

ASECAP DAYS



MILANO 2024



**CONCESSIONI
AUTOSTRADALI
VENETE**



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ENVIRONMENTAL SMART ROAD

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OUR STARTING POINT

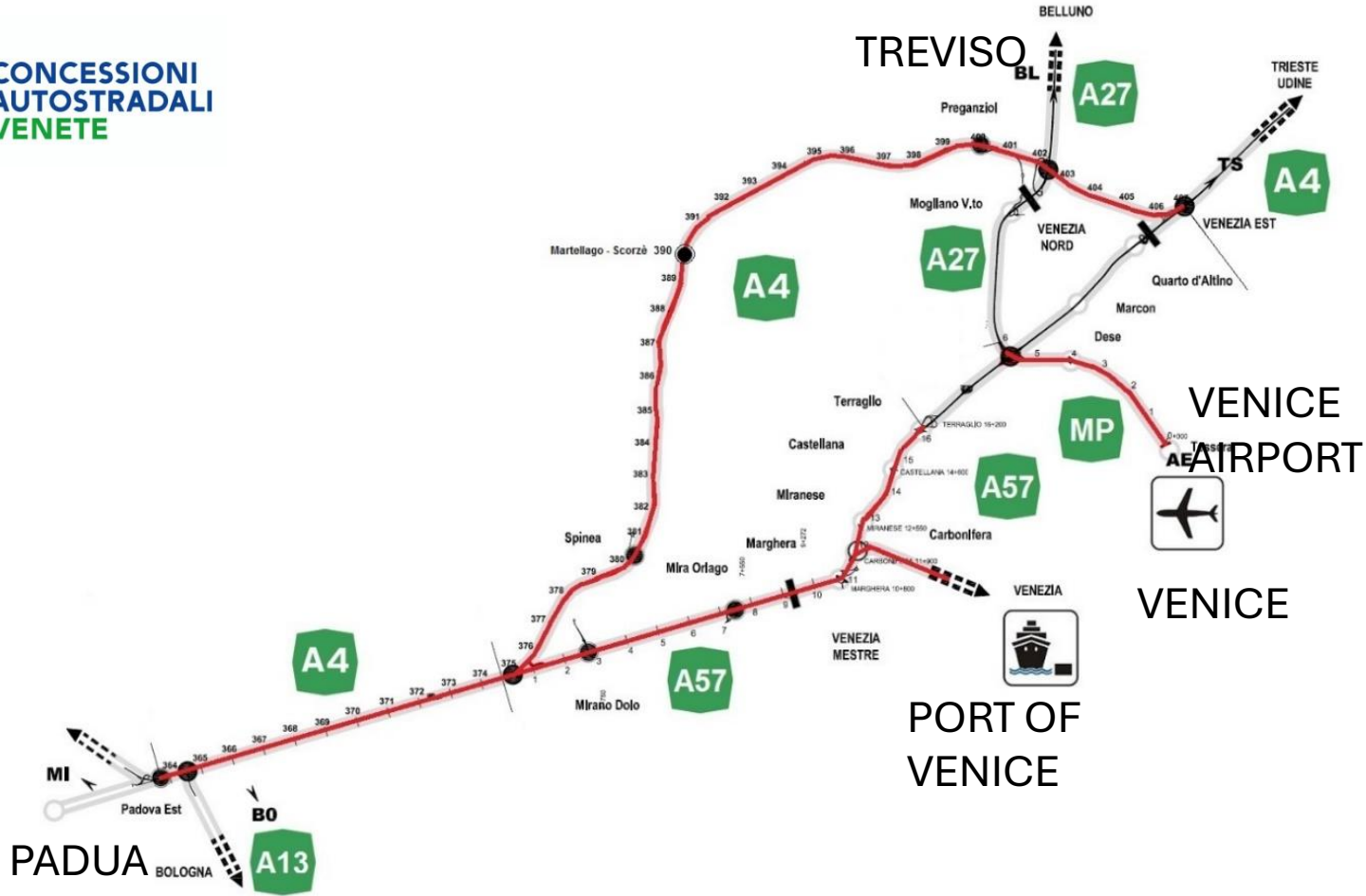
Concessioni Autostradali Venete - CAV SpA is a relatively young motorway company. **Founded in 2008**, it began full operations in 2009 and, right from the beginning, it included among its objectives the **implementation of management systems** that would favour the effective enactment and compliance with the laws and regulations that govern its activities as a legal entity, as a concession holder, and as a stakeholder in the business community. This was the beginning of CAV's **commitment to the environment** as well.

Since their construction in **2008**, the **facilities of the Passante di Mestre** have featured high environmental performance standards, being equipped with:

- **Filtration systems** with filters that can remove pollutants, even those in dissolved form, such as heavy metals, found in rainwater runoff
- **Oil spillage settling tanks** to manage any leaching.



The implementation of ENVIRONMENTAL SMART ROAD is planned within the sections managed by Concessioni Autostradali Venete, the only motorway infrastructure in the area between the cities of Venice, Padua and Treviso, part of corridor 5 of the TEN-T networks, and connected with important intermodal hubs (Port and Airport)



CAV'S COMMITMENT BETWEEN PAST, PRESENT AND FUTURE

Research and collaboration with universities and research centres

Constant investment of significant resources in research activity and collaboration with universities and research centres

Knowledge about rainwater runoff

Constantly expanding knowledge regarding rainwater runoff

The best solution

Always researching the best solution



New technologies

Investment in the use of new technologies with a long-term approach

Updating pursuant to applicable legislation

Constant updating pursuant to applicable legislation

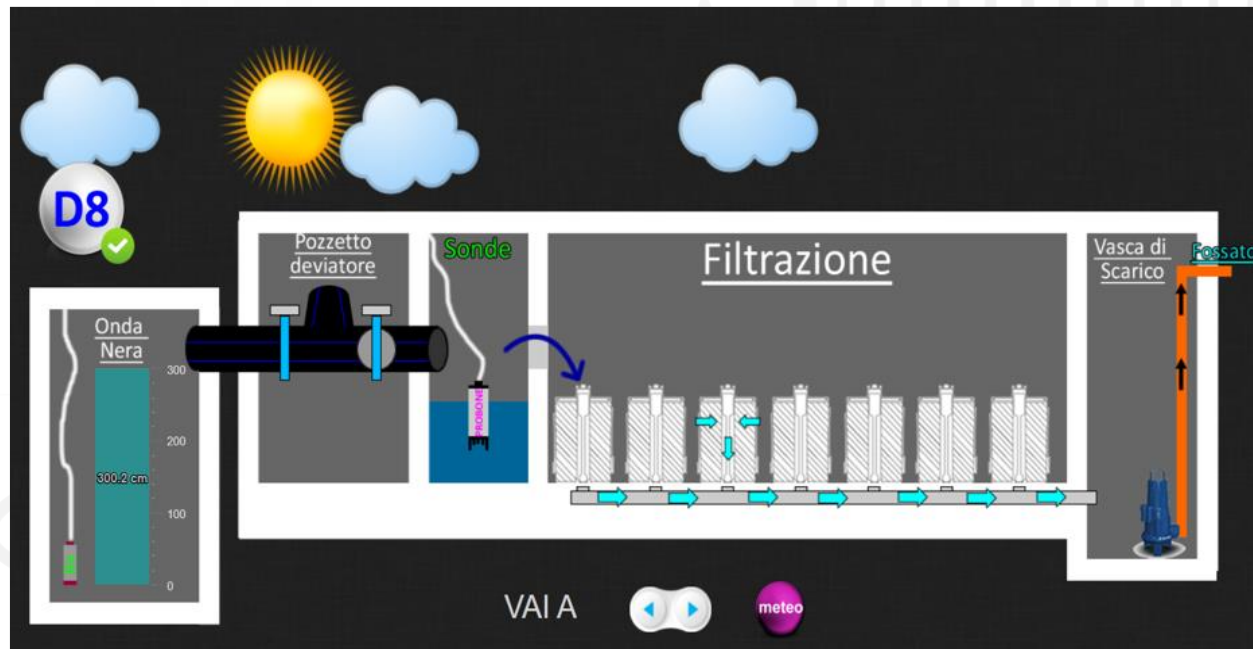
Challenging goals

Pursuit of increasingly challenging goals

ENVIRONMENTAL SMART ROAD

To manage the persistent impact arising from rainwater runoff, the **Passante di Mestre (Mestre Bypass)** and the **Tangenziale di Mestre (Mestre Beltway)** are equipped with runoff water treatment plants in accordance with legislative provisions, developed with different concepts and technologies which also take into account construction timelines.

The project's primary objective is the redevelopment of these plants, with a focus on enhancing the existing environmental protection system. In particular, the new system involves the automation of existing systems in order to make them autonomous. This approach aims to safeguard the environment from both accidental and non-accidental spills that may occur on the motorway surface, irrespective of external factors stemming from human activities.



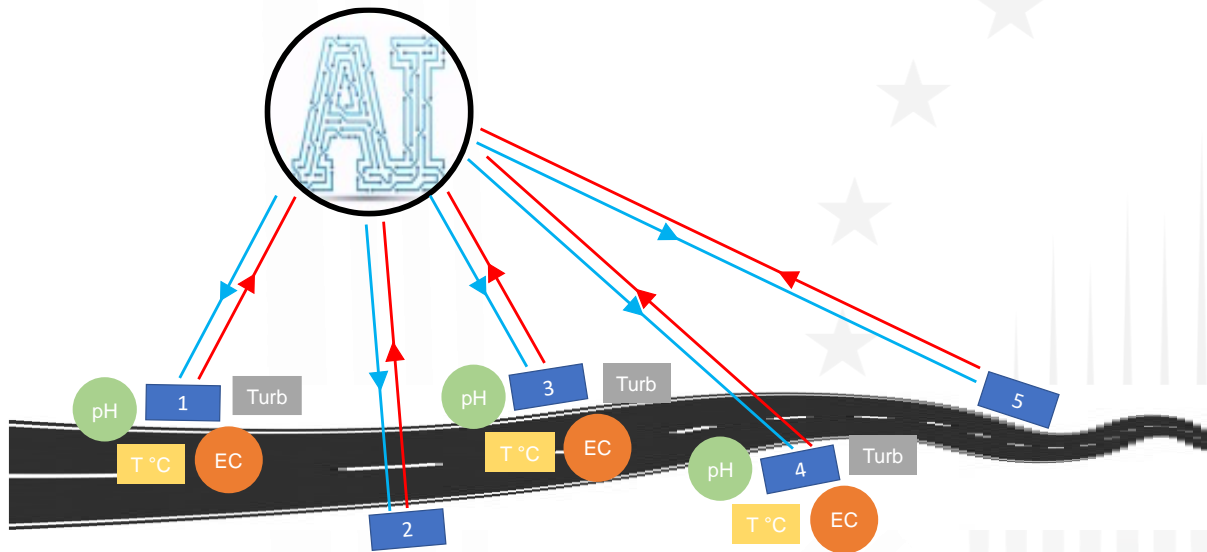
acquisition system.

The intervention entails implementing a 'smart' system, complete with integrated software designed to ensure fully automated operations through a specific programme. This system will be designed to connect to a network, thereby ensuring not only the automatic and localized operation of each plant but also facilitating remote management through a supervisory, control, and data

The goal of the project, starting from the technological revamping of the rainwater treatment plants, is to develop a single solution leveraging artificial intelligence, guaranteeing efficient and unitary management of treatment plants that are disorganized and dispersed throughout the territory, in a cost-effective and scalable manner. The challenge undertaken is to elevate the management level of the systems by creating a unique and smart framework capable of autonomously overseeing all systems along motorway sections, monitoring their efficiency, verifying correct functionality, and planning maintenance activities with the objective of reducing the pollutant load in water.

The revamping project for these plants includes the establishment of a multi-parametric and functional monitoring station for each water treatment plant. **The purpose is to characterize rainwater runoff and implement smart systems capable of identifying potential spills and triggering an emergency response, preventing the dispersion of pollutants into the environment.**

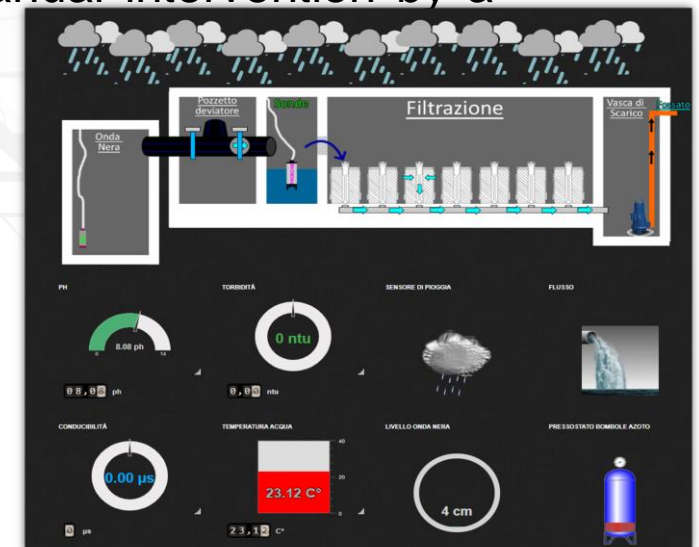




The project also involves the **implementation of a technological solution** to guarantee efficient and unitary management of disorganized and dispersed groups of treatment plants in the territory in an economical and scalable way.

The control units integrated into rainwater treatment plants are linked to a **SCADA system**, receiving data from water monitoring sensors and plant operations. However, the limitation of this monitoring and control system lies in the need for manual intervention by a physical operator for data analysis and the evaluation of plant performance.

The control units integrated into rainwater treatment plants are linked



Our goal



Our goal, starting from the technological revamping of the treatment plants, is to develop a **single solution** leveraging **artificial intelligence**, guaranteeing an **efficient and unitary management of the treatment plants** that are disorganized and dispersed throughout the territory, in a **cost-effective and scalable manner**.

Activities to achieve our goal



The objective is to convert rainwater runoff from an environmental issue into a resource according to the following activities:

- Transforming the set of existing plants on the territory into one **single plant**;
- Using **Artificial intelligence**;
- Enhance the treatment efficiency of plants in order to manage persistent impacts, by equipping plants with PLCs and sensors for efficiency monitoring;
- Create an efficient system for managing severe impacts with a 24-hour monitoring network;
- Equipping the system with a **maintenance programme** integrated with plant efficiency verification;
- 'Social Science' Programme.

Challenges for the future



The challenge for the future is to elevate the quality level of the plants by creating a **unique and smart framework** capable of autonomously overseeing all systems along motorway sections, monitoring their efficiency and correct functionality, and planning maintenance activities with the objective of reducing the pollutant load in water.

CAV ONGOING PROJECTS

'SIMIIAA' Project

- **Research Purpose:** "Smart solutions for the monitoring of environmental impacts and pollution from highway runoff water" and, thus, development of **innovative techniques** for the estimate, prediction, management and treatment of **pollutant load** and environmental impact of highway runoff water.
- The project is developed in **two areas**:
 - Collection of water quality data using **innovative passive sampling systems**.
 - Development of **mathematical models** that integrate various available data sources for estimating pollutant loads.



Ongoing projects



'Microplastics' project

Research purpose: "Assessment of small microplastics (smps < 100 μm) fluxes and other pollutants from highways stormwaters run-off" and thus:

- **Quantification and chemical identification of SMPs** (Small Microplastics < 100 μm) in highway stormwater runoff (water and sediment)
- **Temporal and spatial variability of SMPs** in a facility of the *Passante di Mestre* bypass.
- **Presence of additives**, an important proxy for the presence of SMPs and other pollutants
- Initial assessment of **SMP removal potential** of existing highway stormwater treatment technologies.



OBJECTIVE

DEFINING A COMPOSITE INDICATOR OF INTEGRATED SUSTAINABILITY



TASK 1

ENVIRONMENTAL MATRICES AND A 'SMART' MOTORWAY AS A TOOL TO DEFINE AN INTEGRATED SET OF DYNAMIC EXPERIMENTAL ACTIONS FOR TRAFFIC MANAGEMENT BASED ON A PREDICTIVE AND PROACTIVE LOGIC



TASK 2

OPTIMISED USE OF THE EXISTING INFRASTRUCTURE, ACHIEVING THE MAXIMUM ENVIRONMENTAL BENEFIT WITH THE MINIMUM INCONVENIENCE TO THE USERS, WHILE GUARANTEEING THE **HIGHEST LEVEL OF SECURITY**



TASK 3

MONITORING THE MOST SENSITIVE ENVIRONMENTAL POLLUTANTS IN THE VICINITY OF THE MOTORWAY IN ORDER TO CHECK AND QUANTIFY THE IMPACT OF EXPERIMENTAL ACTIONS ON THE ENVIRONMENTAL COMPONENTS



TASK 4

ENGAGE **STAKEHOLDERS** AS DATA PRODUCERS



TASK 5

DATA ANALYSIS AND POST-PROCESSING FOR THE DEFINITION OF THE COMPOSITE INDICATOR

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**THANK
YOU**

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