

15th October 2024

CRETA project



Financiado por la Unión Europea
NextGenerationEU



MINISTERIO DE ASUNTOS
ECONÓMICOS Y TRANSFORMACIÓN
DIGITAL



Plan de Recuperación,
Transformación
y Resiliencia

CRETA

Control y Reducción de las Emisiones del Tráfico



MASMOVIL[®]

abertis
Mobility Services
autopistas
an Abertis company

OPUS
RSE

cellnex

indra

VINCES
BUILDING
LEGITIMACY

ENGINEERING
SYLTEC
Making the factory



Control y Reducción
de las Emisiones del Tráfico

CRETA is an innovation project funded by **UNICO-5G Sectorial program** from Next Generation EU Funds.

CRETA is born, an innovative project **to promote sustainable mobility and reduce traffic emissions and congestion.**

To achieve this goal, CRETA is based **on the following pillars:**

1. Communications: Creation of a 5G system capable of interconnecting data between different **sensors, infrastructures, and vehicles** in real time.

2. Mobility: creation of a **Dynamic variable pricing** system based on use and the external environmental consequences produced by each vehicle and even, based on real time data.

3. Environmental: Monitoring of the reduction of the source of emissions (road traffic) with **autonomous remote sensing systems** connected to the 5G network.

March 2023 – Sept 2025

Proyecto	Inicio	Fin	Estado
Proyecto 1	2023	2025	Activo
Proyecto 2	2023	2025	Activo
Proyecto 3	2023	2025	Activo
Proyecto 4	2023	2025	Activo
Proyecto 5	2023	2025	Activo
Proyecto 6	2023	2025	Activo
Proyecto 7	2023	2025	Activo
Proyecto 8	2023	2025	Activo
Proyecto 9	2023	2025	Activo
Proyecto 10	2023	2025	Activo



3 demonstrators



Barcelona / C-32



Irun – Cross Border



Madrid-Alcobendas

CRETA combines 3 disruptive technologies:

- **5G Communications and Edge Computing**
- **Remote traffic emissions measurement technology**
- **Artificial Intelligence**










Control y Reducción
de las Emisiones del Tráfico



2



Use cases - Demonstrators

ENTITY	PROTOTYPES	PT6 Irun Cross Border Pilot		PT7 – Dynamic Tariff pilot				PT8 - Urban Mobility Management and ZBE Pilot – Madrid/Alcobendas	
		Identification of polluting gases	Pricing of polluting gases	Speed Recommendation Discounts APP Awai	Speed Recommendation CV2X OBU	Mobility and emissions analysis	Dynamic pricing Emissions and Congestion	Characterization of mobility	Active mobility management
	EMISSION DETECTION SYSTEMS	X	X				X	X	X
	VEHICLE DETECTION SYSTEMS	X	X				X	X	X
	CCAM SERVICE SYSTEMS							X	X
	EDGE SERVER PLATFORM PROTOTYPE							X	X
	AI ALGORITHM PROTOTYPE							X	
	SATELLITE MONITORING PROTOTYPE OF CONNECTED VEHICLES							X	
	MEC AND IOT COMPUTING SYSTEMS	X	X	X	X		X	X	X
	C-V2X EDGE COMPUTING SYSTEMS				X				
	CV2X COMMUNICATIONS			X	X				
	TRAFFIC MONITORING SYSTEMS			X	X				
	TRAFFIC MODELING AND PREDICTION SYSTEMS					X			
	DYNAMIC TARIFF TOLL SYSTEM						X		

DYNAMIC ROAD PRICING PILOT – BARCELONA / C-32

Interurban mobility and access to cities

Goals:

- Measurement of speed, acceleration, environmental category, and emissions of each vehicle to **develop a variable pricing system** on the section based on the intensity of traffic and the actual emissions of each vehicle.
- **Generation of alerts for highly polluted vehicles.**
- **Recommended speed calculation** will be determined based on traffic and pollution sensors and through the use of AI algorithms.
- **Recommended speeds will be sent** through the **AWAI app** for Highways and **CV2X communications (RSU/OBU)** deployed on the C-32.
- If the recommended speed is met, the customer will receive a discount on the toll rate.

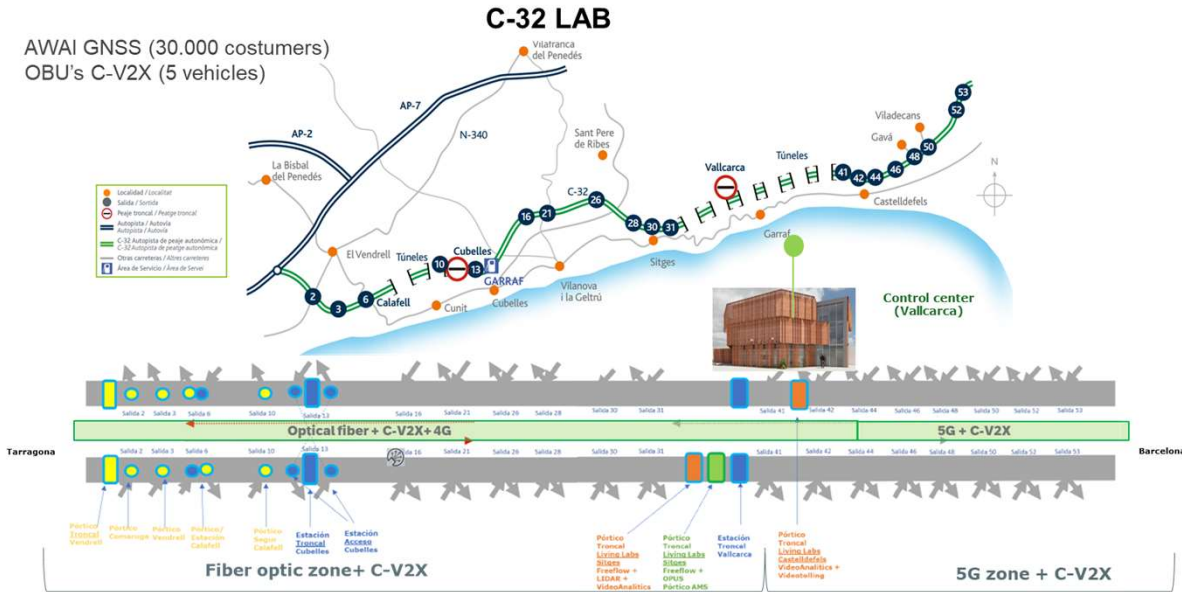
Purpose:

Demonstrate the **ability to charge fairly** based on actual, individual vehicle emissions and dynamically based on traffic intensity and emissions level, variably adjusting the city access fee.



SENSORS & CONNECTIVITY

- AWAI GNSS (30.000 costumers)
- OBU's C-V2X (5 vehicles)



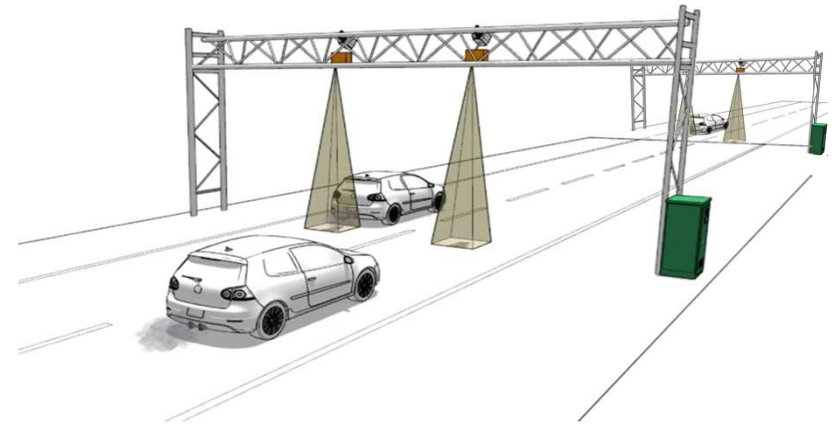
- Pollution sensors: 4
- Cameras VA vehicle counting: 3
- Cameras VA animal detection : 10
- Lidar sensors: 1-5
- Loops: 99
- RSUs C-V2X: 5
- Toll station: 2 trunks toll and 1 access toll

- Pollution sensors: 1
- Cameras VA vehicle counting: 12
- 5G nodes: 3
- RSUs C-V2X: 6



self-sustainable energy poles - wind + solar energy

Measuring the real emissions of each vehicle

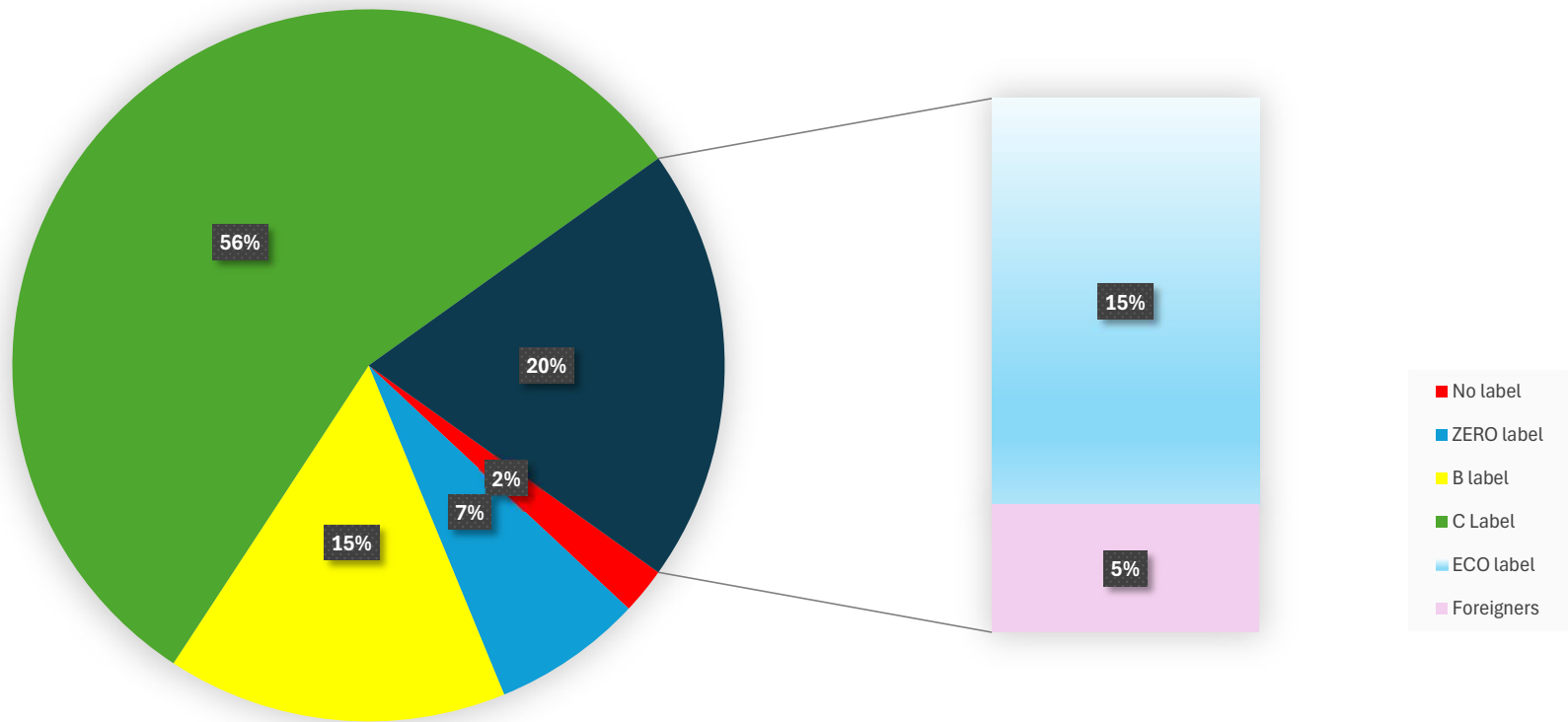


Adjusting the tariff based on actual emissions



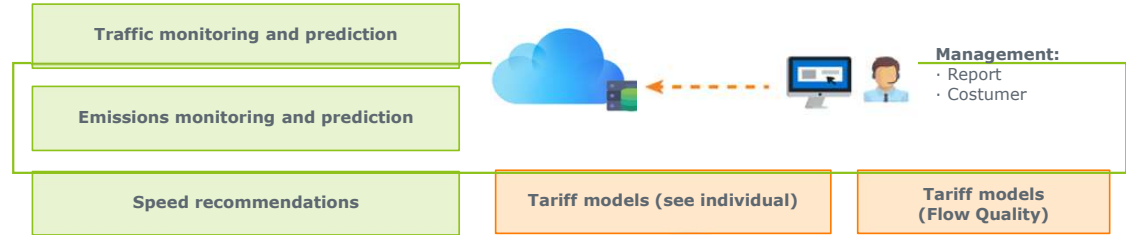
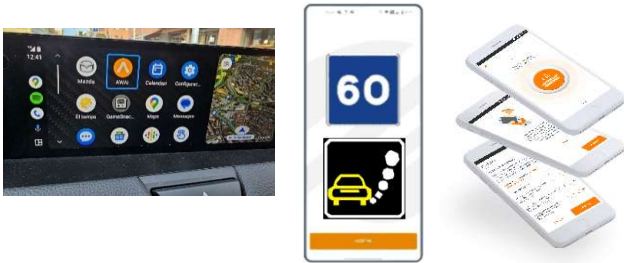
MOBILITY STATISTICS – TRAFFIC VEHICLES DISTRIBUTION October 2024

Distribution of Environmental Labels free flow gantry C-32

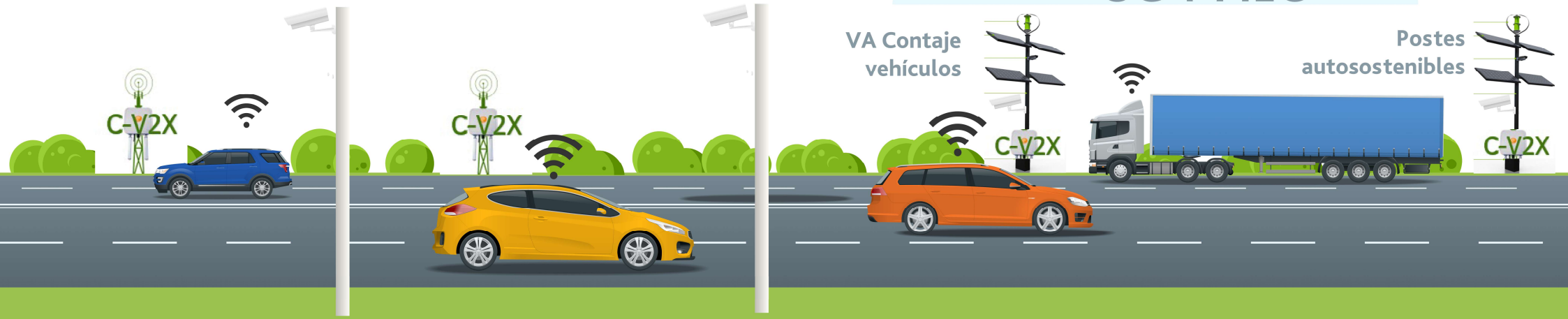


DYNAMIC ROAD PRICING PILOT – BARCELONA / C-32

C-ITS  AWAI



5G + MEC



DYNAMIC TARIFF ALGORITHM

Goals:

- Internalize traffic externalities in toll prices.
- Develop a variable pricing system to reduce congestion and emissions



The cost of the fee to be paid by the customer takes into account 3 costs:

1) Base Tariff – Infrastructure Cost

These are the rates that currently correspond to the payment of the toll for the 4 categories of vehicles.

	Categoría I	Categoría II	Categoría III	Categoría IV
Peaje / Peatge troncal de Vallcarca	3,87	8,05	14,20	17,42
Peaje / Peatge troncal de Cubelles	2,31	4,81	8,48	10,40
Peaje acceso Cubelles / Peatge d'accés a Cubelles	1,24	2,57	4,54	5,56
Peaje acceso Calafell / Peatge d'accés a Calafell	0,36	0,75	1,33	1,63

2) Congestion Tariff

The congestion charge to be applied to light and heavy vehicles is calculated based on the section (number lanes, slope, traffic, % heavy vehicles, cost of time value, PCE, etc.). **Motorcycles are exempt from the congestion charge.**

Congestion threshold: Starts from 45% of flow maximum capacity (3.400 vehicles/hour)

3) Emissions Tariff

Pollutant	Coste € / gr
NO _x	0.0095 €
SO ₂	0.0193 €
NH ₃	0.0112 €
PM _{2,5}	0.0867 €

CROSS BORDER IRUN – POLLUTION CONTROL

Cross-border control and payment for pollution

Objetivos:

- **Installation of an RSD** system to measure the emissions of a large number of trucks at the Irún toll booth.
- **Deployment of 5G** in the area.
- **Real-time monitoring of polluting emissions.**
- Creation and testing of a real-time alert system for potentially tampered trucks to alert the police patrol.

Purpose:

Discriminate against heavy vehicles based on their actual emissions and trigger alerts in cases of illegal vehicle tampering.



Irún – Guipúzcoa





URBAN MOBILITY MANAGEMENT AND LEZ MADRID-ALCOBENDAS PILOT

Management of urban mobility and low emission zones (LEZs)

Goals:

- Implementation of a global system of monitoring, analysis and intelligent management of urban mobility that will facilitate decision-making to carry out advanced and fair mobility management.
- Exploitation of **5G technology and Edge Computing** to improve efficiency in data processing and service deployment.
- Development of **3D LIDAR technology** to obtain an accurate characterization of vehicles and traffic conditions.
- **Development of AI algorithms** to detect the front and rear occupants of vehicles with high reliability.
- Development of **bidirectional V2X services** to obtain information from connected vehicles and send information in real time.
- **Use of satellite technology** to make the routes made by the vehicles in real time thanks to the precise positioning from the infrastructure.

Purpose:

- Implementation and demonstration of the functionality of **the global access management and control system between Madrid and Alcobendas**, considering different parameters and technologies, exploiting the capabilities of 5G and edge computing.

Madrid / Alcobendas



Creta is born: an innovator to promote sustainable mobility and reduce traffic emissions



The mobility project led by Indra and made up of companies such as MásMóvil, Abertis and Cellnex, has obtained a grant of 2.7 million euros

MásMóvil, Cellnex, Indra and Abertis promote a mobility project with 5G



 <https://cretaproject.com/>





SCAN ME



Carles Fuentes
Gerente de Proyectos y Estudios
de Tecnología

