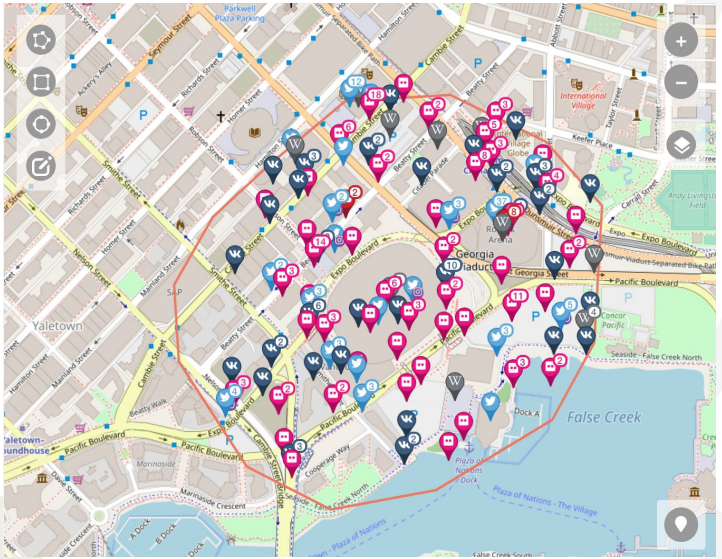
Video Surveillance

Focus on **schools**
(covered 15 schools)
and
Movida areas
(covered 32 points of interest)

Monitoring tourist flow in the main tourist areas of the city

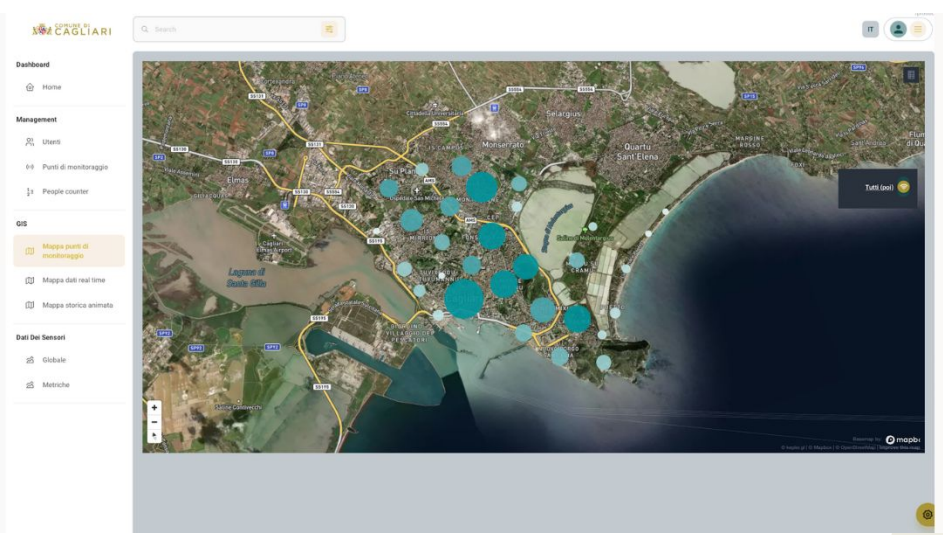
Tourist Flow Monitoring KPI

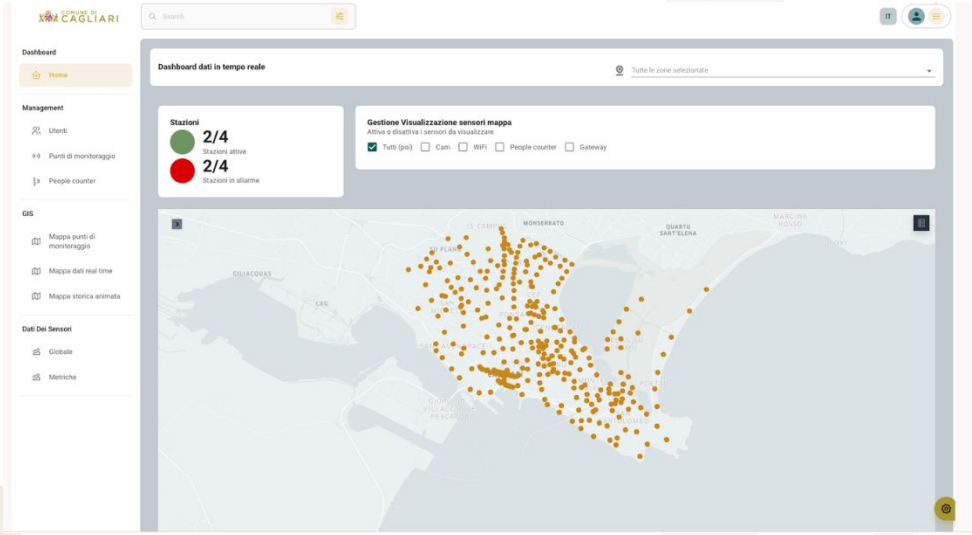
Events Monitoring



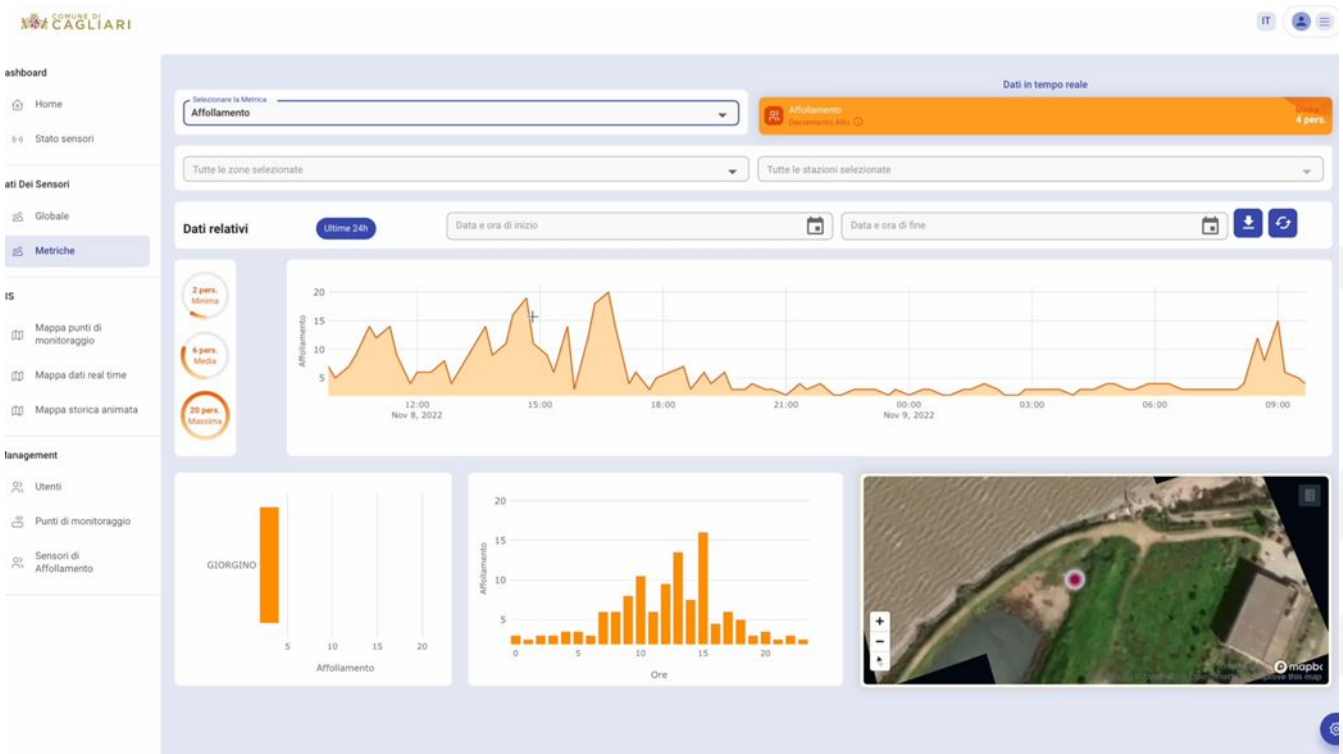
Tourist Flow Monitoring KPI

Interactive Crowding Dashboard



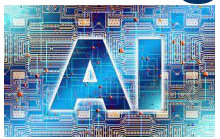


Tourist Flow metric



Project Benefits for Cagliari's citizens

Cagliari **environment improvement** thanks to constant data monitoring



Implementation of **AI** based on huge amount of sensors data collected

Air quality improvement thanks to focused actions based on data

City planning redefinition

Tourist flow monitoring and more control on public events and city attractions

Sensors net improvement that allows **more security** controls for citizens

Public WiFi coverage expansion

Control Room monitoring and **intervention** based on data collected

Timeline

Phase I: Core Network Fiber Optic creation fors sensors and VDS on 15 points

Phase III: Complete installation of WiFi and People counting equipement

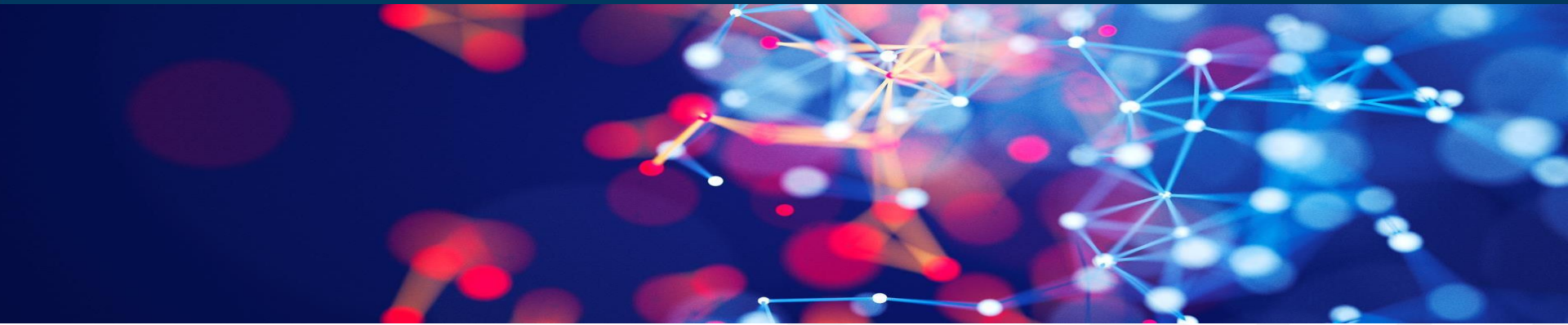
Phase II: Expansion of the fiber optic network for sensors and VDS on another 50 points

Phase IV: Completion of sensor network installation

We never stop!

What do we plan to do in the future?

- Enlarge coverage
  - In the city: emprove the density of data sensor
  - In the metropolitan city: implement basic monitoring services
- New citizen healthy parameter monitored (e.g. noise)
- …



Project Partnership

Università degli Studi di Cagliari

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FASTWEB