

Contributions to sustainability
goals from ERTICO and
Partnership activities

SIS59 – ITS to mitigate climate change
and reduce pollution:
Impacts and quick wins

Andrew Winder

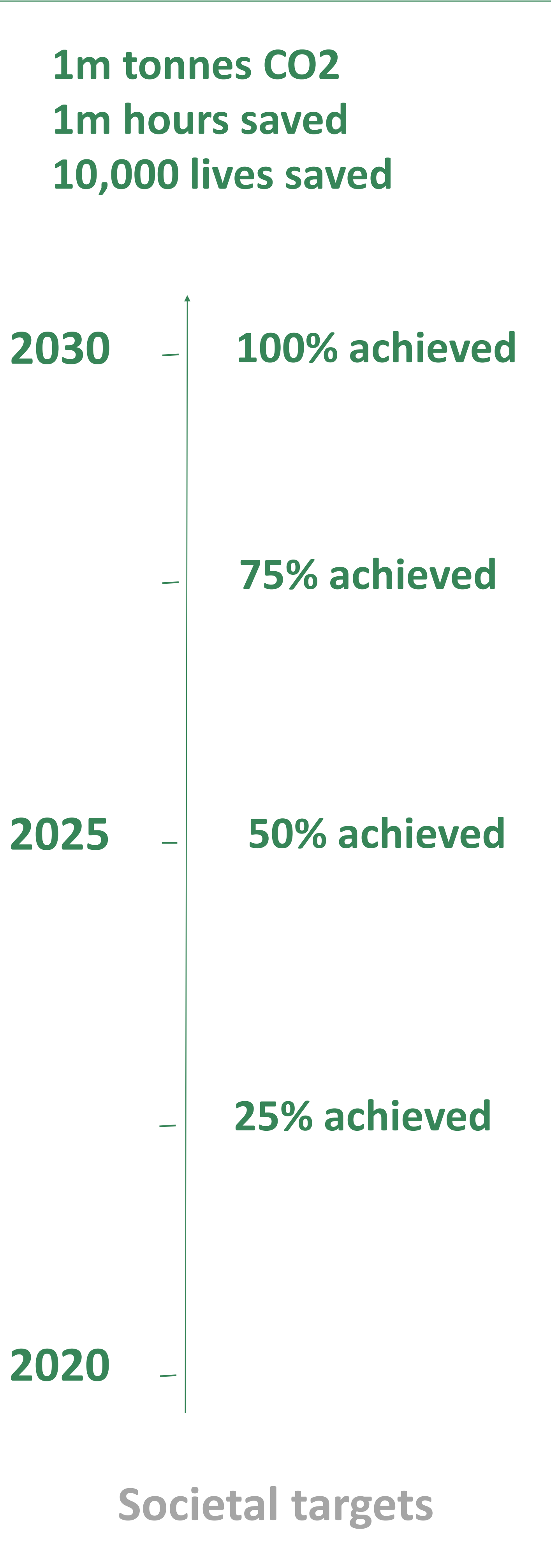
Emin Aliyev

ERTICO



LISBON 2023

ERTICO Clean and Eco-Mobility Roadmap



Ultra low emission mobility
widespread in both urban and non-urban area

ELVITEN
eCharge4Drivers

Electric Light Vehicles (ELVs) Integrated with transport and energy networks in several European cities and on key interurban corridors. Eco/low-emission driving apps or features used for all remaining ICE vehicles



MODALES
OptiTruck

2024: Common methodologies to allow externally auditable impact assessment of ITS measures for clean/ eco-mobility

NextETRUCK

2035: All new cars are zero emissions, as well as a majority of new HDVs (trucks, buses)



2030

Smart electro-mobility widely deployed in cities

2027
eCharge4Drivers

2027: Europe-wide smart infrastructure for clean modes

MODALES

2022: Low-emission driving app and training tested and available

2023

2020

PROJECTS
PLATFORMS
ERTICO Academy
ERTICO City Moonshot

Clean and Eco-Mobility

Sustainability contributions: overview of ERTICO

- **Goal:**
based on internal survey of projects, the report
- focuses on environmental (decarbonisation) impact of ERTICO projects running and closed between 2021-2023.
 - intends to highlight other values, such as social, scientific, educational ones.
 - puts forward real life measures and impacts.
 - shows results from 21 projects (out of ≈40)

#	Questions (Q) and Answers (A)
1 Q	Expected decarbonisation impact (CO2 or reduction of other emissions) according to the DoA ?
1 A	Please be specific (max: 10 lines).
2 Q	What are other project impacts KPIs according to the DoA?
2 A	<p>Please be specific (max: 20 lines, if nothing to add, please just say N/A)</p> <ul style="list-style-type: none">• Scientific: (high quality new knowledge, human capital in ITS R&I, Open science) ...• Economic: (reduced transport costs, job/company creation, company growth, leading position in the field in Europe, increase of competitiveness in EU ITS, etc)...• Societal: (safety of the users, noise, quality of life, awareness raising on a specific problem, behavioural, EU or national policy / regulatory impact etc) ...• Exploitable: (new services, new products, platforms etc)...
3 Q	What are the real-life, measured achievements in the project when it comes to decarbonisation?
3 A	Please be specific (max: 10 lines)
4 Q	What are steps needed to ensure after-life continuation and expansion of the services?
4 A	Please be specific (max: 10 lines) Cooperation / collaboration; Educational programmes; Training sessions; Patents; Applications etc.



Sustainability contributions: overview of ERTICO

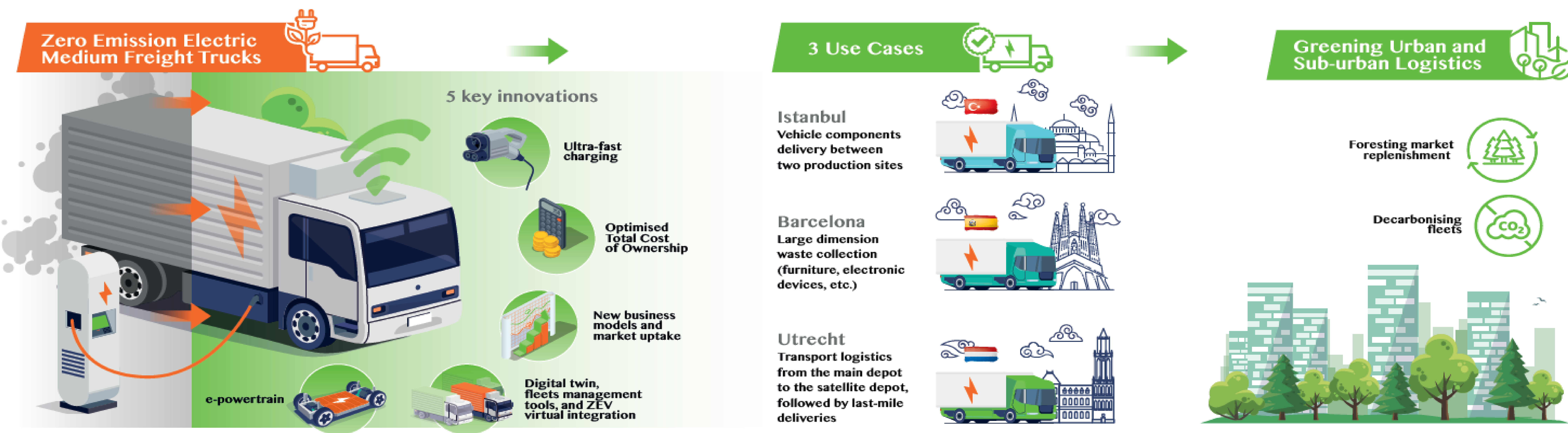
Findings:

- 21 projects (out of ≈ 40) are addressing one or more environmental and social targets
- 11 projects address decarbonisation and have clear objectives/KPIs or mentions them
- 7 projects addresses road safety and have clear targets
- 5 projects indicate clearly energy efficiency targets



Sustainability contributions of ERTICO projects: three cases from the projects:
CASE 1 : *NextETRUCK* (2022-2025)

Efficient and affordable **Zero Emission logistics**
through the **NEXTgeneration of Electric TRUCKs**



Sustainability contributions of ERTICO projects: three cases from the projects:

CASE 1: *NextETRUCK*

Goal: Zero emission vehicle concepts tailored for regional medium freight haulage (N2 & N3) with at least **10% energy efficiency increase** compared to existing highest-end benchmark EVs of the same size category and operating for similar mission profiles.

How?: the 10 % reduction will be done thanks to optimised battery thermal model, reduced thermal load on heating and cooling systems, waste heat recovery from HV/e-powertrain components.

Baseline:

16 t e-truck; 0,95 kWh/km energy

Consumption

Target:

0,86 kWh/km energy consumption (can go down to 0,75)

What impact can NextETRUCK create?

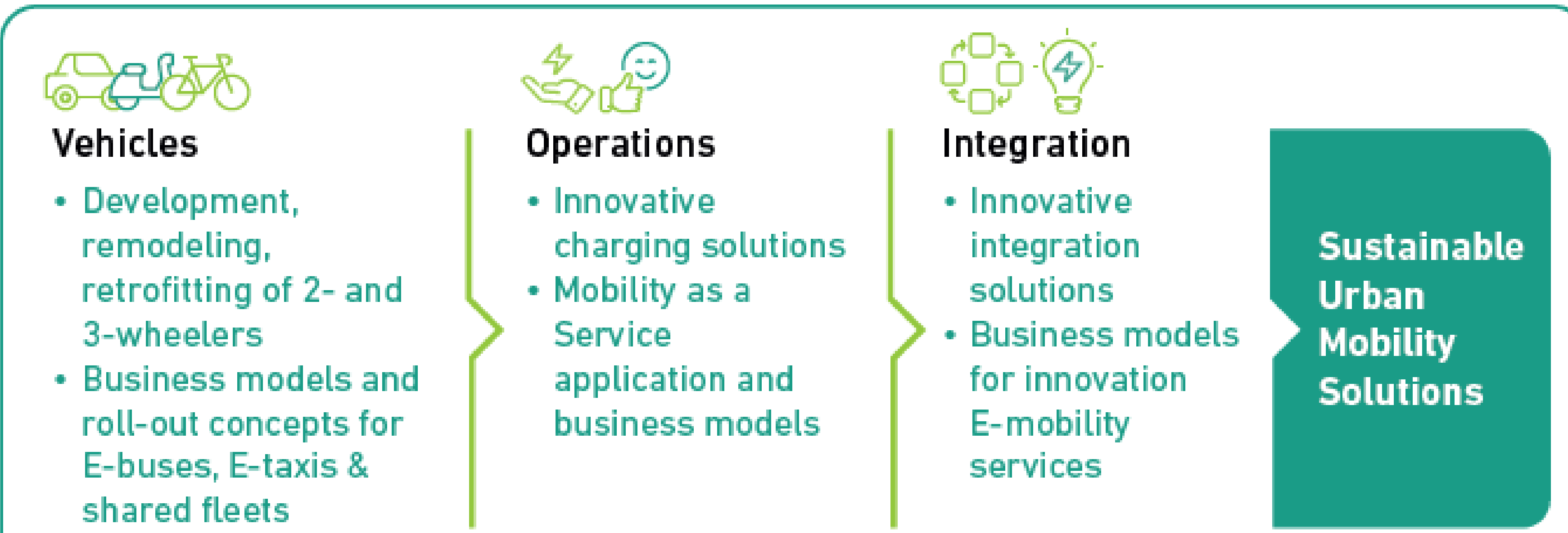
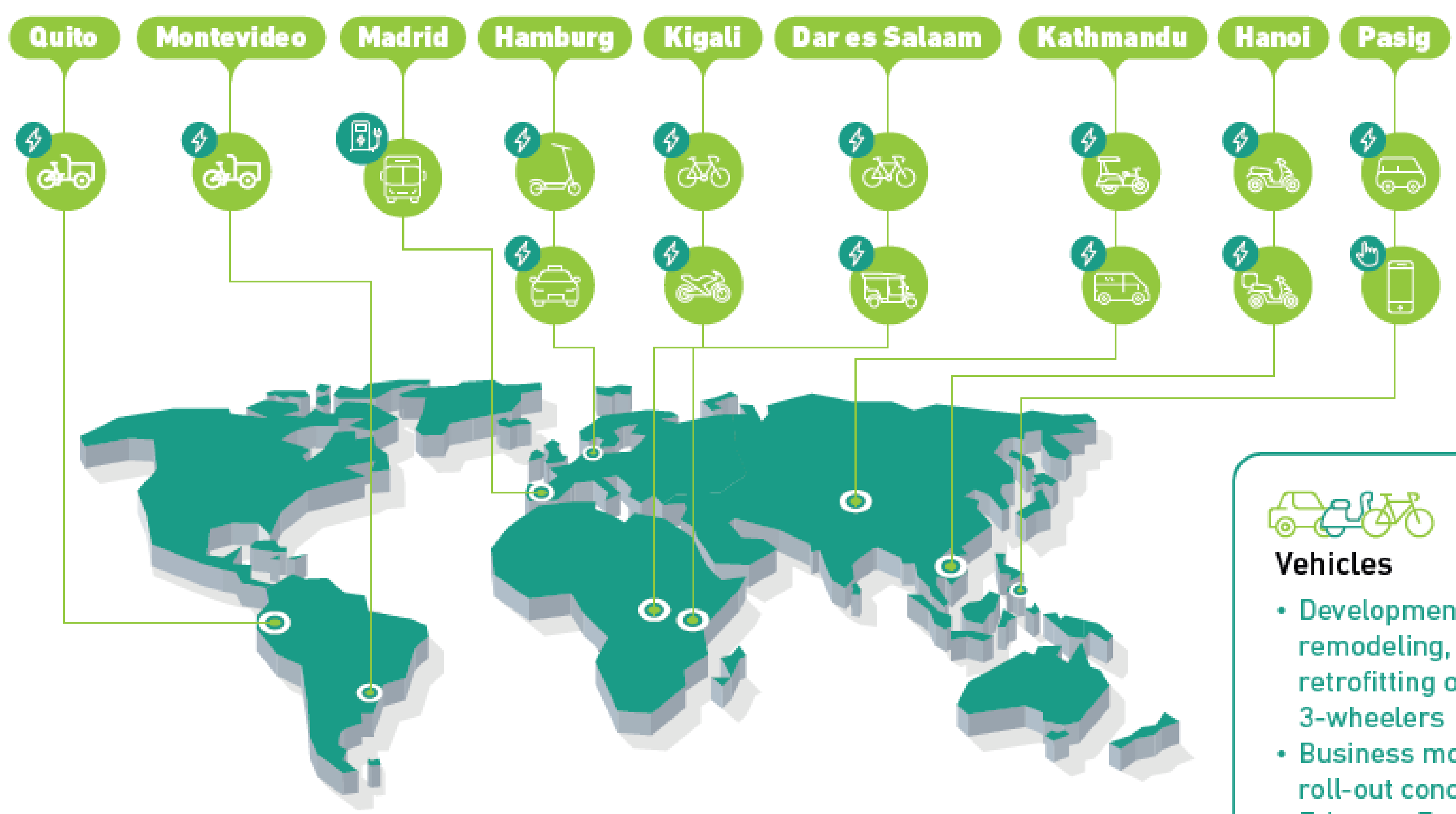
- The total energy amount of a NextETRUCK MCV per year will be approximately 45000 kWh, (based on 0.75 kWh/km).
- 43.7k tonnes CO2 compared to an ICE truck.
- The timeframe considers the project's duration (2022-2025) and the expected market penetration and adoption (2025-2028)

CASE 2: **SolutionsPlus**: Joint Global e-Mobility Platform





Developing electric mobility in **10 Living Labs** to kick start the transition towards low-carbon urban mobility



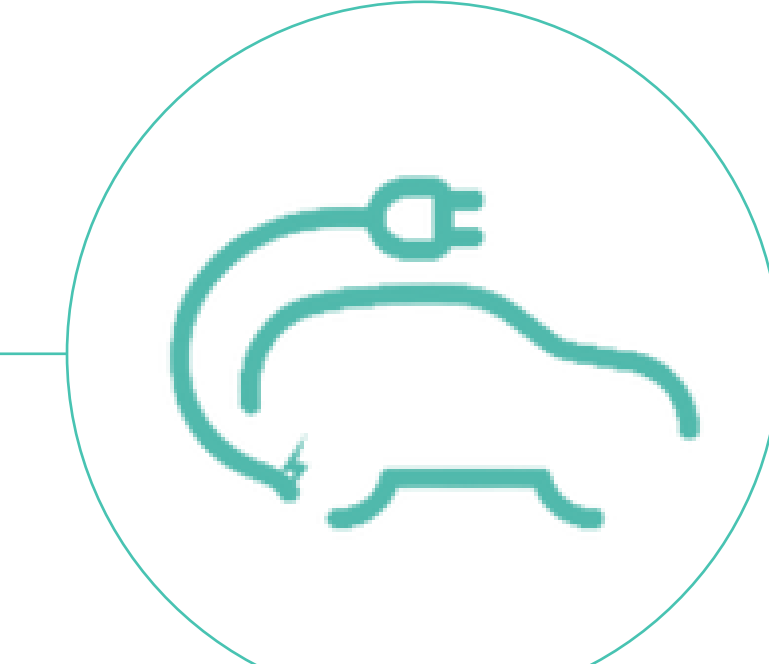
Main achievements

- Demonstration of a wide range of electric vehicles with zero tailpipe emissions
- Development of low-carbon technologies such as fleet management systems, battery swapping and charging points

 This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 875041.



Another ERTICO project with worldwide impact
Online training courses available free here:
<https://www.mobility-academy.eu/course/index.php?categoryid=47>



This project has received funding from the European Union Horizon 2020 research and innovation programme under grant agreement No. 8705041



Gender-inclusive Electric Mobility

USING E-MOBILITY TRANSITION TO INCREASE WOMEN PARTICIPATION



This project has received funding from the European Union Horizon 2020 research and innovation programme under grant agreement No. 875041



Policy Advice Paper

Electric bicycles in Rwanda:
Fiscal and regulatory framework

CASE 2: SolutionsPlus: IMPACTS

What impact can SolutionsPlus create?

- ✓ 6800t CO2e direct (short term in all 9 partner cities), 7.5mt CO2e (indirect, long-term by 2030).
- ✓ At least 4 policy dialogue events organised in the context of the UN Environment, UN Habitat and Climate summits facilitated

Other impacts:

- 2000 experts, officials and practitioners trained directly (short term); other capacity building programmes will be informed by SOLUTIONSplus through train-the-trainer activities, which will multiply the number of individuals trained by the project
- 9 demonstration actions implemented with the contribution from European industry partners
- at least 9 project concepts with a high CO2 mitigation potential submitted to climate finance institutions (over 4 years)
- 15 e-mobility business models developed (summaries published by end of 2nd year)
- 20 replication actions initiated (project summaries published by end of 4th year)
- 15 national and local policy action plans developed/adopted by the period.
- 15 Local-European partnerships initiated (partnership profiles published by month)
- 4 finance and business cooperation platforms established
- 1 international cooperation summary report submitted to the EC

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ITS: The Game Changer.

CASE 3: **MODALES**: Adapting driver behaviour for lower emissions

Project Vision:

To **reduce air pollution** from all types of road vehicles (but especially older ICE vehicles) by encouraging adoption of **low-emission driving behaviour** and **proper maintenance choice**

Core objective:

To advance the understanding of the co-variability between **user behaviour** and **vehicle emissions** from **powertrain, brakes and tyres**, in order to **modify user behaviour**, via **training** which includes a **driver assistance app** and an **awareness campaign**

modales-project.eu



MODALES receives funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 815189.



Expected impacts:

Contribute to **reducing emissions** from the existing combustion-engine car fleet:

- Best practice in technical inspections, retrofits, combatting illegal tampering – Providing technical evidence to address gaps
- Contribute to reducing **unnecessary driver-induced emissions** though better public awareness, training and a driver support app

MODALES project innovation areas



Driver

1. Low-emission driving style & training
2. Guidelines for regular maintenance
3. Use of adaptive cruise control & navigation to avoid congestion
4. Increased awareness of emissions
5. Real time indication of emission (app)



Retrofits

6. Diesel-saving technologies for cars & vans
7. NOxBUSTER for buses and trucks
8. Diesel particulate filter servicing



On-Board Diagnostics

9. More robust & durable emission control systems
10. Enhanced OBD functionality as an anti-tampering measure



Periodic inspections

11. Enhanced inspection procedure to trap tampering
12. Roadside emissions testing

Exhaust emission

CO₂, CO, HC, NO_x, PM, PN



Brake and tyre/road wear

Fine and ultrafine particles (PM, PN)

CASE 3: **MODALES**: Adapting driver behaviour for lower emissions



Adapting driver behaviour
for lower emissions

Naturalistic on-road trials in 7 countries (Finland, UK, Luxembourg, Spain, Italy, Greece, Turkey)

- 180 drivers in total (mostly car)
- Stage 1 (baseline period) with drivers using app in data collection mode with OBD dongle
- Drivers view 15-minute training video and re-download app with active and passive recommendations
- Stage 2 driving with app.
- Data analysed by:
 - road type (3)
 - emission type (4)
 - site (8 countries)
 - driving behaviour KPI (>5)
 - air pollutant (>3)
 - vehicle type (4)
 - user type (3)
 - vehicle age
 - user age, experience, gender etc.



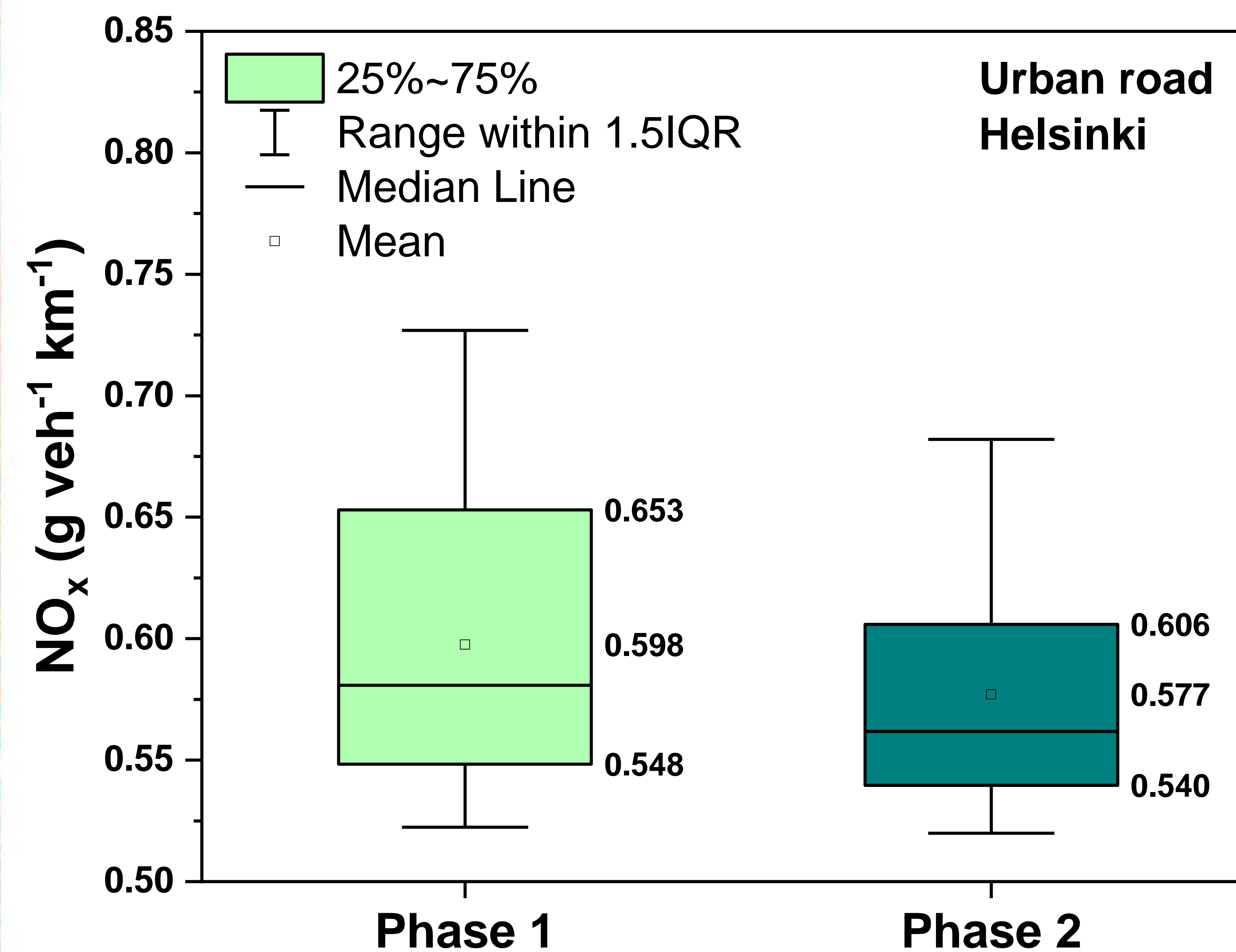
CASE 3: **MODALES**: Adapting driver behaviour for lower emissions



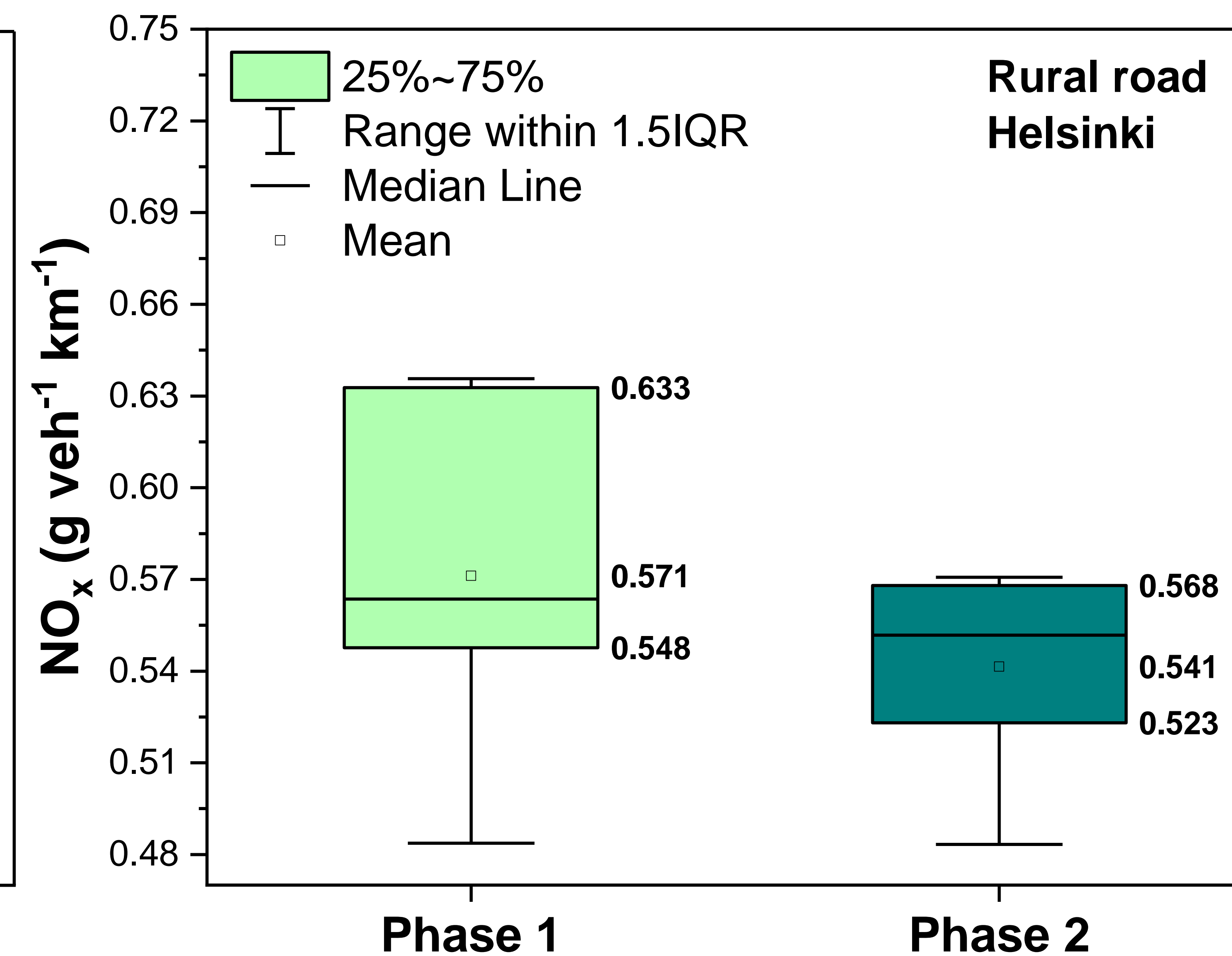
Adapting driver behaviour
for lower emissions

Key outcomes – Exhaust emissions, by road type (example: Helsinki)

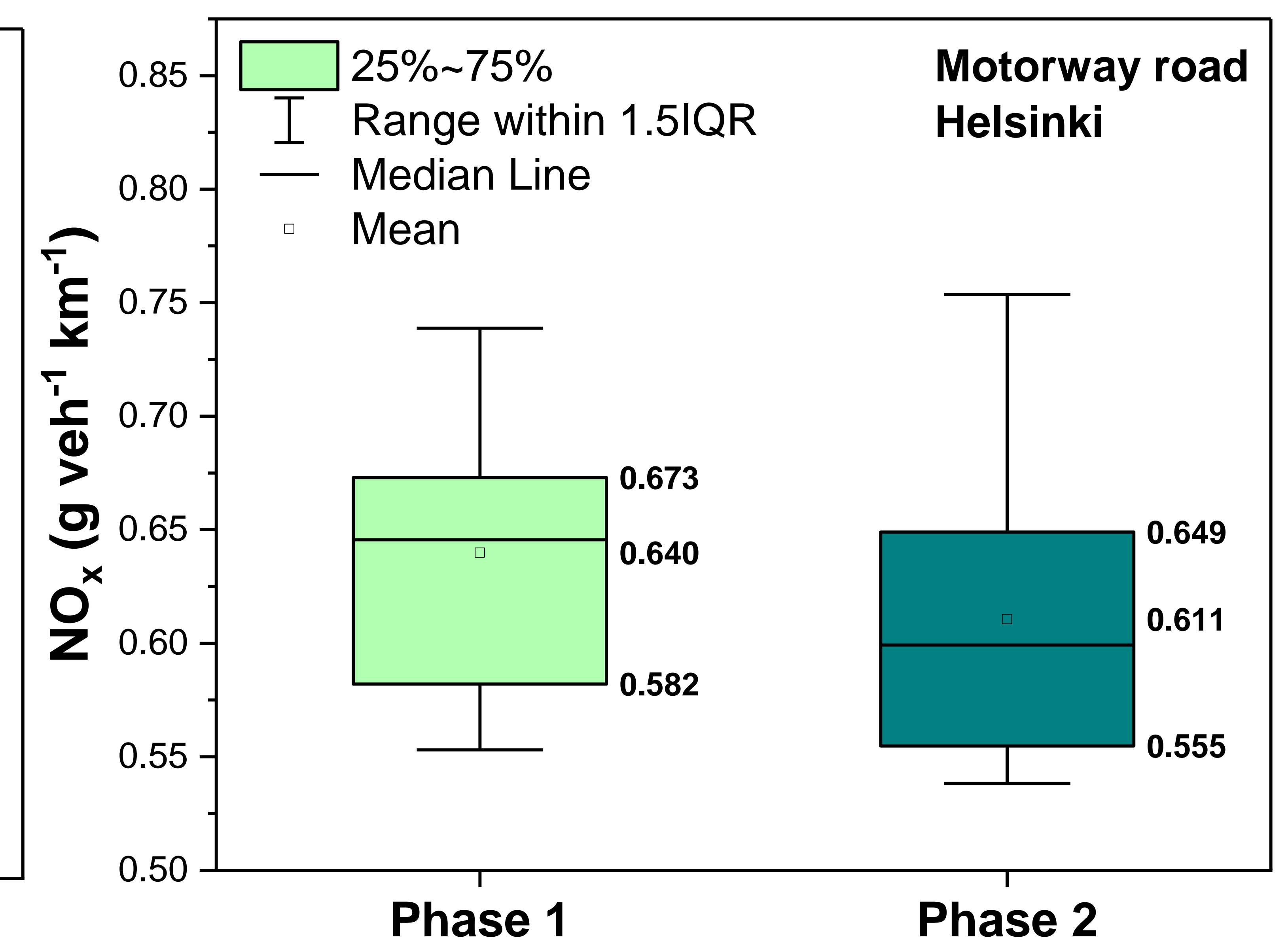
Urban road



Rural road



Motorway



CASE 3: **MODALES**: Adapting driver behaviour for lower emissions



Adapting driver behaviour
for lower emissions

Key outcomes - Exhaust emissions (NOx): median reduction 3.1%

Best vs worst performance

Site	Best	Worst
Leeds	-6.1%	+2.3%
Helsinki	-10.9%	+2.9%
Barcelona	-4.9%	0.0%
Luxembourg	-4.5%	+2.9%
Istanbul	-1.8%	+7.0%
Thessaloniki	-1.8%	+6.0%

CASE 3: **MODALES**: Adapting driver behaviour for lower emissions



Adapting driver behaviour
for lower emissions

Key outcomes - Brake wear (PM2.5, PM10), mg per stop, before and after training: average -19.7%

Best vs worst performance

Site	Best	Worst
Leeds	-41.3%	-7.1%
Helsinki	-64.4%	-10.0%
Barcelona	-31.4%	-7.6%
Luxembourg	-36.0%	-3.3%
Istanbul	-37.8%	-1.3%
Thessaloniki	-33.8%	+4.8%

CASE 3: **MODALES**: Adapting driver behaviour for lower emissions



Key outcomes - Tyre wear, mg per km, before and after training: average **-3.28%** Adapting driver behaviour for lower emissions

Best vs worst performance

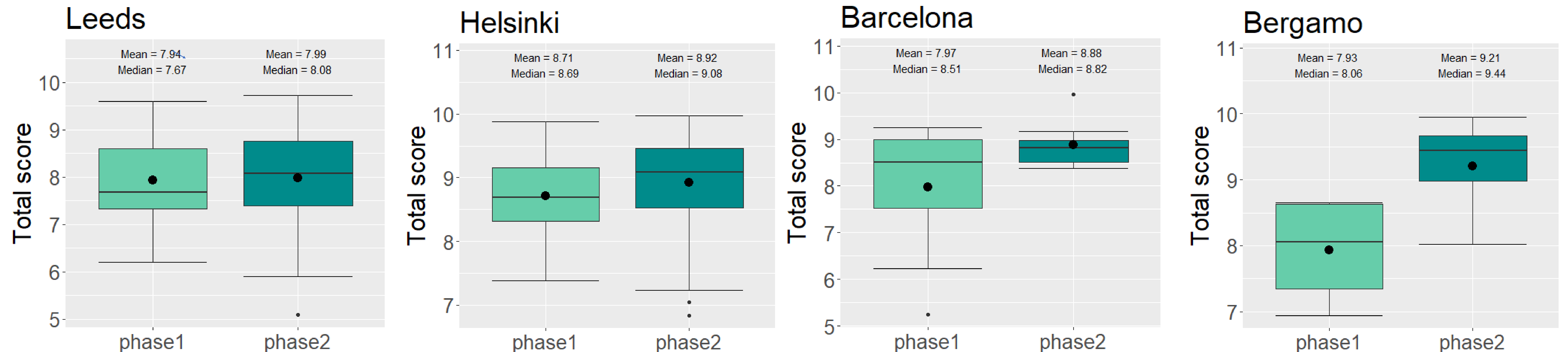
Site	Best	Worst
Leeds	-6.0%	+2.3%
Helsinki	-14.9%	+4.4%
Barcelona	-7.1%	+1.7%
Luxembourg	-5.5%	+1.2%
Istanbul	-11.3%	-4.5%
Thessaloniki	-4.2%	+0.2%

CASE 3: **MODALES**: Adapting driver behaviour for lower emissions



Key outcomes – Combined emissions (scores before & after training and app)

Adapting driver behaviour for lower emissions



5.3% improvement

4.5% improvement

3.6% improvement

17.1% improvement

ERTICO Partnership survey on ITS for Climate

Purpose

- To **gather evidence** on how ITS applications can help reduce greenhouse gas (CO2) and pollutant emissions
- To **showcase solutions** from ERTICO Partners

Key questions were:

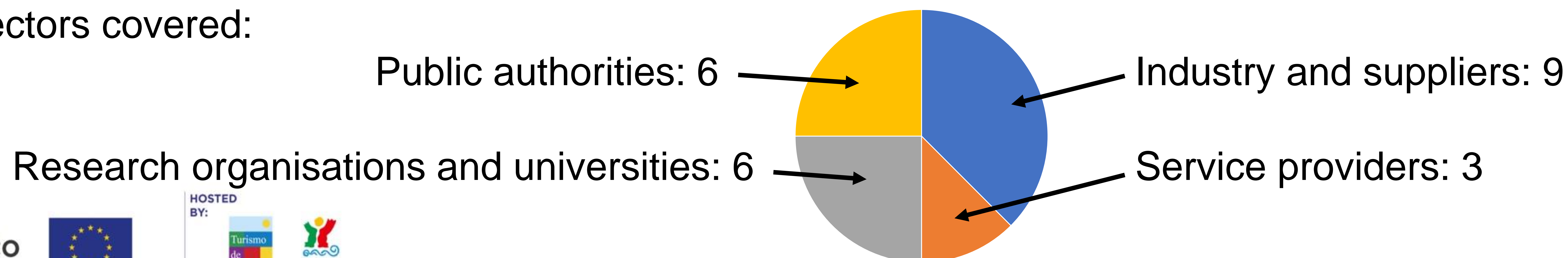
- Which ERTICO partners produce **off-the-shelf ITS solutions** which can contribute to greenhouse gas reduction?
- What are the **proven or estimated benefits** of these products?
- Which **projects or deployments** have they participated in, with climate-related results?
- What were these **results** and how were they calculated?

Responses

- 26 responses from **24 ERTICO Partners** covering European countries:



- Sectors covered:

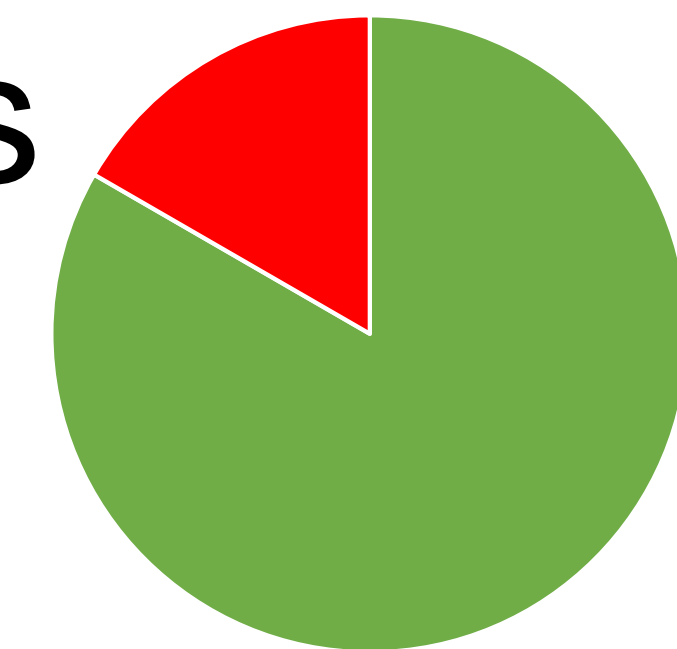


ERTICO Partnership survey on ITS for Climate

Key findings – 1

Produce/manufacture/install/sell ITS products on the market (off-the shelf solutions)

No: 14 partners



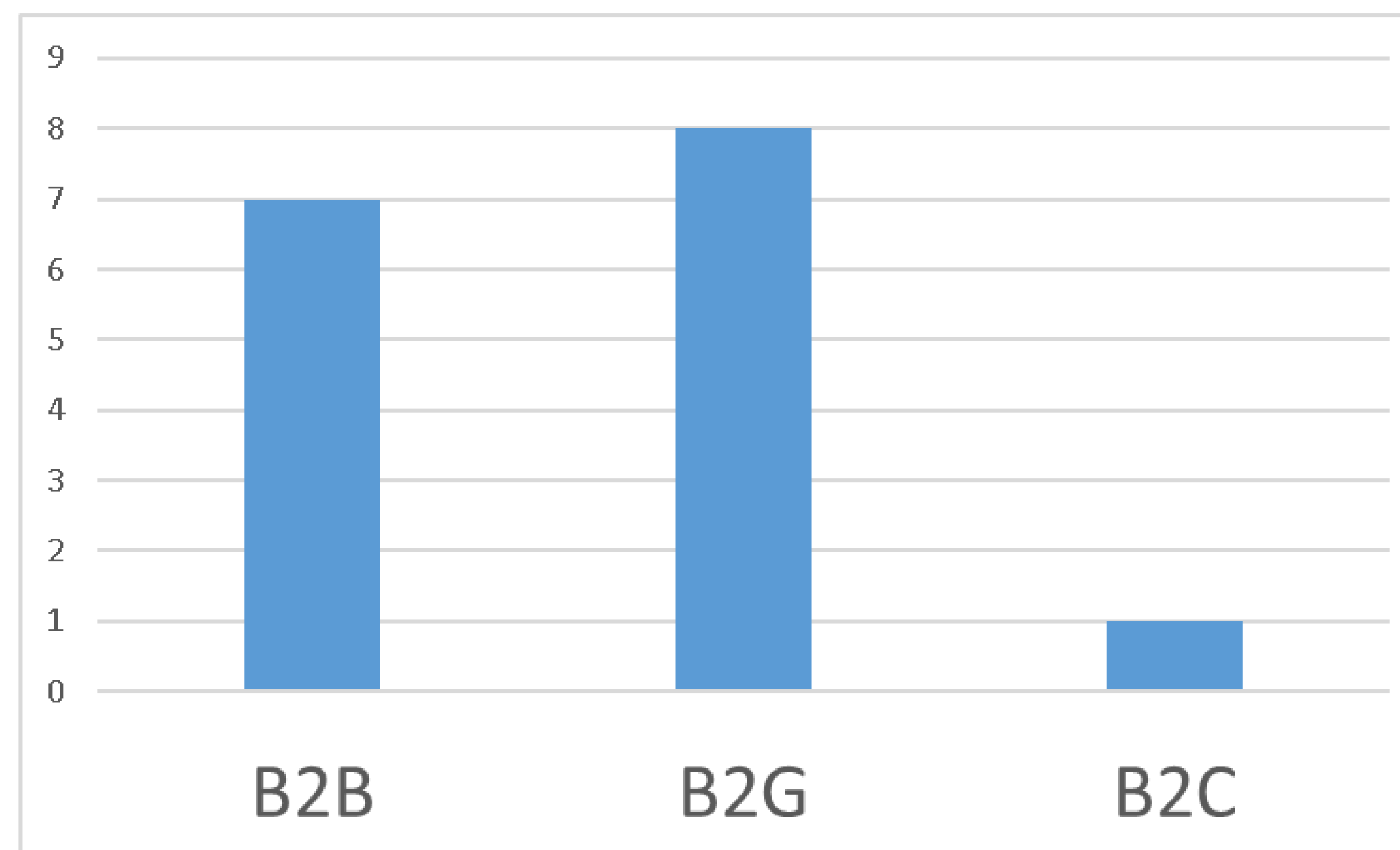
Yes: 10 partners

Do any of these products or solutions contribute towards climate change mitigation and adaptation?

■ Yes: all 10 which produce solutions

■ Benefits:

- +/- 30% fuel saving
- Collect data for better understanding of vehicle's status, health and driving profile
- Recycling of Thermal energy in total reduce
- Est. 10-20% reduction in CO2 emissions expected due to improved traffic flow
- Reduced delays for buses (up to 40%)
- Environmental Traffic Management can reduce up to 22.4% of PM2.5 emissions, 7.1% of PM10, 17.3% of NO2 and 15.2% of CO2
- Shift towards greener modes of transport / Less congestion
- Reduced direct energy consumption in cities
- GLOSA: Reductions in CO and HC emissions of 15.5% and 40.2%
- 3% fuel reduction when approaching an intersection 5% reduction in CO emissions 2% reduction in HC emissions 2% reduction in NOx



ERTICO Partnership survey on ITS for Climate

Key findings – 2

Types of products (examples)

Environmental
Traffic Management
System

Navigation module:
eco-routing

Module for managing air
quality

Connectivity for
vehicles – e-Horizon

Real time information
and traffic signal
priority for public
transport and cyclists

Smart parking system
with management
platform

Digital rewarding mechanism
based on Blockchain: Raise
awareness of GHG emissions;
encourage behaviour shift

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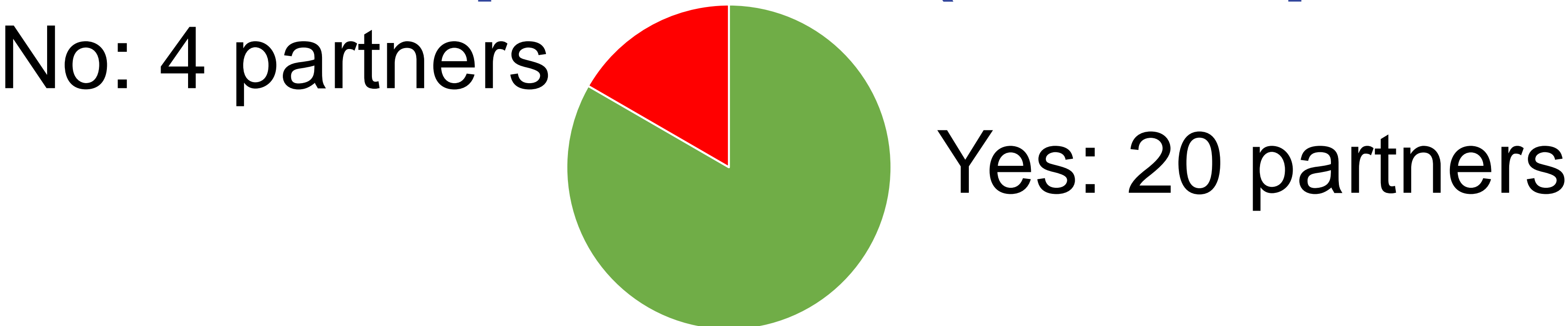
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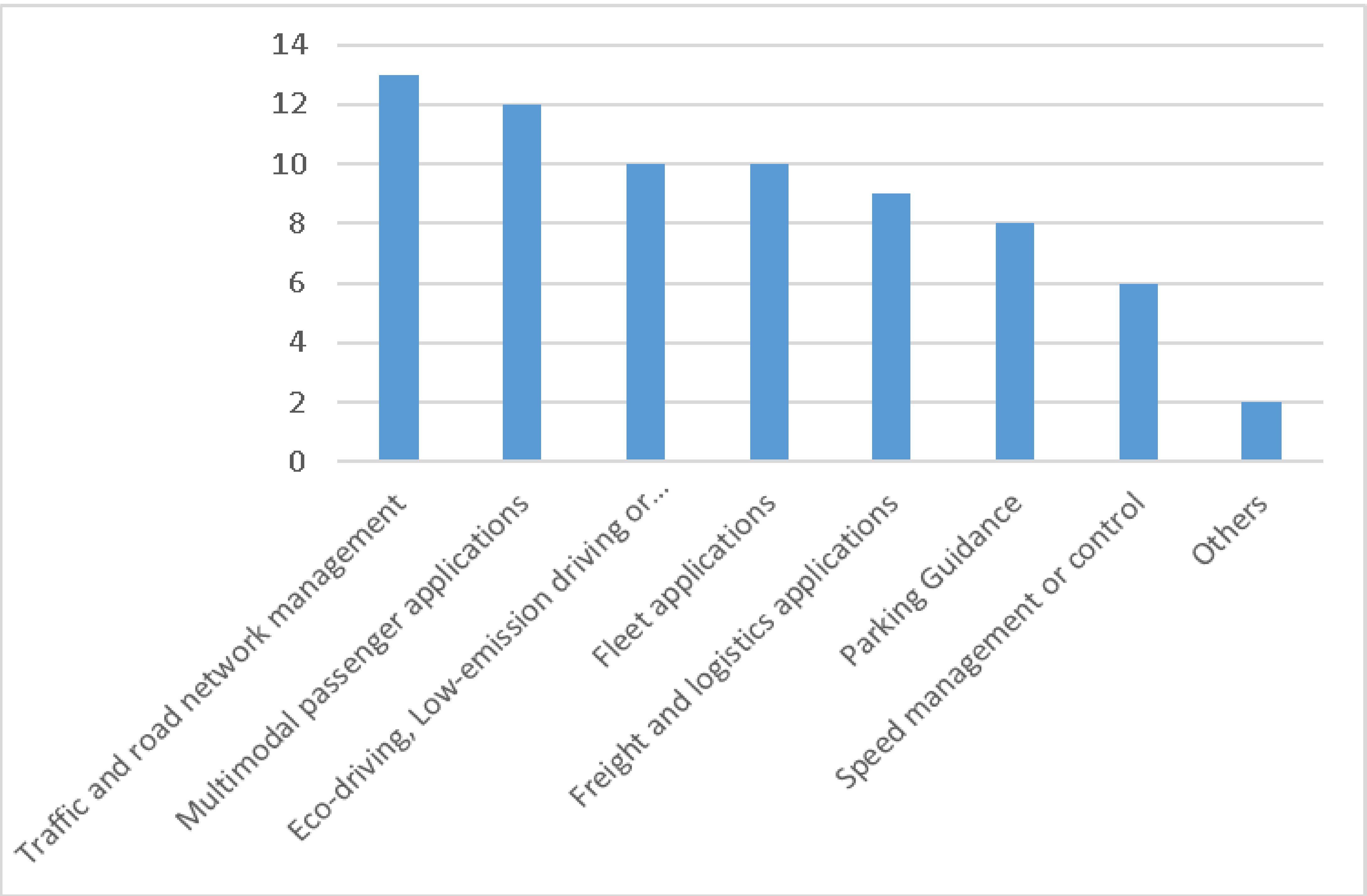
ERTICO Partnership survey on ITS for Climate

Key findings – 3

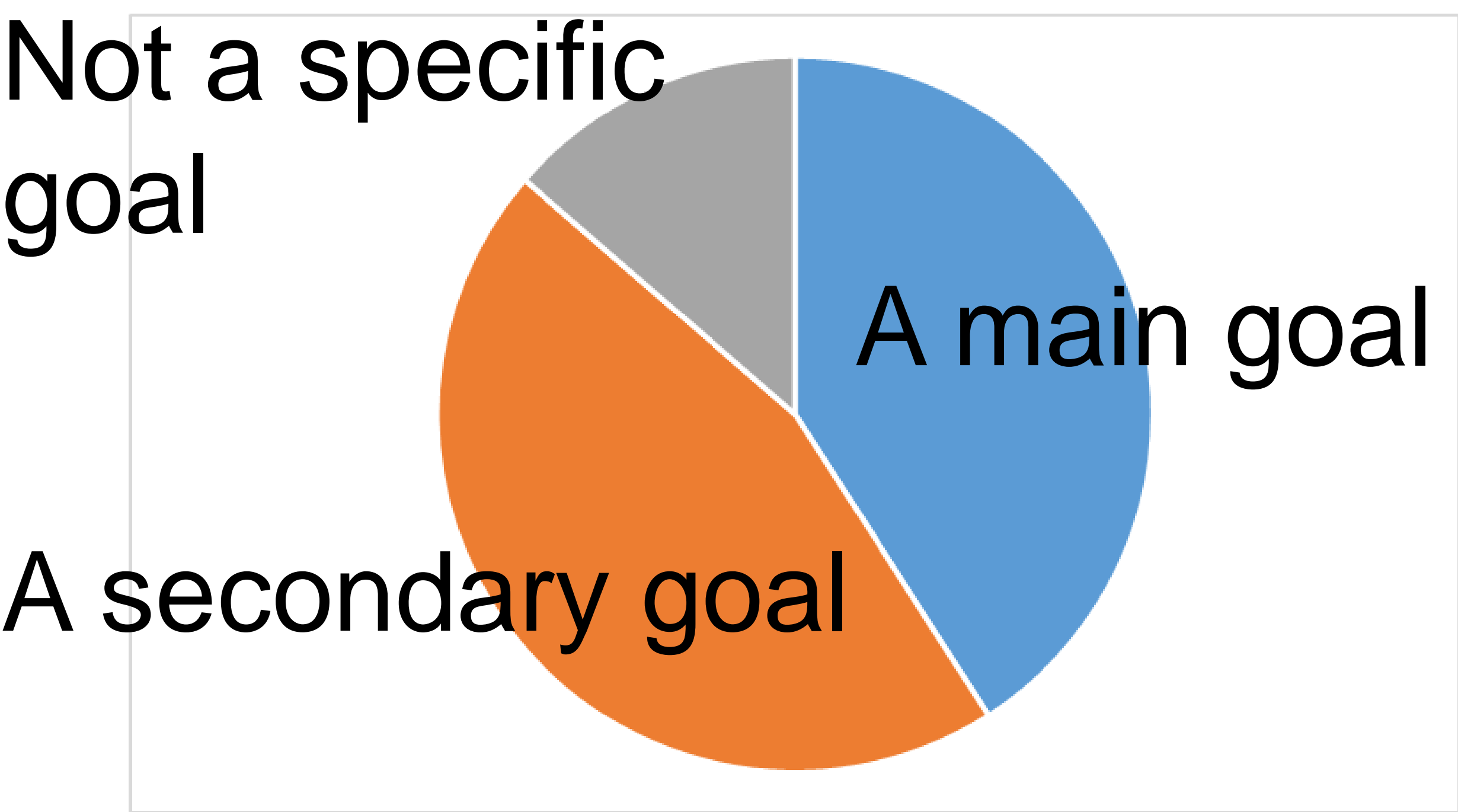
Participated in any projects or implementations concerning the use of any kind of ITS application which produced (or is expected to produce) results on CO2 emissions



Domains covered:



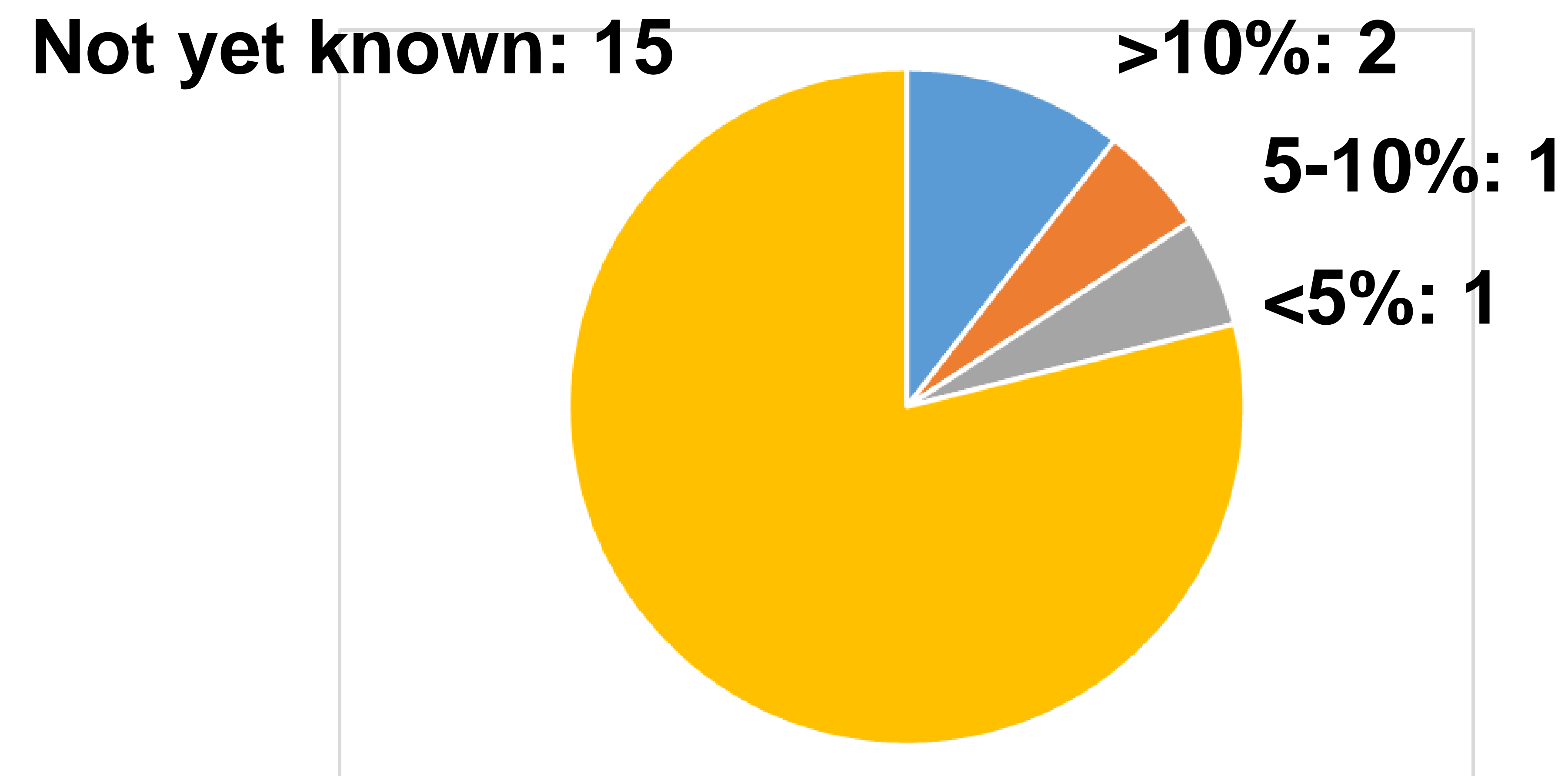
CO2 reduction was:



ERTICO Partnership survey on ITS for Climate

Key findings – 4

Levels of CO2 savings



Examples:

- Real-time powertrain control and speed optimisation (optiTruck project, simulation)
- Decision support system to analyse implementation of a consolidation centre for the construction sector
- Pre-assessment of logistics strategies, infrastructures and policies
- Traffic signal optimisation / GLOSA

Andrew Winder
a.winder@mail.ertico.com



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Thank you!