

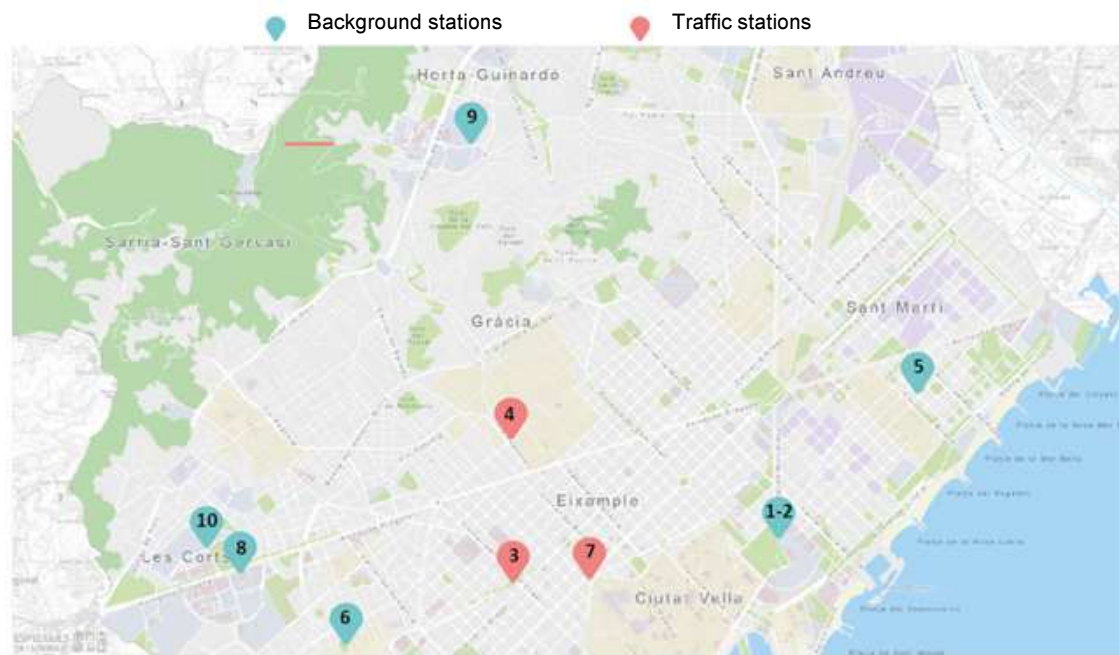


Ajuntament
de Barcelona

Evolution of the Low Emission Zone in Barcelona

IMPACTS, April 2024

CONTEXT: BARCELONA NMFAP



The Network for Monitoring and Forecasting Atmospheric Pollution (NMFAP) includes 10 stations that measure the various contaminants present in the city of Barcelona.

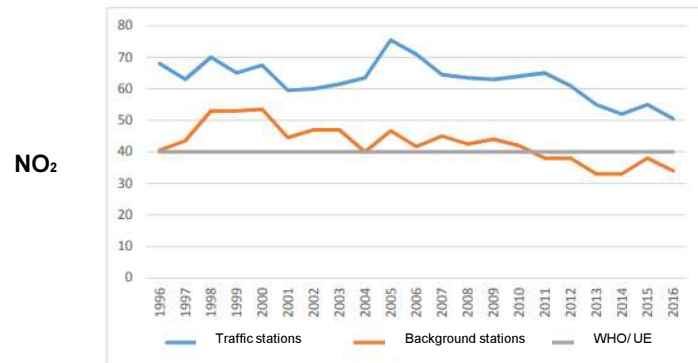
It is possible to distinguish between traffic stations (Eixample, Gràcia-Sant Gervasi, and Plaça Universitat) and background stations (the rest). A station is classified as traffic or background based on the environmental conditions of its location and its proximity to road traffic.

1. Ciutadella	Parc de la Ciutadella
2. IES Verdaguer	Parc de la Ciutadella
3. Eixample	Av. Roma - c/Comte Urgell
4. Gràcia – Sant Gervasi	Plaça Gal·la Placídia
5. Poblenou	Plaça Josep Trueta
6. Sants	Jardins de Can Mantega
7. Plaça Universitat	c/Balmes – Gran Via de les Corts Catalanes
8. Zona Universitària	Av. Diagonal, 643
9. Vall d'Hebron	Parc de la Vall d'Hebron
10. Palau Reial	c/John Maynard Keynes – c/Jordi Girona

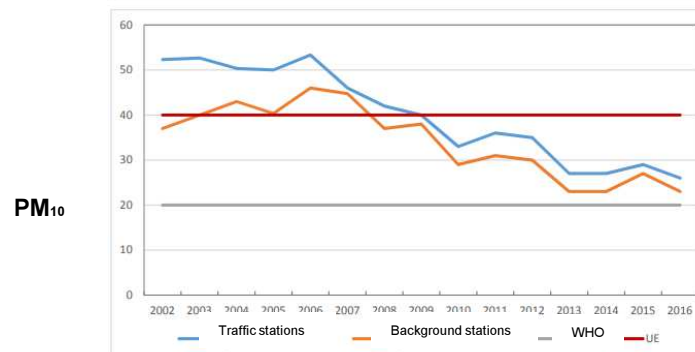




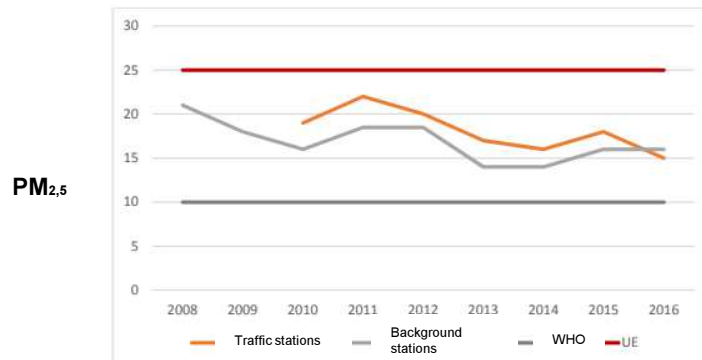
TEMPORAL EVOLUTION OF ANNUAL EMISSIONS PRECEDING THE LOW EMISSION ZONE



Temporal evolution of the annual average aggregated by traffic and background stations of NO₂ (in µg/m³) for the period 1996-2016







Temporal evolution of the annual average aggregated by traffic and background stations of PM₁₀ (in µg/m³) for the period 2002-2016.

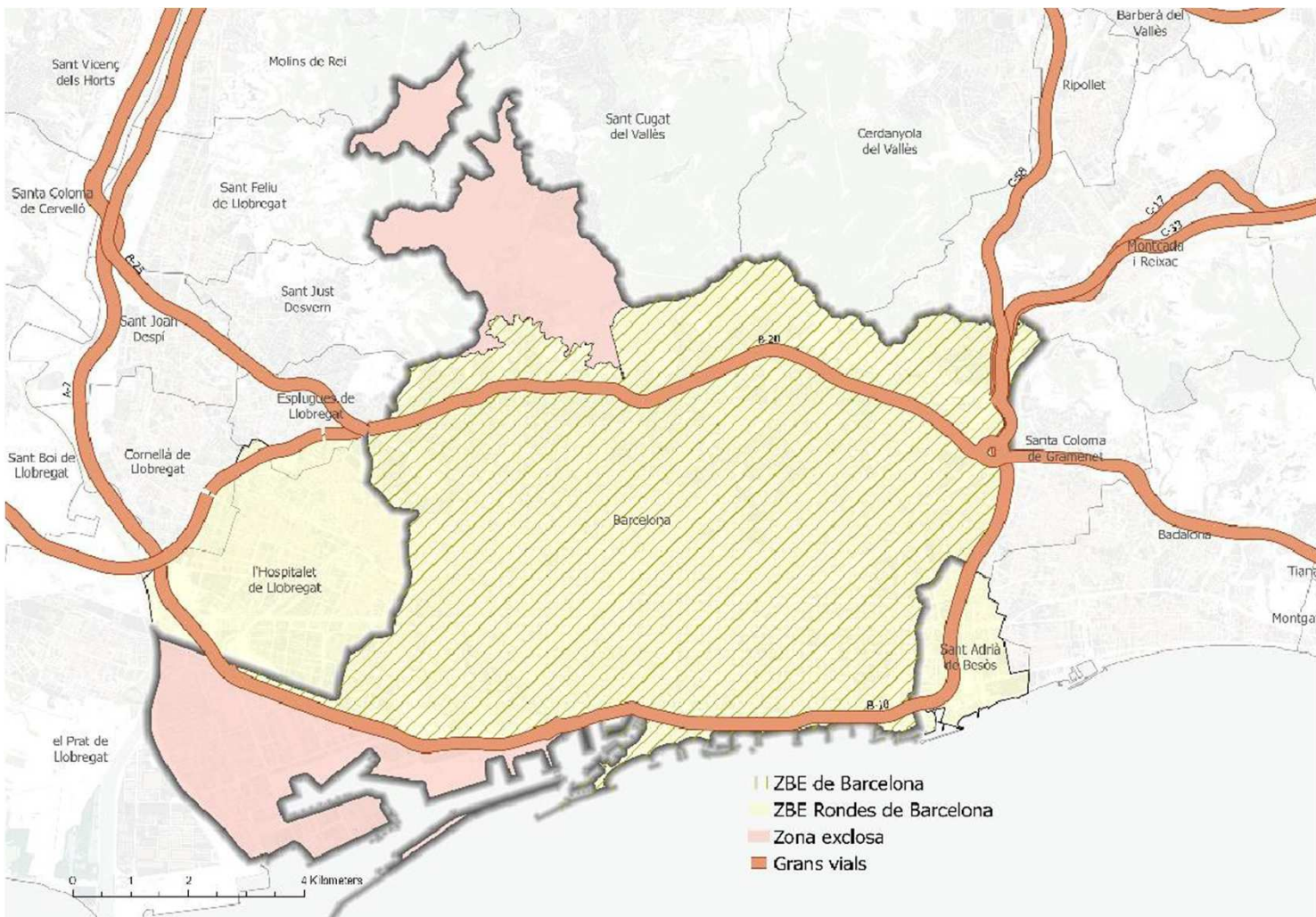


Temporal evolution of the annual average aggregated by traffic and background stations of PM_{2,5} (in µg/m³) for the period 2002-2016.

ENVIRONMENTAL LABELS FOR VEHICLES

<p>Without DGT label</p>	<ul style="list-style-type: none"> • Passenger cars (M1) gasoline EURO 2 and older • Vans (N1) gasoline EURO 2 and older • Passenger cars (M1) diesel EURO 3 and older • Vans (N1) diesel EURO 3 and older 	<ul style="list-style-type: none"> • Motorcycles and mopeds EURO 1 and older • Trucks (N2 and N3) gasoline and diesel EURO 3 and older • Buses (M2 and M3) gasoline and diesel EURO 3 and older
<p>B label</p> 	<ul style="list-style-type: none"> • Passenger cars (M1) gasoline EURO 3 • Vans (N1) gasoline EURO 3 • Passenger cars (M1) diesel EURO 4 and 5 • Vans (N1) diesel EURO 4 and 5 	<ul style="list-style-type: none"> • Motorcycles and mopeds EURO 2 • Trucks (N2 and N3) EURO 4 and 5 • Buses (M2 and M3) EURO 4 and 5
<p>C label</p> 	<ul style="list-style-type: none"> • Passenger cars (M1) gasoline EURO 4,5 and 6 • Vans (N1) gasoline EURO 3 • Passenger cars (M1) diesel EURO 6 • Vans (N1) diesel EURO 6 	<ul style="list-style-type: none"> • Motorcycles and mopeds EURO 3 and 4 • Trucks (N2 and N3) EURO 6 • Buses (M2 and M3) EURO 6
<p>ECO label</p> 	<ul style="list-style-type: none"> • Plug-in hybrid vehicles with a range of less than 40 km • Non-plug-in hybrid vehicles (HEV and PHEV) • Vehicles powered by natural gas (CNG and LNG), or liquefied petroleum gas (LPG) 	
<p>Zero emissions</p> 	<ul style="list-style-type: none"> • Battery electric vehicles (BEV) • Extended range electric vehicles (REEV) • Plug-in hybrid electric vehicles (PHEV) with a minimum range of 40 kilometres • Fuel cell vehicles. 	

THE BARCELONA LEZ [2020 – currently in force]



**ZBE Barcelona
Rondes**

2020
Permanent
Monday to Friday from
7 am to 8 pm



September 20, 2020



April 2021



January 2022















July 2022



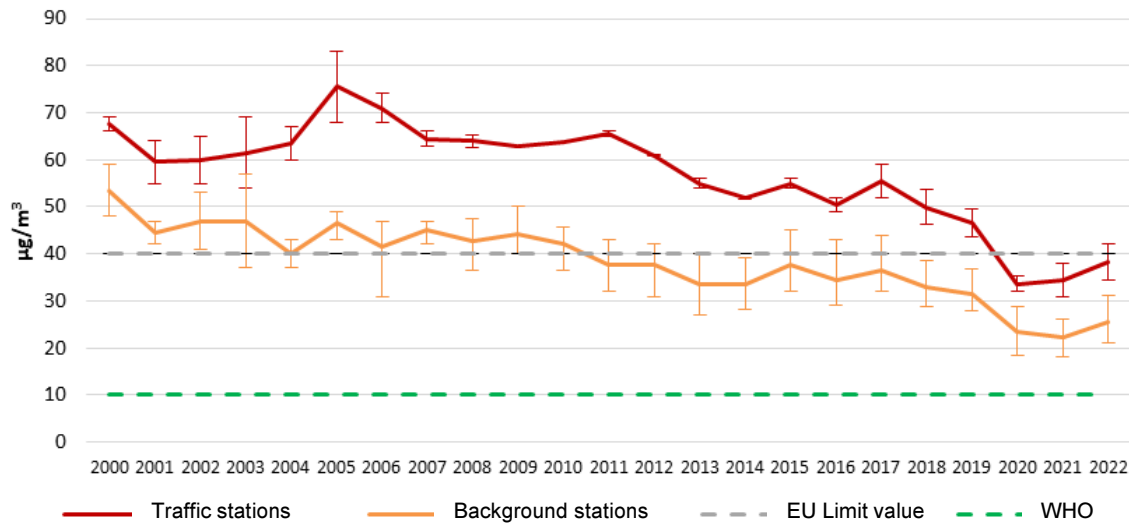
THE BARCELONA LEZ [2020 – currently in force]

AUTHORIZATIONS / EXEMPTIONS WITH SOCIAL CRITERIA:

- **Daily permits:** to ensure the occasional use of a vehicle affected by the measure (24 days/year per affected vehicle)
- **Special vehicles:** includes additional categories (vehicles dedicated to construction) to those already included in the previous ordinance
- **Professionals nearing retirement age:** holders of whom are missing a maximum of 5 years for retirement
- **Moratorium for replacement:** vehicles replaced by a new one can have a temporary access authorization to the LEZ
- **Low-income individuals:** temporary authorization for vehicles of low-income individuals

 <p>Autoritzacions diàries Registre de vehicles per poder sol·licitar fins a 24 autoritzacions de circulació l'any</p> <p>Més informació i registre</p>	 <p>Persones amb mobilitat reduïda Vehicles destinats al transport de persones amb mobilitat reduïda.</p> <p>Més informació i registre</p>	 <p>Serveis d'emergència i essencials Serveis mèdics, funeraris, protecció civil, bombers, i cossos i forces de seguretat.</p> <p>Més informació i registre</p>
 <p>Vehicles estrangers Registre de vehicles que disposen de matrícula estrangera. Tots s'hi han d'inscriure per circular dins les ZBE</p> <p>Més informació i registre</p>	 <p>Malalties o discapacitats Vehicles dedicats al transport de persones amb malalties o amb discapacitat reconeguda que els condicionen l'ús del transport públic.</p> <p>Més informació i registre</p>	 <p>Tractaments mèdics periòdics Vehicles que transportin persones que es fan tractaments mèdics periòdics en centres situats dins les ZBE.</p> <p>Més informació i registre</p>
 <p>Vehicles especials Vehicles adaptats que presten un servei singular i necessiten un accés temporal.</p> <p>Més informació i registre</p>	 <p>Professionals propers a l'edat de jubilació Vehicles de les categories M2, M3, N1, N2 i N3 als titulars dels quals els manquin 5 anys com a màxim per a la jubilació.</p> <p>Més informació i registre</p>	 <p>Proves dinàmiques en tallers Vehicles que realitzen proves de circulació en tallers autoritzats.</p> <p>Més informació</p>
 <p>Moratória per reposició Els vehicles que se substitueixin per un de nou poden disposar d'una autorització temporal d'accés a les ZBE.</p> <p>Més informació i registre</p>	 <p>Activitats amb autorització municipal Vehicles amb autorització municipal per prestar servei en activitats singulars o esdeveniments a la via pública.</p> <p>Més informació i registre</p>	 <p>Persones amb rendes baixes Autorització temporal per a vehicles de persones amb rendes baixes.</p> <p>Més informació i registre</p>

CONTEXT: EVOLUTION OF ANNUAL NO₂ EMISSIONS

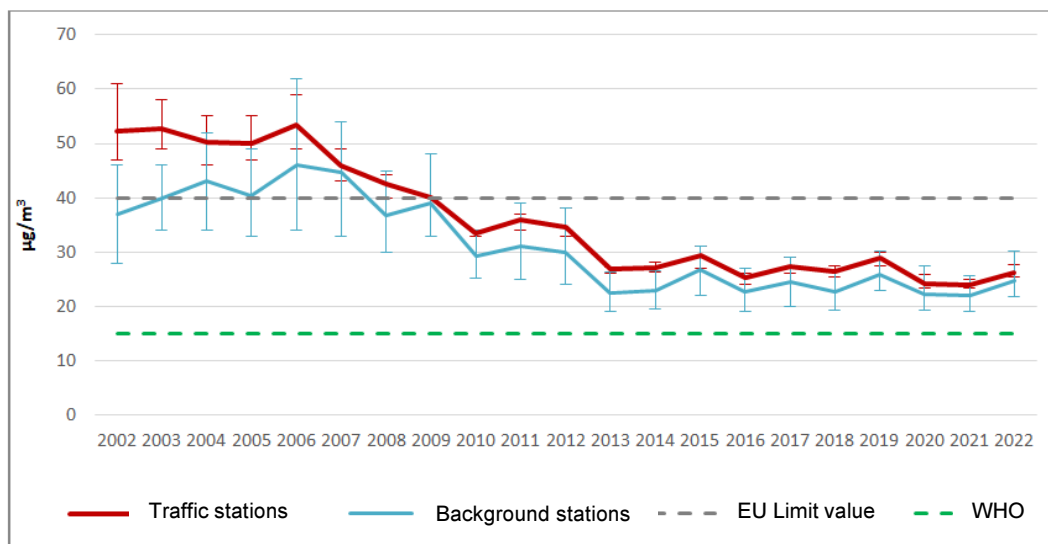


The annual average of NO₂ has been declining over the past decade, particularly at traffic stations (those located closer to traffic or in areas with higher traffic volume).



The evolution of annual NO₂ emissions at the traffic stations, is compared with the annual mobility data, showing a significant correlation between annual mobility variations and pollution levels

CONTEXT: EVOLUTION OF ANNUAL PM₁₀ AND PM_{2.5} EMISSIONS



Particulate PM₁₀

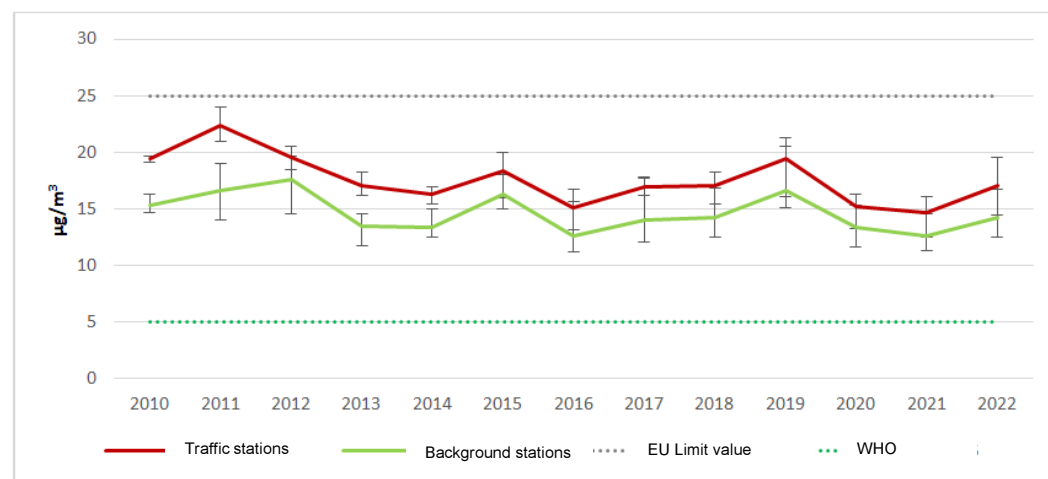
Since 2013, PM₁₀ levels have remained stable in the city, both at traffic and urban background stations, within compliance of the legal limit value and consistently exceeding the WHO guideline value

Traffic stations:

Eixample, Gràcia-Sant Gervasi, Plaça Universitat

Background stations:

Poblenou, Sants, Palau Reial, IES Verdaguer, Zona Universitària, Vall d'Hebron



Particulate PM_{2.5}

The annual average of PM_{2.5} particles remains above the WHO guideline value (5 µg/m³) during the period 2010-2022, while it complies with the legal limit value (25 µg/m³), which is less strict according to European regulations. The general trend shows stability in levels since 2013, both at traffic and urban background stations.

Traffic stations:

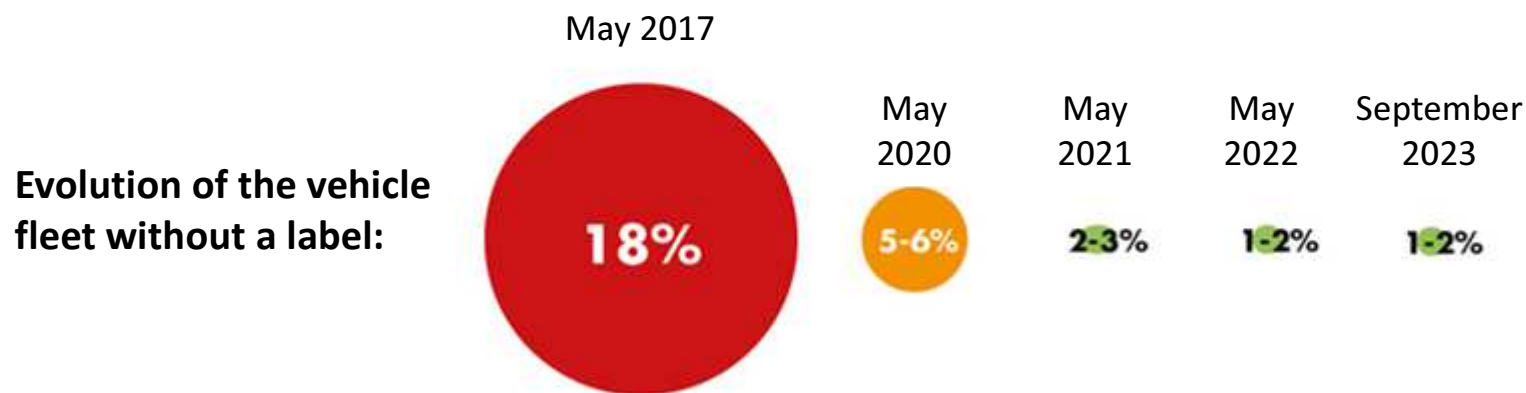
Eixample, Gràcia-Sant Gervasi, Plaça Universitat

Background stations:

Poblenou, Zona Universitària, Vall d'Hebron

LEZ MONITORING

EVOLUTION OF THE VEHICLE FLEET

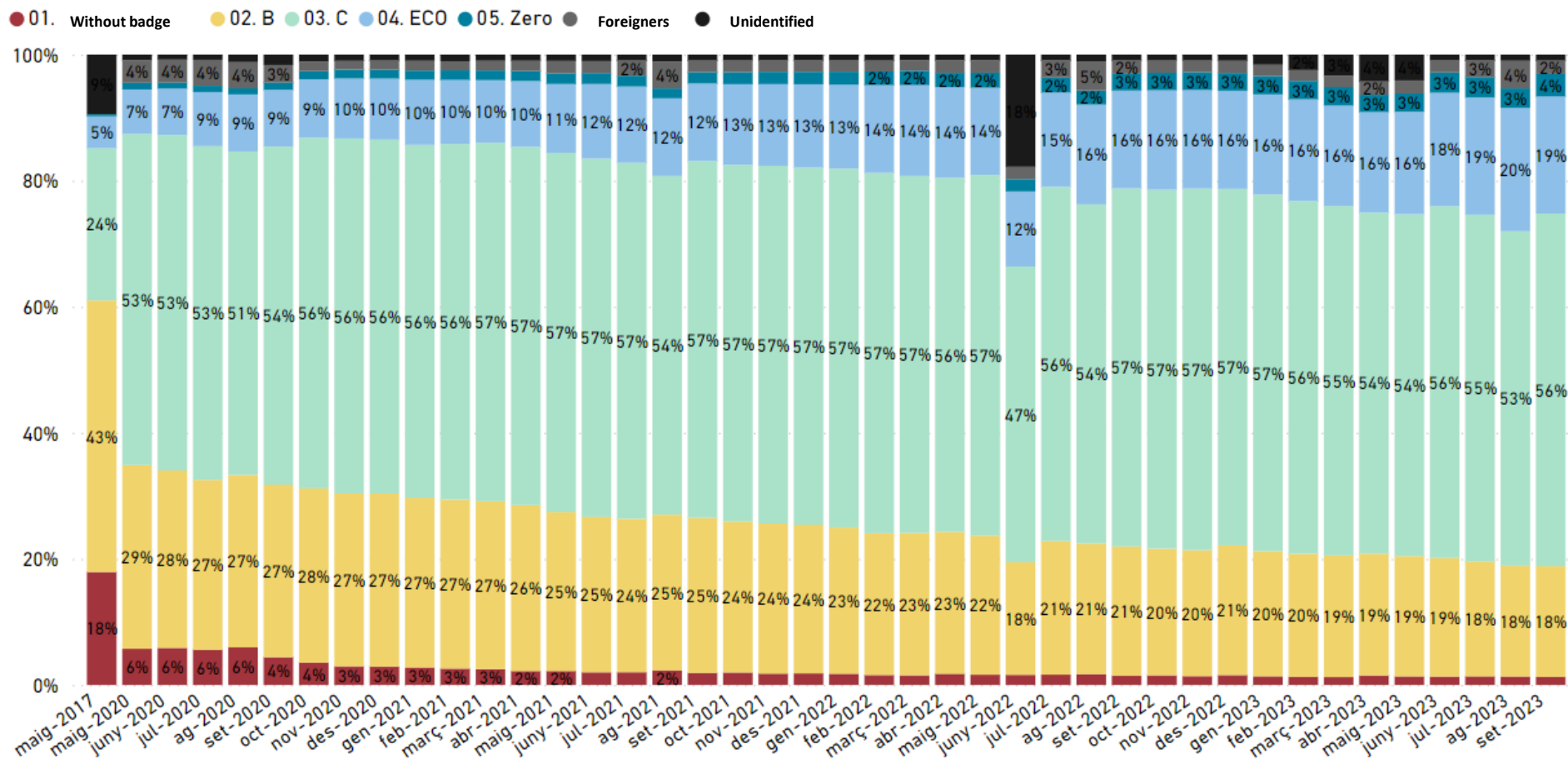


- CARS: Since February 2023, there have been more ECO cars detected than B cars in the Barcelona LEZ. Data from September 2023: **ECO: ≈25%, B: ≈18%**
- OVERALL VEHICLE FLEET: With data from September 2023, the number of ECO vehicles is also higher than that of the B label (due to the significant proportion of cars in the total vehicle fleet).

		Set/22	Oct/22	Nov/22	'Des/22	'Gen/23	'Feb/23	'Mar/23	'Abr/23	'Mai/23	'Jun/23	'Jul/23	'Ago/23	Set/23
Cars	B	21,31%	20,99%	20,78%	21,30%	20,58%	20,32%	20,27%	20,73%	20,30%	19,30%	18,88%	18,57%	18,27%
	ECO	20,65%	20,89%	20,60%	19,72%	20,51%	21,18%	21,39%	21,41%	22,04%	23,83%	24,70%	26,09%	24,59%

LEZ MONITORING

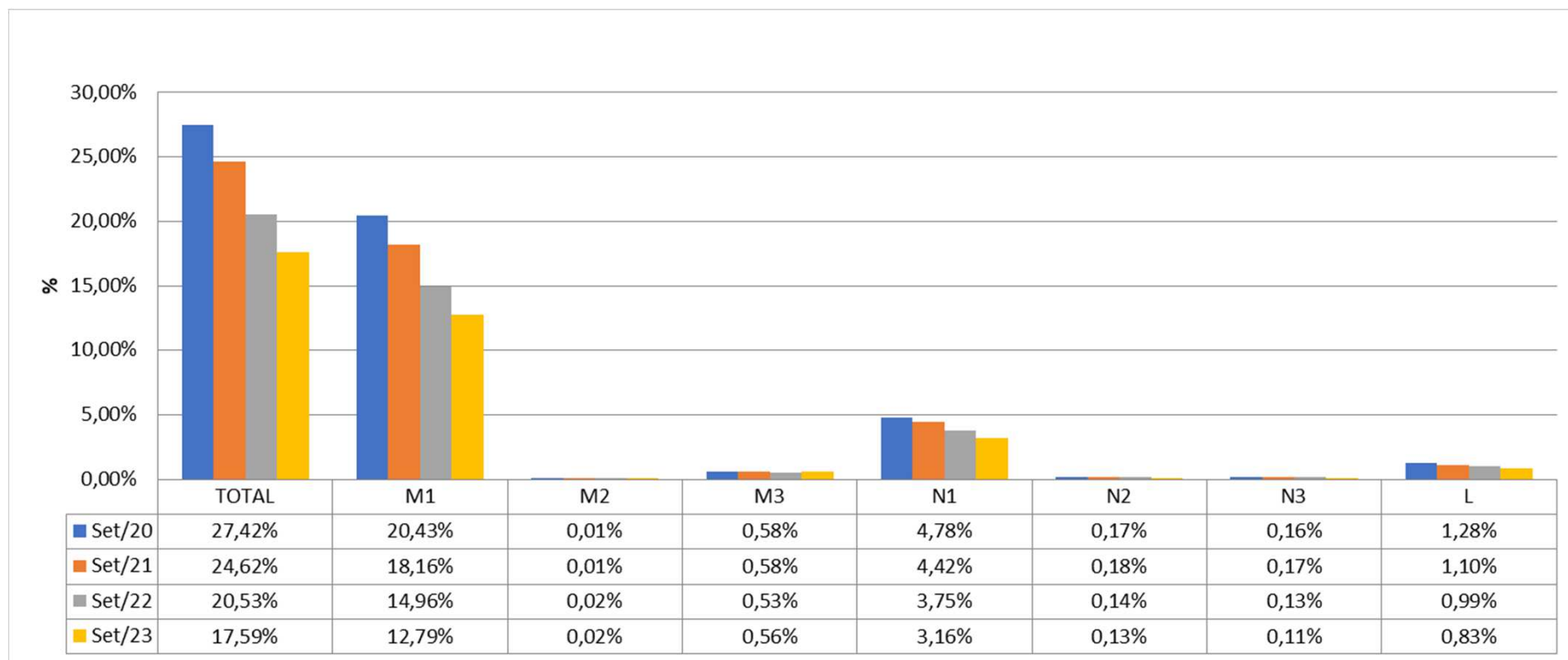
EVOLUTION OF THE VEHICLE FLEET



Note: The data from June 2022 is affected by an error in the license plate capture system, which overestimated the presence of 'unidentified' vehicles.

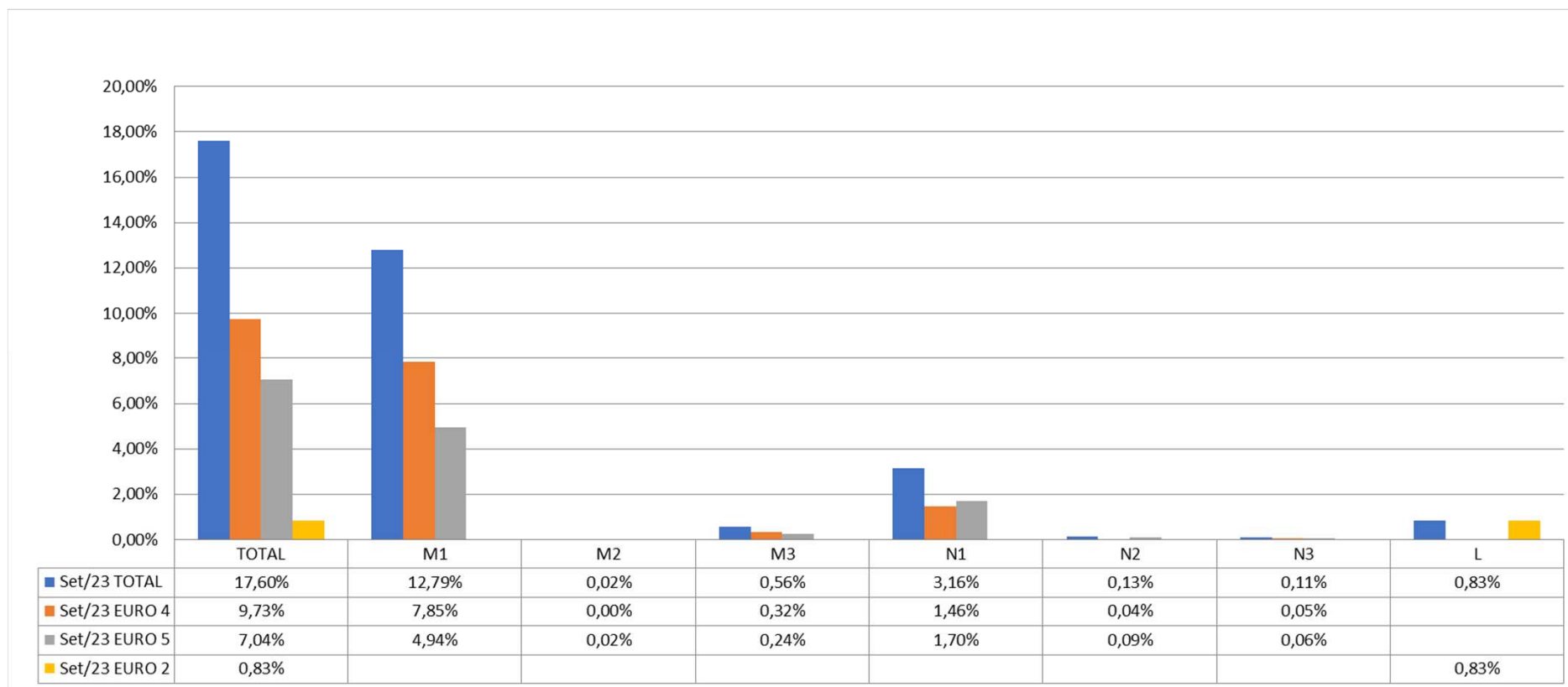
LEZ MONITORING

EVOLUTION OF THE FLEET WITH YELLOW LABEL (B) FROM SEPTEMBER 2020 TO SEPTEMBER 2023



LEZ MONITORING

FLEET COMPOSITION WITH YELLOW LABEL (B) AS OF SEPTEMBER 2023



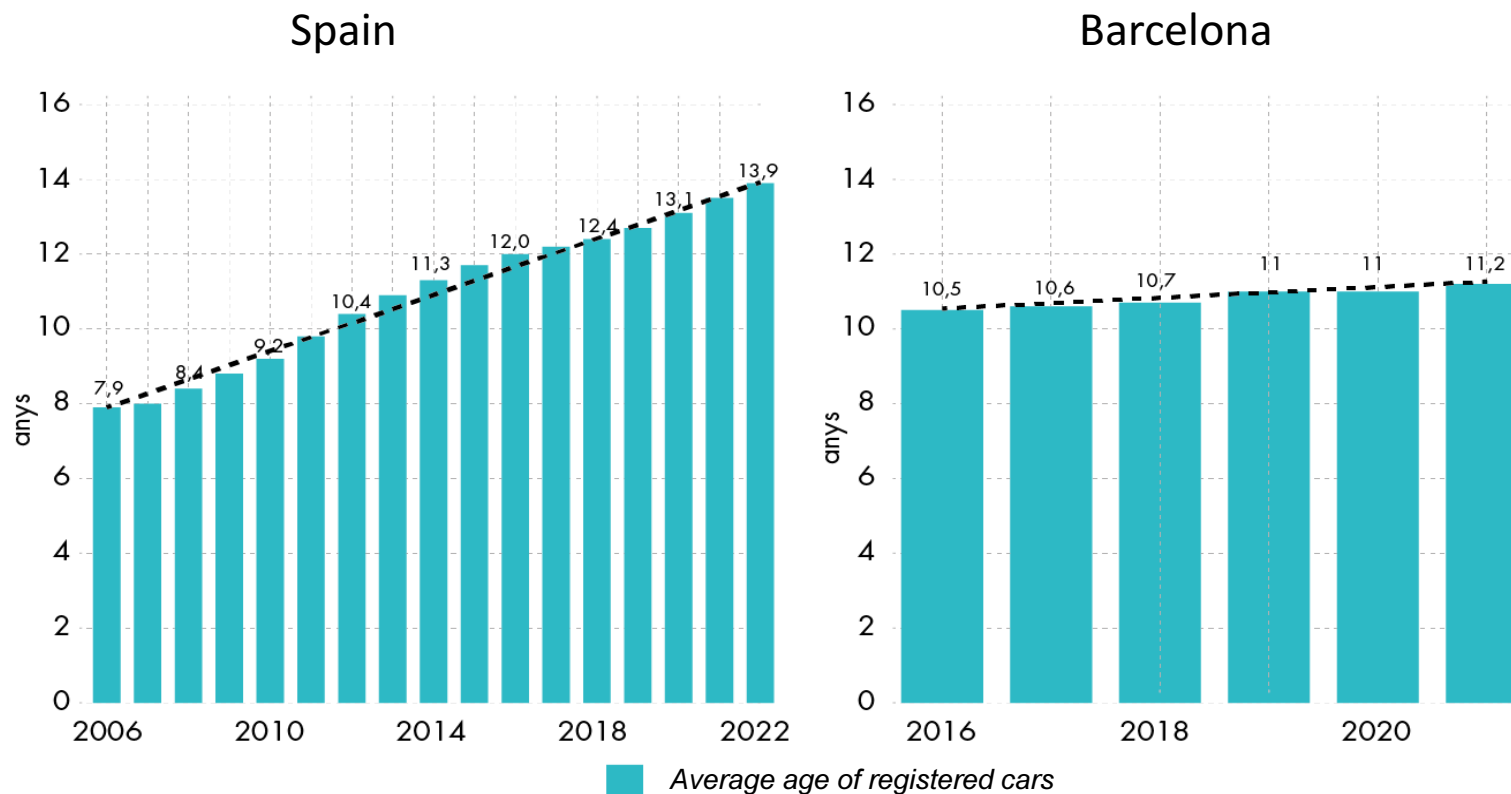
Note: Data based on distribution according to EURO regulations as of December 2022. Estimation as of September 2023 based on the composition of the circulating fleet detected by ZBE cameras.

LEZ MONITORING

Age of registered vehicles

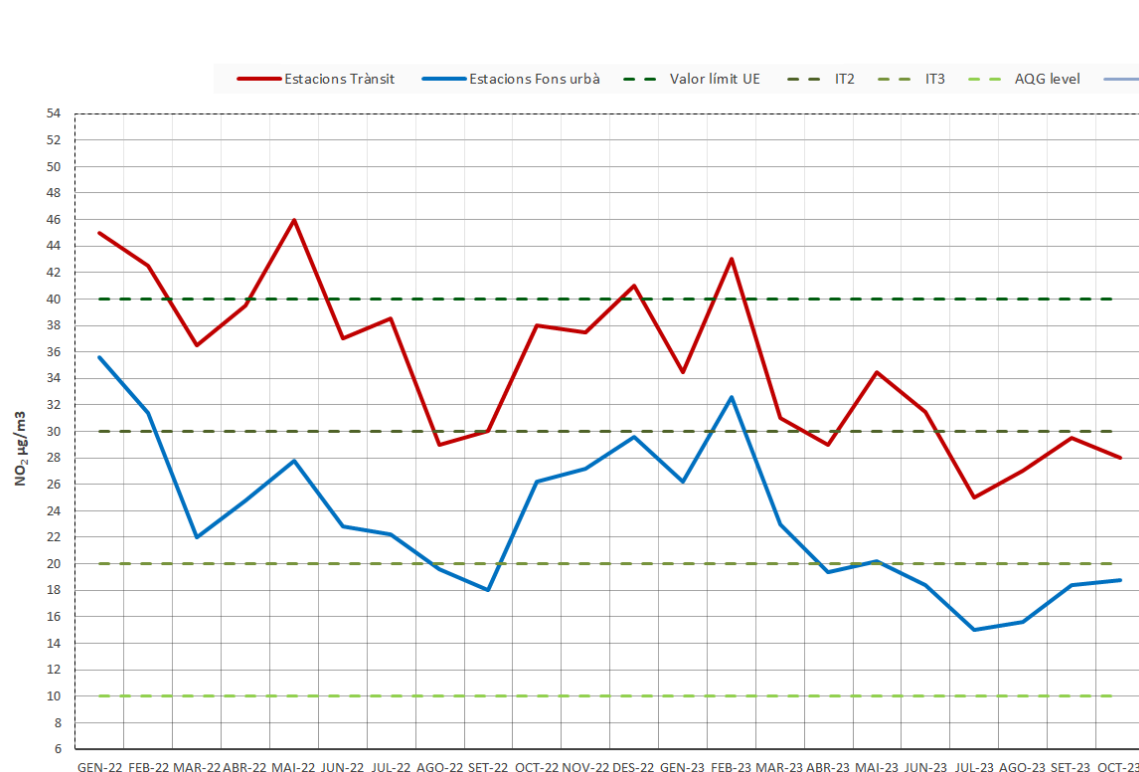
From the state statistics provided by the DGT, it can be observed that **since 2006, the average age of registered cars in Spain has been increasing, reaching 13.9 years in 2022.**

However, when referring to the **average age of registered vehicles in the city of Barcelona**, we see that this indicator does not follow the trend of the Spanish state. In the graph, it can be observed that **from 2016 to 2022, there is an increase of only 0.7 years**



REASONS FOR CONSIDERING AN EVOLUTION OF THE LEZ

- The current Barcelona LEZ has been a **necessary measure** that has led to a reduction in emissions from road traffic (the main contributing source in Barcelona).
- The levels recorded in 2023 maintain a positive trend, and no non-compliance is expected at any station once the year 2023 is completed (accumulated from January to October at the Eixample station: $33 \mu\text{g}/\text{m}^3$).
- The **new limit values** are significantly lower than the previous ones, **which will likely result in widespread non-compliance throughout the city** (the new Directive includes levels of $20 \mu\text{g}/\text{m}^3$ to be met by 2030). Additionally, the World Health Organization (WHO) has already updated its guidelines or recommended levels.



	Maximum annual average NO ₂
EU Directive (Limit Values by January 2030)	$20 \mu\text{g}/\text{m}^3$
Former WHO recommended values	$40 \mu\text{g}/\text{m}^3$
WHO Current Intermediate target 3	$40 \mu\text{g}/\text{m}^3$
WHO Current Intermediate target 2	$30 \mu\text{g}/\text{m}^3$
WHO Current Intermediate target 3	$20 \mu\text{g}/\text{m}^3$
Current WHO recommended values	$10 \mu\text{g}/\text{m}^3$

PREMISES WHEN CONSIDERING AN EVOLUTION OF THE BARCELONA LEZ

The following aspects must be taken into account:

- Consideration of **depreciation periods** for different vehicles (PIMEC Depreciation)
- **Gradual introduction** by vehicle type
- Ensuring annual **impacts** are **reasonable**
- Avoid penalizing **occasional trips**
- Incorporation of **social criteria** to minimize impacts
- Evolution with a **metropolitan perspective. Shared governance.**
- **Next milestone ??**

Els vehicles amb etiqueta groga no podran circular per la ZBE a partir de l'1 de gener del 2028

A partir de l'1 de gener del 2026, no podran circular els vehicles dièsel amb etiqueta groga quan s'activin avisos per contaminació de NO₂

Maria Solans | Maria Casals Torres 3 d'abril de 2024



IMPACTE | CONTAMINACIÓ

La prohibició de cotxes amb etiqueta groga a les ZBE s'endarrereix fins al 2028

La prohibició només es farà efectiva el 2026 per als vehicles dièsel en episodis de contaminació, segons un pla que el Govern té previst rematar en forma de decret després de les eleccions, amb l'executiu en funcions

Cataluña limitará la circulación de los vehículos con etiqueta amarilla en las ZBE en 2026 y la prohibirá completamente en 2028

MEDIDA

El Govern quiere prohibir los vehículos con etiqueta amarilla en las ZBE a partir de 2028



CONCLUSIONS

- The current Barcelona LEZ has been a **necessary measure** that has led to a reduction in emissions from road traffic.
- The emission factors (g/km) have been declining for years, indicating the accelerated renewal of the vehicle fleet towards vehicles with lower emission levels. Since February 2023, **there have been more ECO cars detected than B cars** in the Barcelona LEZ. Data from September 2023: **ECO: ≈25%, B: ≈18%**.
- **The volume of circulating vehicles** is almost **constant**, but **each vehicle pollutes much less**.
- Likewise, the total emissions of NO₂ (g/km), a pollutant closely related to traffic, have also experienced a reduction of almost 45% compared to the year 2017. Mobility between 2022 and 2017 has experienced a reduction of approximately 6%
- **The reduction in limit values** represents significantly lower thresholds compared to current standards, which **will inevitably lead to widespread non-compliance across the city**. Hence, there is a pressing **need to consider an evolution of the Low Emission Zone (LEZ)** to accommodate these changes



**Ajuntament
de Barcelona**