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### **Challenges & opportunities in achieving net-zero**

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# Demonstrate the ability to reduce congestion, accident risk and pollution by influencing drivers' behavior in a real setting with real customers



Road Safety - Reduce traffic accidents.

**Traffic efficiency** - Prevent congestion and improve mobility.

**Environment** – Reduce pollution and comply with current air quality legislation.

#### **ASECAP DAYS**



#### Transitioning from infrastructure operator to mobility operator



#### PHYSICAL INFRASTRUCTURE Construction

Certificates of construction.



#### **BASE-ITS**

#### Information

A network to monitor major roads and tunnels, including electronic toll collection (ETC/MTC) systems integrated with Intelligent Transportation Systems (ITS).

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#### INFRASTRUCTURE AND DIGITALIZATION AWARENESS

Digitization

- Advance Payment Systems.
- A digital platform based in the Cloud, utilizing AI and Bigdata.
- Systems for monitoring traffic and predicting patterns, including risk detection for accidents

() 5G

• C-V2X-Pilots.



#### SMART

Smart developments

- Smart roads and C- V2X
- Advanced traffic monitoring, intelligent traffic control, and management in real-time Assistance in Driving and Autonomous Support
- New business models with digital solutions offering digital services and solutions for both public and private.







#### **Future Road Lab** () 5G 6 88 FUTURE ROAD LAB New smart digital traffic management centre 5G SA antenna Magnetic sensors LED lighting in tunnels Detection of vehicles, speed, direction of travel, distance between vehicles and type of 280 l₽¦ vehicles per lane. Real-time Incident Simulation and HD maps Video Analytics Traffic regulation traffic traffic modelling management cameras using virtual monitoring and tools gantries management HIII. -0-C-ITS service Traffic and road Weather Various payment rollout works information information and methods forecasting 12 CO, "aucat Traffic emission control and reduction 000= C-ITS 000 and C-V2X antennas Bluetooth and LiDAR antennas Matrix signs Ě Awai mobility 4 and payment Solar power plants 140management app Powering the Operations, Sustainability and Innovation Centre and tunnels Efficient fleet Electric vehicles





#### **Future Road Lab**

Understand



Understand the performance and mobility of the transport network. Identify problems as early as possible.



Forecast what will happen to anticipate impacts instead of reacting to them.

- Monitoring traffic in real time.
- Monitoring emissions of CO2, NO2 and NOx in real time.
- Predicting future traffic scenarios (congestion and risk accidents)
- Automatic detection of objects, animals, or vehicles on the road.
- Adverse weather conditions: heavy rain, strong wind, etc.



Decide the best way to react and achieve a better future outcome than expected

#### Communicate



Transmit traffic strategies to connected vehicles and VMS. Group of them or individual

- **Propose strategies** to enhance mobility and road safety
- **Communicate** strategies to drivers and connected vehicles
- **Speed recommendations** to reduce accident risk, improve traffic flow, or avoid exceeding NO2 and NOx emission limits.
- In case of pay-per-use, **incentivize** users to improve mobility or charge based on the **vehicle's emissions**

**Understand Flow and velocity prediction** 

**ASECAP DAYS** 







# <text>

#### Automatic detection of animals



#### **Traffic emissions**



#### **Environmental pollution**





#### **Communicate with drivers**



#### **AWAI APP**

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Android Aut. & Apple Car

#### **Connected Vehicles**





**VMS** 





# CRETA

- Based on pollution algorithms and risk accidents, the recommended speed will be determined and, depending on its compliance, a discount will be made on the toll tariff.
- Sending at the recommended speed, based on pollution algorithms and risk accidents.
- Detection of the speed, category acceleration and emissions of each vehicle to generate a variable pricing system in the section based on the intensity of the traffic and the real emissions of each vehicle. Generation of alerts for highly polluting vehicles.
- Replicated as much as possible using CV2X communications deployment (RSU/OBU).

Deploy an intelligent road based on the digitization of physical infrastructure, with a 5G communication network and C-V2X on critical road infrastructure such as **tunnels**, offering **CCAM services**.

This aims to enhance traffic flow, improve safety, and reduce the environmental impact generated.

Three use case

- Prediction and incident management
- Reduction of emissions
- Emergency vehicle priority







## **THANK YOU** GRAZIE

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