ASECAP DAYS
ISTANBUL 2023

Celebrating 50 YEARS OF Successful TOLL ROAD PROJECTS

FROM BLACK BOX TO GREEN BOX

GREEN ASSESSMENT OF UNIPOLTECH'S TELEMATICS DATA

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UnipolTech
SOLUZIONI TECNOLOGICHE

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ICA
YAVUZ SULTAN SELİM BRIDGE AND NORTHERN RING MOTORWAY

Origins and Evolution of Telematics in the Unipol Group and the role of UnipolTech

ASECAP DAYS ISTANBUL 2023 — Celebrating 50 YEARS OF Successful TOLL ROAD PROJECTS

FULL OUTSOURCING

2003 Unibox
First Experiments with Telematics

2010 "Km Sicuri"
Geolocation by incident and three different product types (Easy,Top and Professional)

2005-2006:
Launch of the **first market-wide telematics product**

2016 "Km&Servizi"
SuperEasy and Full for PAYD rate with VAS services for the Customer

March 1st 2016 AlfaEvolution TECHNOLOGY
- **"Ingestion" of all telematics data into Alfa's BDH[1]**
- **Direct purchase of the boxes and connectivity**
- **Insourcing of the telematics client**

October 2017
Crash Validator
Total insourcing

November 2016
Telematics offering launch on AlfaEvolution

November 2017
ISO9001

March 2019
- **TSP[2] internalization**
- **Direct management of industrial services**

November 2018
KM&Servizi Fleet

July 2018
Telematics offering launch

March-May 2017
- Product launch «Casa&Commercio»
- Product launch «Cane&Gatto»

November 2019
Qshino, first beyond insurance telematics product

September 2020
Birth of the proprietary Kernel, the basis of the **"Vehicle Ecosystem"** is born, with its first applications:
- **Unibox Safe**
- **Unibox SuperEasy Più**

July 2020
SuperEasy 2Ruote, first product completely designed for motorcycles

SuperEasy 2Ruote

GHOST

SOLAR VOICE

July 2021 Rebranding
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November 2022
Unibox Smart Drive

March 2021
First telematics exercise abroad

TRADEX INSURANCE SERVICES

April 2022
EETS accreditation and **launch** of **UnipolMove**

September 2022
Based on SuperEasy UnipolTech

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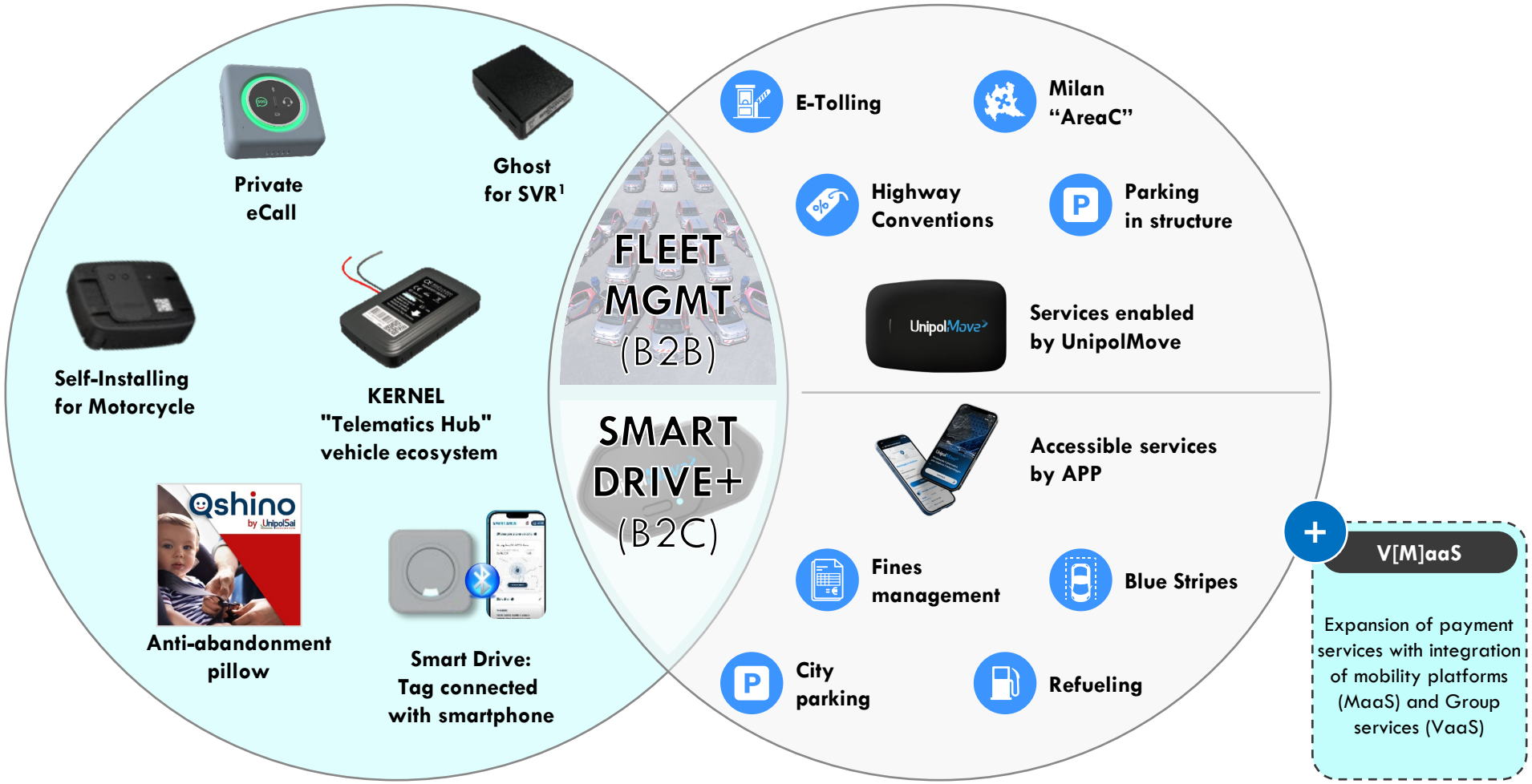
1. Big Data Hub owned by UnipolTech;
2. Telematics Service Platform owned by UnipolTech

UnipolTech offer



1. Stolen Vehicle Recovery – proactive theft service

UnipolTech manages the datayearly generated by UnipolSai Uniboxes and by UnipolMove

4 Mln Telematics Customers

415 Mln Detected Events

183 k Managed Crash Events

25,4 Bn traveled km

580 k UnipolMove Devices

480 k UnipolMove Customers

8,7 Mln delivered VAS

28 Mln Highway Transit

- GNSS
- Modem
- Bluetooth
- Accelerometer
- Gyroscope
- Back up Battery

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UNIPOLTECH possesses high value-added data compared to competitors

- DATA HETEROGENEITY
- WIDE SAMPLE SIZE
- UPDATED DATA

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Euro Class might not be the only parameter to be used in the green assessment of a vehicle

Currently, the **only reference used** for traffic blocks or limiting access to LTZs are the **Euro Classes** of vehicles. These are **official categories, regulated** by **government agencies** and recognized by all, but they are **not selective** (tailored to the actual pollution profile)

*Thanks to the **Unibox data** it is **possible** to **retrieve additional** useful **information***

Traveled Km

Thanks to **GNSS data** it is possible to **reconstruct** the **amount** of **miles driven,** which is one of the key parameters to really understand the pollution profile

A Euro 0 that does 30km in a week has lower emissions than a euro 6 that does 300km in a week. In addition, it would be possible to evaluate the time slots of mileage, so that critical time slots are penalized

Average Speed

Again, thanks to **GNSS data** it is possible to know the **driving speed,** which is another useful parameter for assessing the actual pollution profile of a vehicle

A speed that is too low or too high leads to higher pollutant emissions per km than staying constant average speeds

Driving Style

Thanks to **inertial and GNSS sensors,** particularly **aggressive driving profiles** can be **detected**

Aggressive driving definitely has an environmental implication in terms of fuel consumption and brake pads. So, a driver with aggressive driving pollutes more than one with gentle driving

Green Box project and the «Virtual Sensing» Algorithm

Using **data collected** by **Unibox** devices, **combined** with **information** on **vehicle emissions,** UnipolTech has created a **"virtual sensing" algorithm** for a **measure** of a vehicle's true **environmental impact**

Consider from literature and official information from manufacturers:

- **Emission/consumption by model**
- **Emission by use profile** (urban, extra urban, ...)
- **Emission/consumption by Euro Class**

Consider data from the Uniboxes:

- **Average travel speed**
- **Kilometers driven** and **actual geolocation** of **kilometers driven** (e.g. urban, suburban, ...)
- **Driving style based** on **accelerometer** and **GNSS data** (hard braking and acceleration)

Classification of the **environmental impact** of each vehicle, but **based** on **actual usage data** and not just theoretical data

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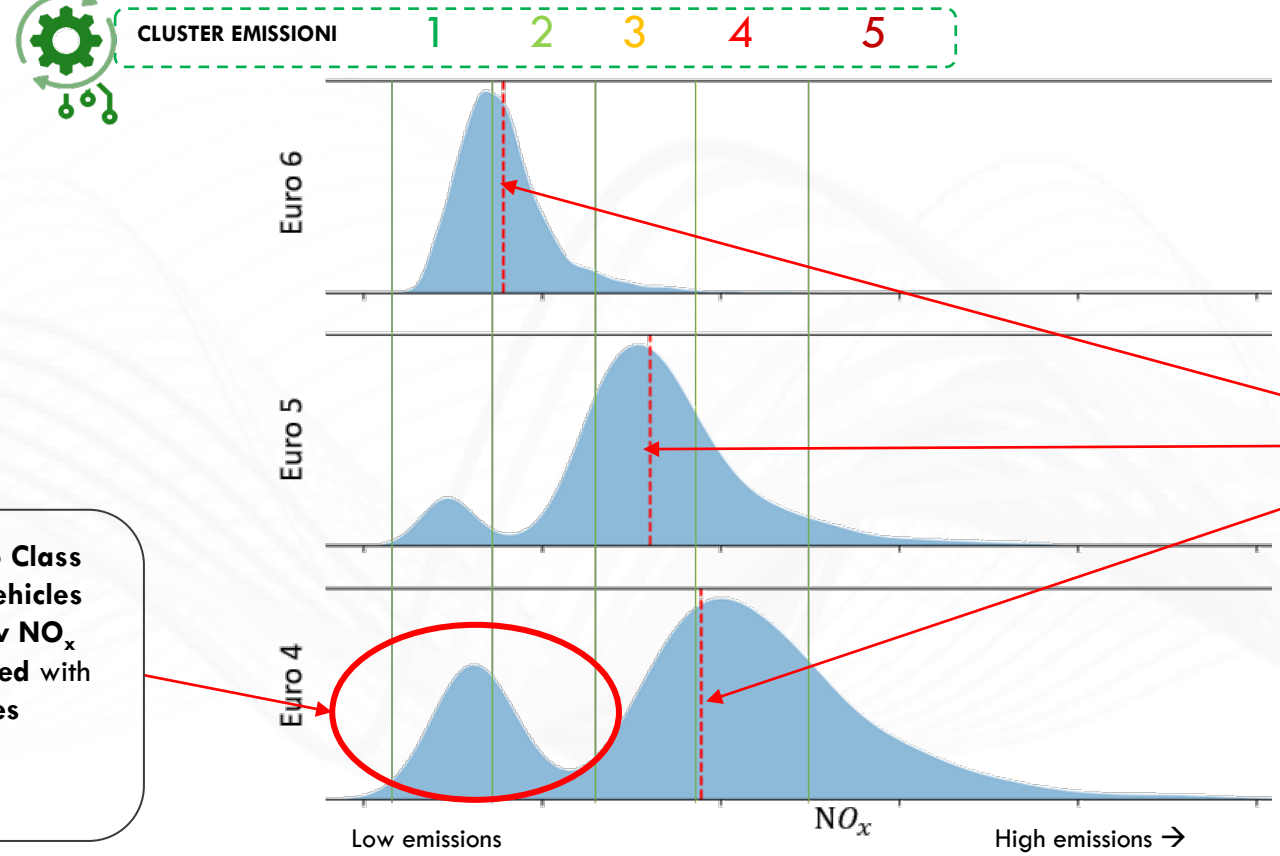
Comparison of vehicle emissions - NO_x[1] actually emitted

Analyzed vehicle fleet[2] broken down by NOx pollution emitted for each Euro class



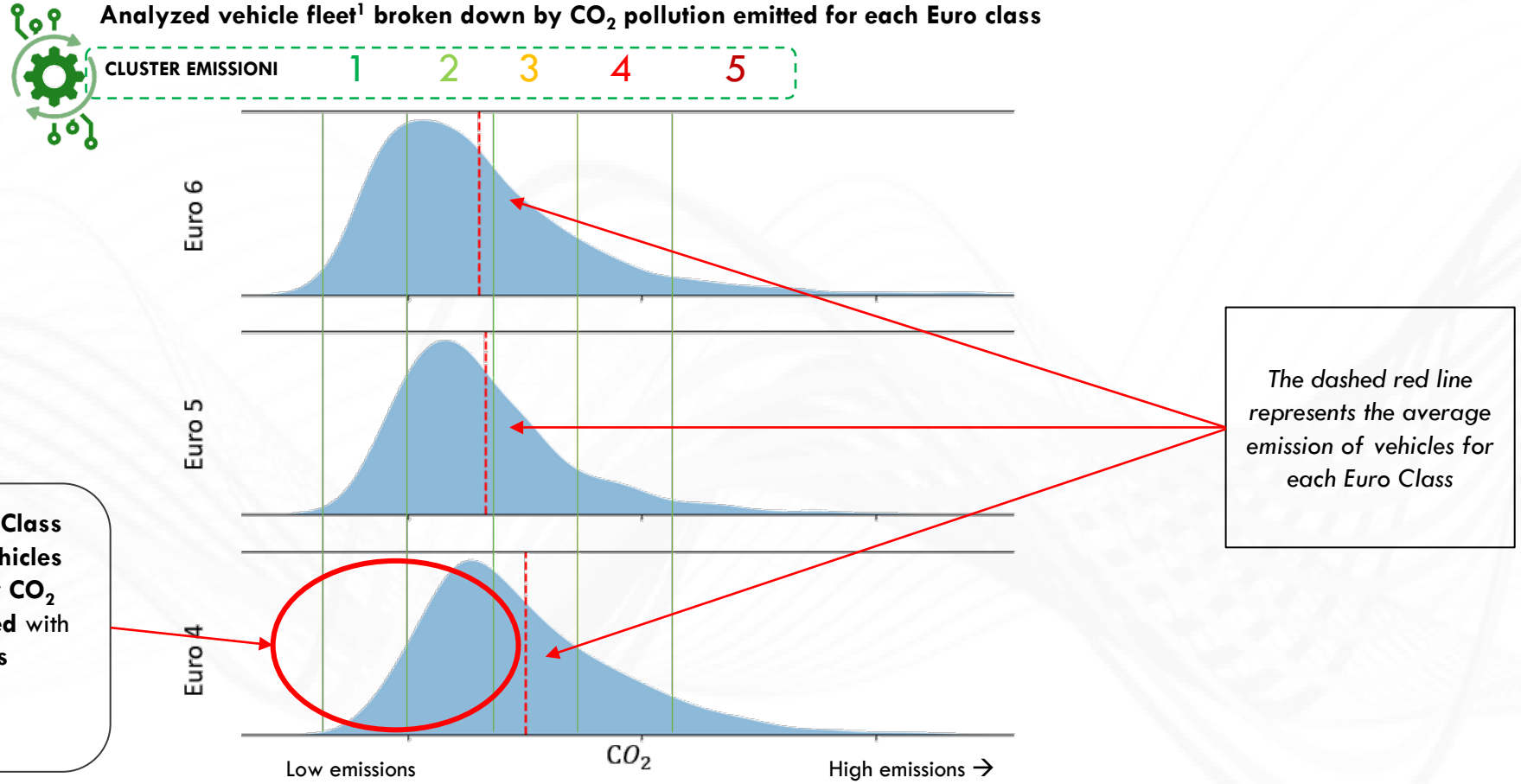
A **policy based** on **Euro Class alone** would **exclude vehicles** that have relatively **low NO_x emissions** even **compared** with **newer Euro Classes**

The dashed red line represents the average emission of vehicles for each Euro Class

1. NOX: Nitrogen oxides produced by combustion;
2. 8.000 vehicles equipped with Unibox

Comparison of vehicle emissions – CO_2 actually emitted

Analyzed vehicle fleet[1] broken down by CO_2 pollution emitted for each Euro class



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1. 8.000 vehicles equipped with Unibox

«Virtual Sensing» algorithm | Real Examples (1/3)

Toyota Rav4 2000-2005 – EURO 3

1. Euro class: **Euro 3**
2. Fueling: **Diesel**
3. Registration year: **2000 - 2005**
4. Total Km: **~ [15.000 – 20.000] km**
5. Urban Consumption [l/100km]: **9,4**
6. Extra-urban Consumption [l/100km]: **6,2**
7. Mixed Fuel Consumption [l/100km]: **7,4**
8. CO2 emission [g/km]: **175**

Official manufacturer data and related Vehicle Class

Vehicle ID	9629	9640	9663
Total Km	19.949,27	19.831,28	17.409,8
Urban Km	340,77	234,02	726,28
Highway Km	0	0	163,11
Mixed km	19.608,5	19.597,26	16.520,41
Average speed U [km/h]	16,083	16,617	32,43
Average speed H [km/h]	0	0	70,537
Average speed M [km/h]	23,486	33,553	47,619
Driving Style Score	1,011	1,006	1,01
Consumption Score	0,508	0,412	0,299
CO_2 Score	0,431	0,378	0,292
NO_x Score	0,431	0,429	0,376
EMISSIONS CLUSTER	4	3	2

From Unibox

From UnipolTech algorithms

Key Takeaways

With **similar mileage** between the three vehicles, it can be seen that the **average higher speed** means that the **actual fuel consumption** is **much lower,** with a much more positive "green" impact

«Virtual Sensing» algorithm | Real Examples (2/3)

Lancia Ypsilon 2000-2005 – EURO 4

1. Euro class: **Euro 4**
2. Fueling: **Diesel**
3. Registration year: **2000 - 2005**
4. Total Km: **~ [15.000 – 20.000] km**
5. Urban Consumption [l/100km]: **5,7**
6. Extra-urban Consumption [l/100km]: **3,9**
7. Mixed Fuel Consumption [l/100km]: **4,6**
8. CO2 emission [g/km]: **122**

Official manufacturer data and related Vehicle Class

Vehicle ID	6078	6098	
Total Km	15.716,8	15.110,2	
Urban Km	8.412,68	684,32	
Highway Km	0	372,09	
Mixed km	7.304,12	14.053,79	*From Unibox*
Average speed U [km/h]	19,375	13,714	
Average speed H [km/h]	0	61,978	
Average speed M [km/h]	33,556	38,474	
Driving Style Score	1,024	1,005	
Consumption Score	0,223	0,184	*From UnipolTech algorithms*
CO_2 Score	0,23	0,192	
NO_x Score	0,17	0,163	
EMISSIONS CLUSTER	2	1	

Key Takeaways

In this case, given comparable average speeds the **large difference between** the **mileage** on **urban stretches** (with higher consumption) **generates** a **green penalty** for the first vehicle (emission cluster 2)

«Virtual Sensing» algorithm | Real Examples (3/3)

Peugeot 308 2015-2022 – EURO 6

1. Euro class: **Euro 6**
2. Fueling: **Diesel**
3. Registration year: **2015 - 2022**
4. Total Km: **~ 40.000 km**
5. Urban Consumption [l/100km]: **3,5**
6. Extra-urban Consumption [l/100km]: **2,9**
7. Mixed Fuel Consumption [l/100km]: **3,1**
8. CO2 emission [g/km]: **82**

Official manufacturer data and related Vehicle Class

Vehicle ID	8304	8305
Total Km	40.949,7	37.911,82
Urban Km	3.168,67	2.810,01
Highway Km	1.093,24	2.775,06
Mixed km	36.687,79	32.326,75
Average speed U [km/h]	24,672	19,707
Average speed H [km/h]	77,335	67,371
Average speed M [km/h]	35,858	49,306
Driving Style Score	1,041	1,013
Consumption Score	0,357	0,274
CO_2 Score	0,358	0,298
NO_x Score	0,142	0,131
EMISSIONS CLUSTER	3	1

From Unibox

From UnipolTech algorithms

Key Takeaways

The second vehicle (emission cluster 1), while having similar mileage to the first, has a **better score** given by the **higher average travel speed**

UnipolMove customer CO_2 reduction Observation July - August 2022

An analysis has been conducted on a sample of **35.000** customers who have **Unibox** telematics device in combination with **UnipolMove** electronic toll collection device

Main evidence

- Data gathered on trips concerning **July-August 2022** (peak period related to summer exodus) observation period
- The presence of **complete vehicle master data** (make/model/power supply) available on telematics clients allowed **estimating CO_2 emissions** for each vehicle, also relying on open data
- The **traffic data** analyzed showed that the presence of the **Electronic Tolling device reduces travel time** by about **40-60 seconds** on average for each TLP barrier crossed on exit

> 300t CO2 savings *in the period July - August 2022 with* ***UnipolMove***[1]

1. Data reversed on the entire sample of UM clients. Estimation based on the sample of 35.000 telematic UM clients with complete records

Telematics opportunities on Sustainability

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World leader in **telematics** for **light vehicles,**
to date, **uses data collected only** for **insurance purposes.**
However…

… thanks to the **capabilities** of

Data collection thanks to its own **boxes**

Data processing thanks to **machine learning algorithms**

is **able to correlate…**

The **driving style** of its customers

&

Actual **CO_2** and **NO_x emissions**

Enabling the **assignment** of a **pollutant class more consistent** with the **actual consumption profile** of an **individual vehicle**

This is a **vision,** which **if shared** at the **common level,** could **open up new** concrete **scenarios** for **exploring:**

Point-in-time discounting policies on **highway tolls** with a **view** to **decarbonization**

Strategies aimed at **traffic control, promoting** more **sustainable mobility** in the **long term**

Telematic services and **eTolling** integration for a **fair** access to **city LTZs** and **eToll calculation**

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THANK YOU

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