USER-CHI webinar
16 July 2024
10:00 – 11:30

Light Electric Vehicles

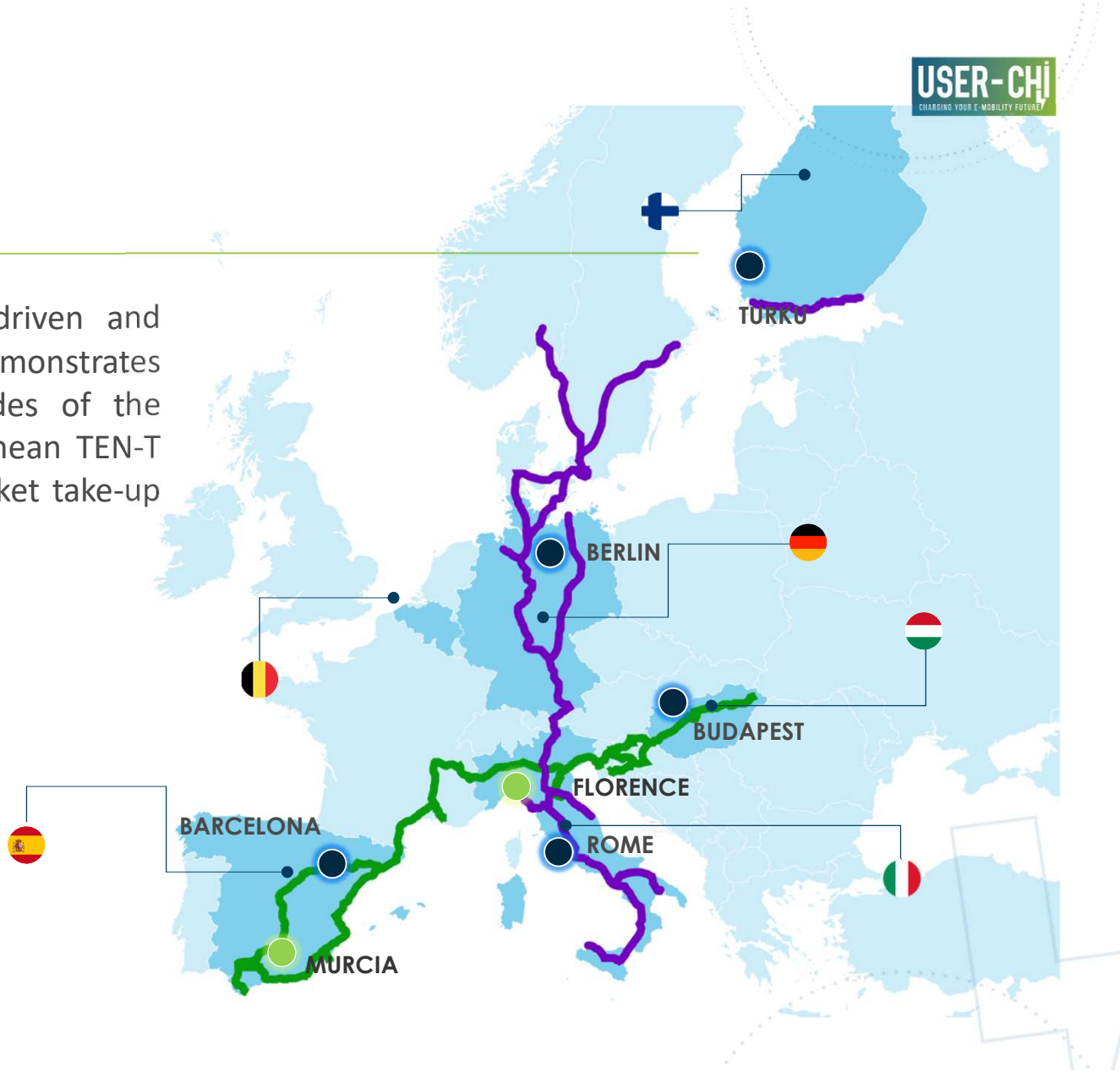
Challenges and opportunities from different perspectives

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No [875187]

The Project

USER-CHI is an industry-powered, city-driven and user-centric project which co-creates and demonstrates smart solutions around 7 connecting nodes of the Mediterranean and Scandinavian-Mediterranean TEN-T corridors to boost a massive e-mobility market take-up in Europe.

- Duration: 2020-2024
- 24 partners
- Coordinator: etra I+D



AGENDA

Welcome and introduction
Kateřina Kührová, Eurocities

Setting the scene
Annick Roetynck, LEVA EU

LEVs in cities: Best practices from Turku and Murcia

Francisco Javier Montesinos García – City of Murcia
Oona Uusitano – City of Turku

Charging solutions developed within EU-funded projects

Pepe Martí – eCharge4Drivers
Antonio Coccia – Enel X Way

Q&A

Regulatory Changes needed to unlock the full Potential of LEVs

USER-CHI Webinar on Light Electric Vehicles
16 July 2024
Annick Roetynck, LEVA-EU Manager
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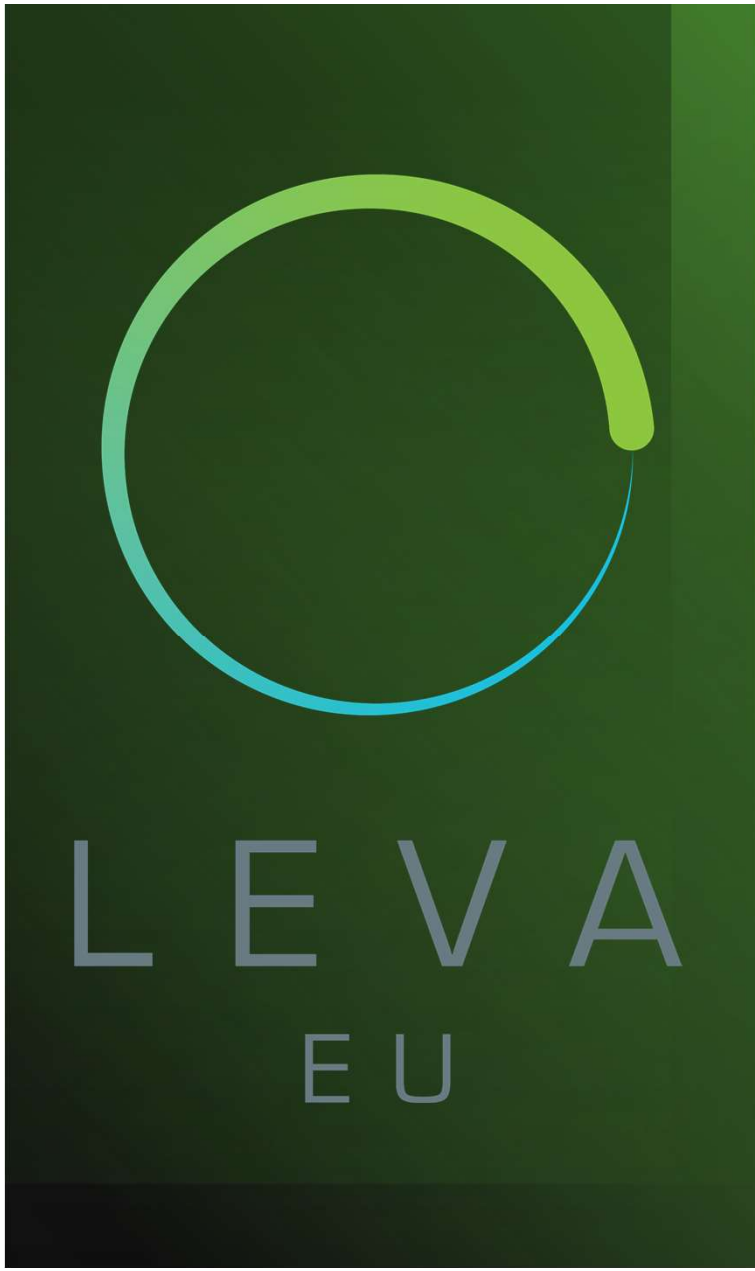
LEVA EU

Mission Statement

LEVA-EU is the only European trade association to work exclusively for light, electric vehicles.

At LEVA-EU, we have a deep belief in the potential of light electric vehicles for making mobility more sustainable and thus helping to tackle climate change.

Therefore, LEVA-EU works to improve the deployment and uptake of light, electric vehicles.



Scope of LEVA-EU

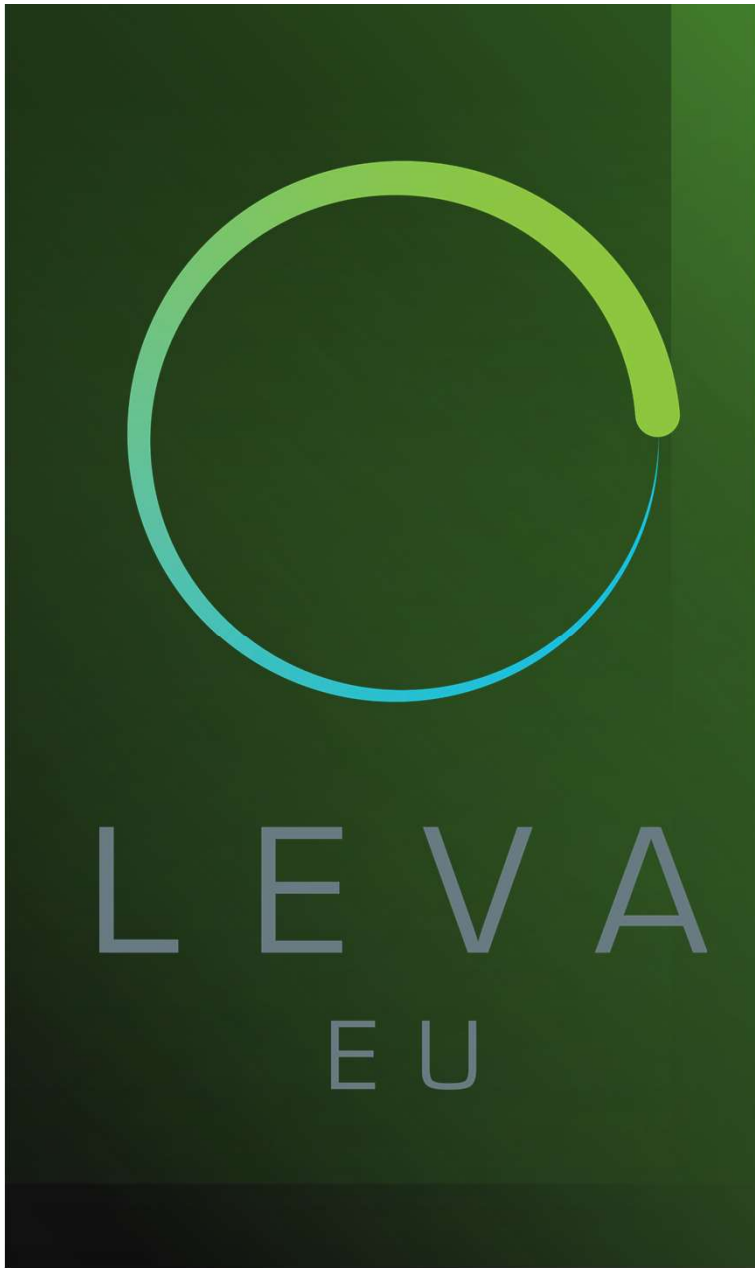
- LEVs in Reg. 168/2013
  - electric (cargo)cycles > 250 W – 25 km/h
  - “speed pedelecs”
  - electric mopeds and scooters
  - electric motorcycles
  - electric 3- and 4 wheels

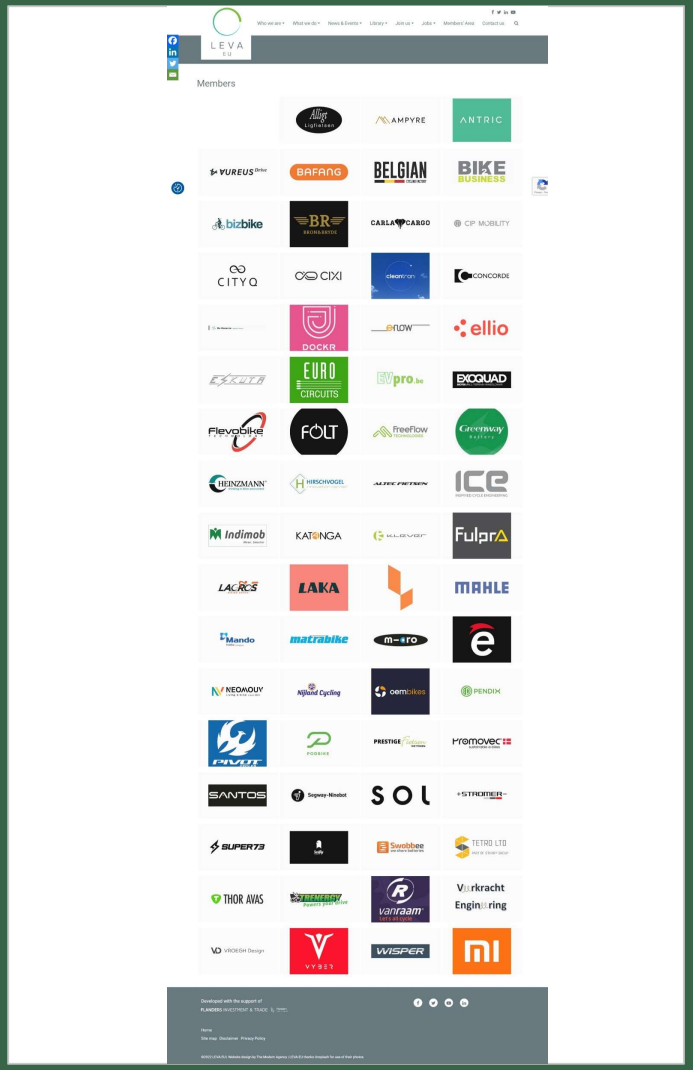
- LEVs excluded from Reg. 168/2013 such as
  - electric cycles 250W-25 km/h
  - self-balancing vehicles
  - vehicles without seating position,
  - etc.

The term Light Electric Vehicle covers a wide range of very different vehicles.
They are exclusively battery powered. In some cases muscular power is added to the motor power.

Activities

- Clarifying rules and regulations for LEVA-EU members
- Contributing to development of European legislation, LEVA-EU is involved in
  - ❖ Commission Expert Group Urban Mobility
  - ❖ Motorcycle Working Group
  - ❖ Sustainable Transport Forum
  - ❖ Machinery Expert Group
  - ❖ Battery Expert Group
  - ❖ …
- Active in standardization: LEVA-EU actively participates in
  - ❖ CEN TC 333 – WG 5 – EPACS
  - ❖ CEN TC 333 – WG 9 – E-cargocycles
  - ❖ CEN TC 354 – WG 4 – Light Electric & Self Balancing Vehicles
  - ❖ ISO TC 149 – SC1 - Cycles
  - ❖ IEC TC 125 – Personal e-Transporters
- Whitepaper on Speed Pedelecs
- Commissioned DLR LEV4Climate Study
- Trade and dumping issues
- Brexit
- ...





LEVA-EU Membership

- ± 80 members
- Members = different types of products & business models: vehicles, components, services, ...
- SME share in membership: 93%
- SME share in membership contribution: 70%

- Further details on leva-eu.com

European LEV-Market

LEV-Type	Year	Number	Remarks
Electric cycle, pedal assistance up to 25 km/h – 250 W	2022	Est. 5,5 million	Sales continuously growing since end nineties
Electric cargocycles	2022	Est. at 165,000 in Germany	Market with strong growth due to increasing number of cities closing off for vans & trucks. E-cargocycles ideal for last mile deliveries.
Speed pedelecs (45 km/h)	2022	Belgium: 24,325 Germany: 11,000 The Netherlands: 4,357	Speed pedelecs represent an estimated 50% of all electric moped sales.
E-scooters, e-monowheels, e-hoverboards, self-balancing vehicles, ...	2021	± 11,7 million	This number is based on incomplete and unclear Eurostat statistics HS codes 87116090 and 95030010
Electric mopeds	2022	85,846 registrations	e-mopeds have a 33,5% share in total moped market. More than half of the e-mopeds are speed pedelecs. The market only grew thanks to e-mopeds,
Electric motorcycles	2022	43,484 registrations	e-motorcycles have 4,6% share in total motorcycle market. Only thanks to e-motorcycles, market grew slightly grow last year.
All light, electric vehicles	**2022**	**Sales estimate: at least 17,5 million**	**For comparison, in 2022: just under 3 million battery electric car registrations in EU.**

What are Light Electric Vehicles?

Vehicle (Sub-)category	Vehicle (Sub-)category name
L1e-A	Powered cycle
L1e-B	Two-wheel moped
L2e	Three-wheel moped
L3e	Two-wheel motorcycle
L4e	Two-wheel motorcycle with side-car
L5e-A	Tricycle
L5e-B	Commercial tricycle
L6e-A	Light on-road quad
L6e-B	Light quadri-mobile
L7e-A	Heavy on-road quad
L7e-B	Heavy all terrain quad
L7e-C	Heavy quadri-mobile

= All electric vehicles included in Regulation 168/2013

= All electric vehicles excluded from Regulation 168/2013, following Article 2.2

2. This Regulation does not apply to the following vehicles:

(a) vehicles with a maximum design speed not exceeding 6 km/h;

(b) vehicles exclusively intended for use by the physically handicapped;

(c) vehicles exclusively intended for pedestrian control;

(d) vehicles exclusively intended for use in competition;

(e) vehicles designed and constructed for use by the armed services, civil defence, fire services, forces responsible for maintaining public order and emergency medical services;

(f) agricultural or forestry vehicles subject to Regulation (EU) No 167/2013 of the European Parliament and of the Council of 5 February 2013 on the approval and market surveillance of agricultural and forestry vehicles ([1]), machines subject to Directive 97/68/EC of the European Parliament and of the Council of 16 December 1997 on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery ([2]) and Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery ([3]) and motor vehicles subject to Directive 2007/46/EC;

(g) vehicles primarily intended for off-road use and designed to travel on unpaved surfaces;

(h) pedal cycles with pedal assistance which are equipped with an auxiliary electric motor having a maximum continuous rated power of less than or equal to 250 W, where the output of the motor is cut off when the cyclist stops pedalling and is otherwise progressively reduced and finally cut off before the vehicle speed reaches 25 km/h;

(i) self-balancing vehicles;

(j) vehicles not equipped with at least one seating position;

(k) vehicles equipped with any seating position of the driver or rider having an R-point height ≤ 540 mm in case of categories L1e, L3e and L4e or ≤ 400 mm in case of categories L2e, L5e, L6e and L7e.

LEVs – Key Regulatory Issues

Key issue:

- LEVs are squeezed into existing vehicle categories, the rules of which have not been devised for LEVs.
- LEVs as a specific category not visible, thus not identifiable as such in regulatory landscape.

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Electric bike? Speed Pedelec?

EPAC
L1e-A Powered Cycle
L1e-B Moped

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Electric bike? Speed Pedelec?

EPAC
L1e-A Powered Cycle
L1e-B Moped

Micro Car?

L6e-B Light quadrimobile - ≤ 425 kg
L7e-C Heavy quadrimobile - ≤ 450 kg
M1 – No weight limitation

Belgium

The Netherlands

LEVs – Key Regulatory Issues

Consequences:

- Current regulatory framework forces LEVs in unsuitable corset.
- This results in major obstructions:

E-bikes: on the market with pedal assistance only.
If not pedal assistance only, type-approval as L1e-A, too complicated, too expensive.
Approximately 87 million disabled people in EU. Many unable to pedal constantly, so **millions denied access to e-bikes**.

E-cargobikes: limited to 250W
Power limitation major problem in hilly areas and for riders with limited muscular power.
Severe obstruction development sustainable logistics

LEVs – Key Regulatory Issues

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L-category type-approval adequate and affordable for LEVs?

- ✓ Many vehicles limited to EPAC-status, because type approval = insurmountable hurdle
- ✓ Impossible to easily convert L6 into L7.
- ✓ Severe obstructions development & market introduction smaller and lighter vehicles.

LEVs – Key Regulatory Issues

Consequences:

- L-category type-approval is almost insurmountable obstacle for LEVs:
  - ✓ Inadequate
  - ✓ Too complex
  - ✓ Too expensive
  - ✓ Not enough technical services available

- Machinery Directive/Regulation also unsuitable for LEVs:
  - ✓ Inadequate
  - ✓ Not acknowledged by Member States as harmonised technical framework for LEVs
  - ✓ Member states add own technical rules
  - ✓ National traffic codes either prohibitive or unsuitable to offer safe use on roads.

LEVs – Key Regulatory Issues

Consequences:

- Invisible/unidentifiable LEVs, therefore additional new legislation not adapted to LEVs & sometimes inadequate for LEVs:
  - ✓ E.g. Battery Regulation defines batteries for "*light means of transport*" as "*a battery that is sealed, weighs 25 kg or less and is specifically designed to provide electric power for the traction of wheeled vehicles that can be powered by an electric motor alone or by a combination of motor and human power, including type-approved vehicles of category L within the meaning of Regulation (EU) No 168/2013*".
    LEV with 1 battery of 50 kg = electric vehicle battery subject to same rules as electric car battery
    LEV with 2 batteries of 25 kg = light means of transport battery
  - ✓ E.g. Critical Raw Materials Act creates discrimination between vehicles in or out of Regulation 168/2013

- Consultation on LEVs currently in:
  - ✓ Motorcycle working group for L-category vehicles
  - ✓ Machinery expert group for vehicles excluded from L-category vehicles

Recommendations technical legislation

- **Stop confusion and legislative mistakes** resulting from a **tangle of terms** to designate light electric vehicles:
  - Micromobility, personal mobility devices (PMD), light means of transport (LMT), ...
- Introduce and define the concept & term "**Light Electric Vehicle**" in EU & national legislation.
- **Exclude all Light Electric Vehicles** from Machinery Directive/Regulation and Regulation 168/2013

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- **Exclude all Light Electric Vehicles** from Machinery Directive/Regulation and Regulation 168/2013
- Develop **new Light Electric Vehicle Regulation**:
  - with essential safety requirements for all LEVs under the Regulation
    - ✓ Risk assessments readily available from LEV-sector
  - Supplemented with
    - ✓ Standards to be harmonized under LEV-Regulation + self-certification
    - ✓ Conformity assessment procedures for more complex vehicles if deemed necessary by sector

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    - ✓ Conformity assessment procedures for more complex vehicles if deemed necessary by sector
- Commission should set up **Light Electric Vehicle Expert Group, to further refine and update LEV-Regulation**
- **LEV Expert Group** could oversee **consistency and coherence** all other **EU technical legislation** relevant for LEVs

Recommendations technical legislation

- **New LEV-Regulation = clearly identifiable LEV-Category,** which allows Member States to:
  - Adapt traffic codes with a view to fully integrate LEV-category
  - Reorganise road infrastructure for full access LEVs (roads – parking – charging)
  - Apply fiscal/financial incentives for LEVs
    See Belgian example tax-free travel allowance for e-bike & speed pedelec commuting. Why not tax-free travel allowance for all LEVs, given considerable external benefits and very low external costs?
  - Adapt UVARs to LEVs
  - Enhance regulatory access to LEVs through adapted drivers' license requirements and tests
- **New LEV-Regulation = clearly identifiable LEV-Category,** will allow to identify relevant economic sector and to develop specific measures:
  - To support EU LEV (related) industry + services
  - To define necessary research

Major development

- **Expert Group on Urban Mobility (EGUM):**
  - Expert group mission is to facilitate exchange of information and cooperation on urban mobility issues between Member States, stakeholders & European Commission, thereby contributing to enhanced coherence of relevant action taken at Member States and EU level.
  - Subgroup 5: recommendations on how to improve EU's Road Safety Policy Framework 2021-2030 for vulnerable road users, **adopted by EGUM on 4 July 2024**:
    - ✓ ***"The speed difference between different vulnerable modes has grown over the last decade. Many new light electric vehicles are on the road, without being (properly) recognized in EU technical legislation and national traffic codes. This lack of recognition and ensuing adequate legislation, creates risks for the users of these vehicles. Without this recognition, the users of the vehicles cannot be properly protected on the road. Harmonized technical rules, road traffic rules and road safety statistics must be adapted to include these vehicles. The Commission must develop harmonized technical legislation and mandate related standards, specifically for these vehicles in close consultation with the light electric vehicle sector. The Commission must consult and cooperate with the Member States on streamlining traffic codes for light electric vehicles and on fully acknowledging light electric vehicles in road infrastructure."***

“Change is the law of life. And those who look only to the past or present are certain to miss the future.” John F. Kennedy

Thank you !

Light Electric Vehicles (LEVs)

=

Sustainable Transport

The Potential of Light Electric Vehicles for Climate Protection through Substitution for Passenger Car Trips - Germany as a Case Study

Final Report of the LEV4Climate Study

March, 24th 2022

Mascha Brost, Simone Ehrenberger, Isheeka Dasgupta, Robert Hahn
DLR Institute of Vehicle Concepts

Laura Gebhardt
DLR Institute of Transport Research

German Aerospace Center (DLR)
Prepared for LEVA-EU

What is a Light Electric Vehicle and which Kind are available today or soon?

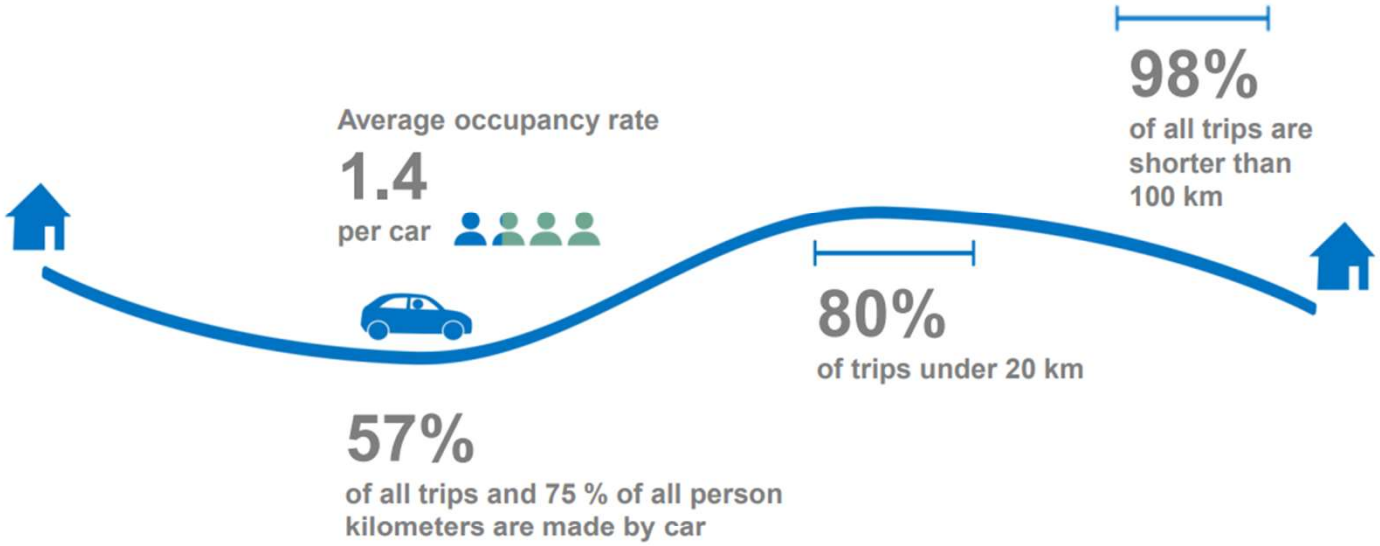
The market offers a rich variety of vehicles - from electric scooters to 4-wheelers. There are models with top speeds over 100 km/h, with and without cabin, with no, one, two or more seats and with different requirements in terms of age and driver's license possession. The graphics show examples of a wide range of LEVs.

Sources: source in each case is the manufacturer indicated on the picture, except for Citroen: https://commons.wikimedia.org/wiki/File:Citro%C3%ABn_Ami_2020_(2).jpg And Aixam: https://commons.wikimedia.org/wiki/File:Aixam_e-Coupe,_Paris_Motor_Show_2018,_IMG_0219.jpg

DLR LEVA EU

How do People move today - what are Characteristics of today's Car Trips?

The car is still the dominant means of transport in the everyday lives of Germans. In most cases, only one or two persons are in the car and the distances traveled are often short*:



Correlation of emissions, mileage & trips

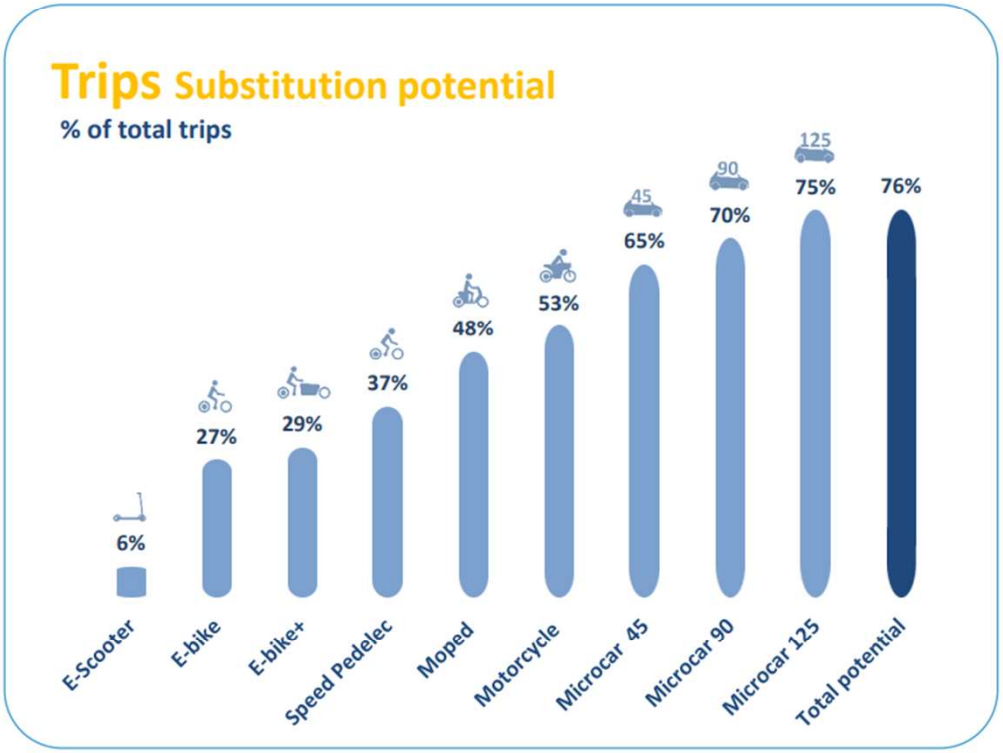
Greenhouse gas emissions attributed to vehicle propulsion are proportional to the number of vehicle kilometers, not to the number of trips. Thus, few long trips cause a relatively high share of emissions. Nevertheless, short to medium distance trips account for the majority of vehicle kilometers and hence also emissions:

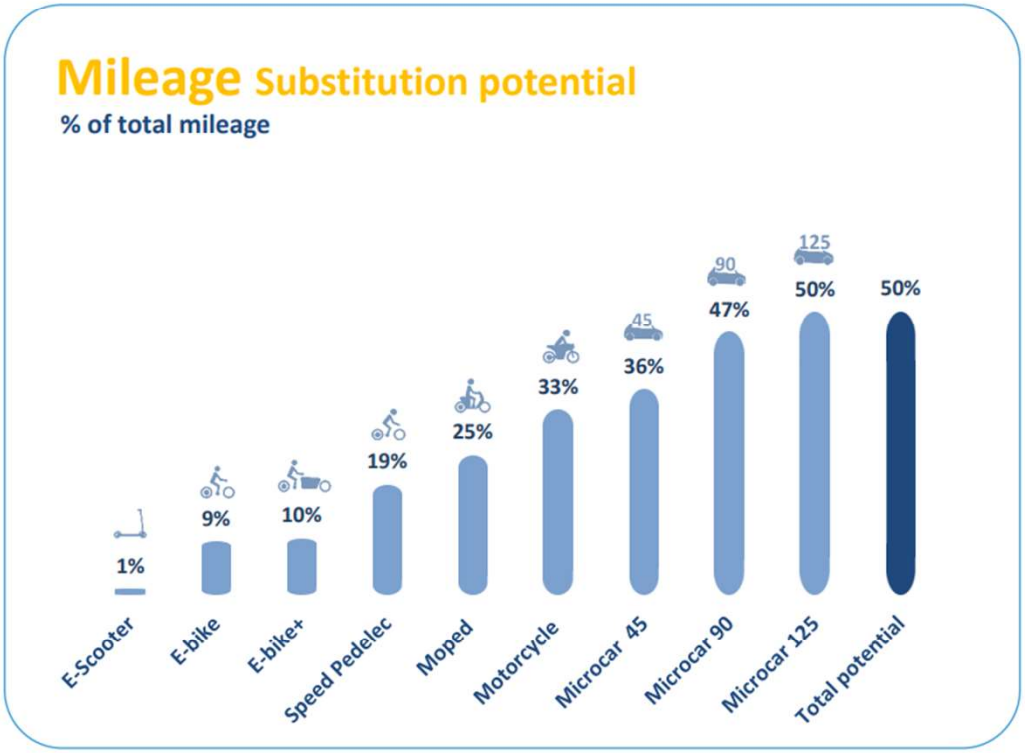
- 60 % of passenger car mileage results from trips under 50 km*
- 75 % of passenger car mileage results from trips under 100 km*

* All Data: BMVI, n. d.

Results: Substitution Potential (% of Possible Trips and Mileage)

Identification of the potential maximum substitution share by LEV category: How many car trips can be substituted e.g. with an E-bike+? Analysis of all reported trips shows that 76 % car trips could be substituted by LEVs.

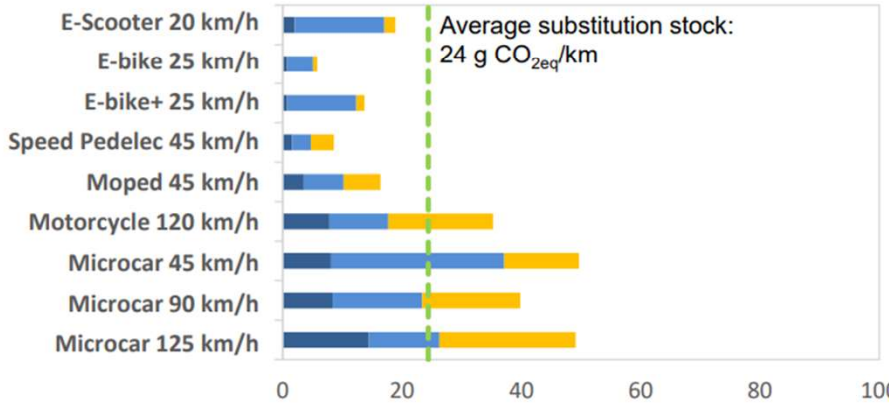




Read: For example, a Microcar 125 vehicle (max. speed 125 km/h) could in theory be used to undertake 75 % of motorised trips. In effect therefore, given it has broadly the greatest capabilities of all LEVs, this almost equals the maximum absolute substitution potential.

Results: Life Cycle Emissions per Kilometer

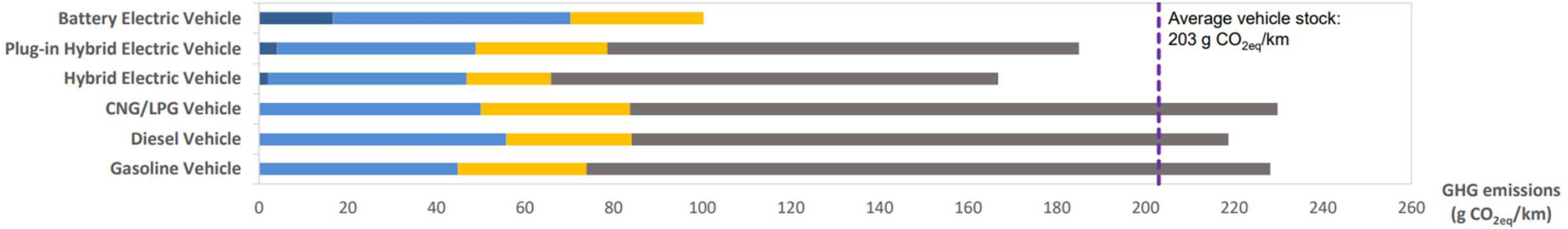
LEVs



GHG emissions of LEVs (substituted mileage weighted average) are only 12 % of the replaced passenger car greenhouse gas emissions.

The contribution of vehicle and battery production vs. vehicle operation depends on the type of drive-train.

Passenger cars



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LEVA EU

Results: Emission Reduction Potential by LEV Substitution

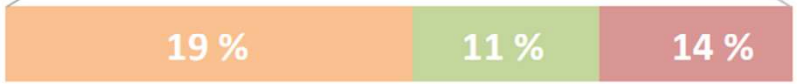
CO_{2eq} emissions before LEV substitution

130 million tonnes per year

CO_{2eq} emissions after LEV substitution

73 million tonnes per year

44% Emission reduction potential contributed by



- E-scooters, e-bikes, e-bikes+ and speed pedelecs
- Motorcycles and mopeds
- Microcars

- Overall saving for baseline scenario is **44%** of entire passenger car emissions before substitution
- Achieved with **50 %** of mileage substitution

In absolute numbers:

- 157 kilo tonnes CO_{2eq} per day reduced from 356 kilo tonnes CO_{2eq} per day without substitution
- This is equivalent to a reduction of 57 Mio tonnes CO_{2eq} per year

DLR

LEVA EU

USER-CHI

Innovative solutions for user centric charging infrastructure

Javier Montesinos
Local Energy and Climate Change Agency
City of Murcia
alem@ayto-Murcia.es

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No [875187]

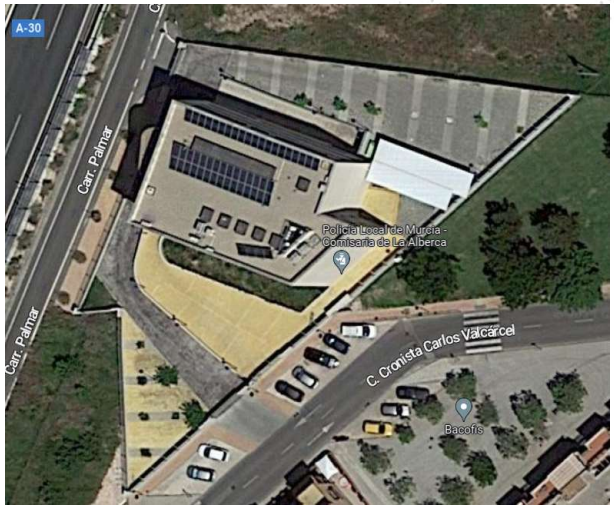
MURCIA'S INITIAL APPROACH

INtegrates SOlar DC-Charging (INSOC)

- Murcia participates in many activities to exchange good practices and to learn from the experience of the project's pilot cities.
- Murcia will build a system to recharge six LEV by inductive wireless chargers and six LEV by shucko plugs.
- The system will will be composed by a PV canopy with LEV chargers. Vehicle charging will be free for users, payment will be the responsibility of the city council.

MURCIA'S FINAL PLAN

- INSOC will be installed in a local police station that already has a photovoltaic solar installation. The system has 6 inductive chargers and 6 Schuko chargers as in the initial approach.
- The installation of the canopy will not be necessary either because there is already a canopy in the police station parking.
- Charging the vehicles will be free for users who will have to register in the INCAR application to be able to recharge.

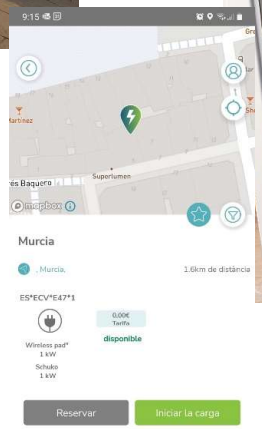


INSOC INSTALLATION MAIN CHALLENGES

- The charger was sent from Italy so it took a few days to arrive and the unloading had to be coordinated with the installation company.

- The work was coordinated with the police station in order to not hinder the service to citizens during the time the installation lasted.

- Once the electrical installation was completed, tests were carried out to launch the charging software (INCAR).



INSOC RESULTS EVALUATION

- User satisfaction was evaluated with email surveys and direct comments from people.

- Main advantages:

  Helpful for charge ebikes and escooters.

  Avoid parking vehicles inside the local police station

  Charge with inductive technology.

- Main disadvantages:

  Mandatory to use app to charge.

  Slow recharge system.

OTHER PROJECTS

THANK YOU!

Connect with us

@Userchi_H2020

www.linkedin.com/in/user-chi-project

www.userchi.eu

info@userchi.eu

Bike garage

Oona Uusitalo, project coordinator, City of Turku

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No [875187]

Background

USER-CHI project brought INSOC charging system to Turku

We wanted to make sure that following challenged would be taken in consideration:

1. Winter conditions
2. Safety
3. Vandalism

Answer:

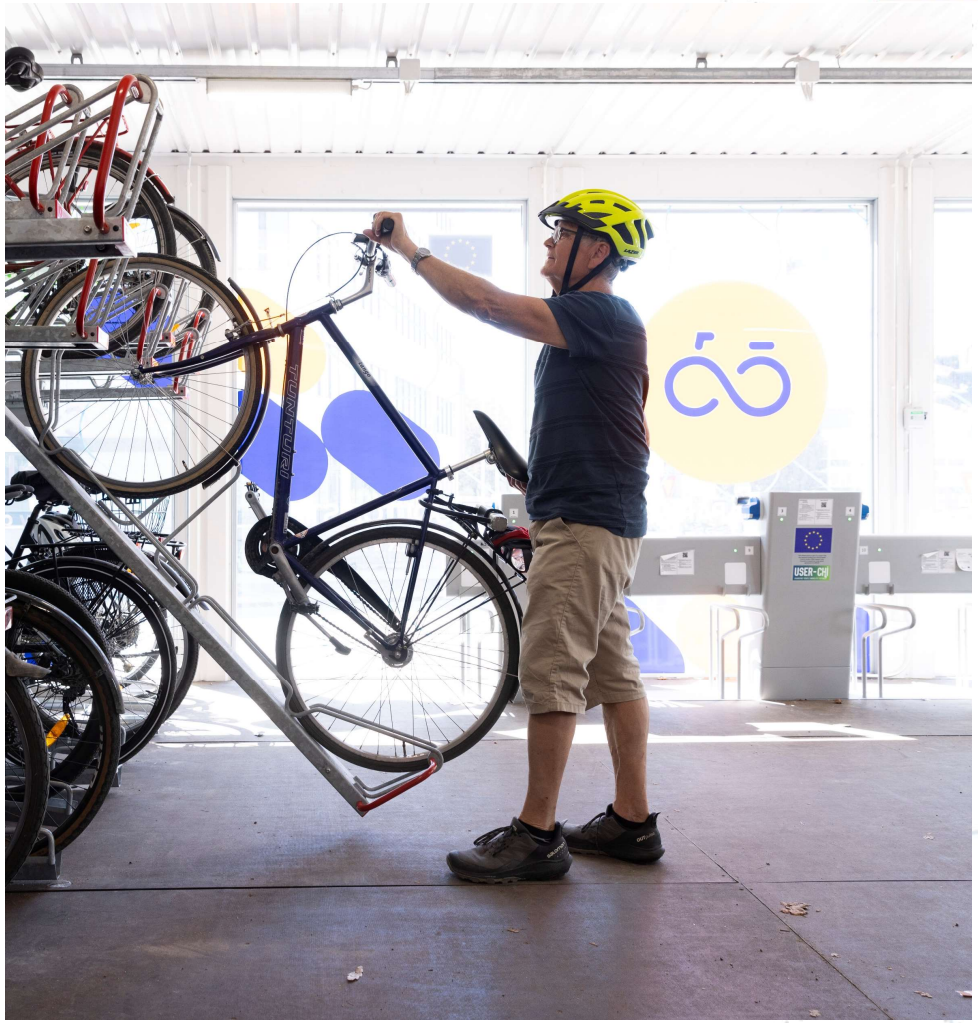
bike garage

Suitable for winter conditions and any situations

INSOC is protected from rain, snow and wind which makes the experience of using it better

Solar panel is located on the roof

Bike garage is open to everyone 24/7



Suitable for winter conditions and any situations

Brings together services:

- rentable e-cargobike
- bike maintenance station
- frame lock of all bikes

Safe and accessible

Safety has been taken into account in the design: -

- easy access through a gradual ramp
- automatic sliding doors
- frame locking possibilities for all types of bikes
- big windows
- light is always on, gets brighter when motion is detected
- security cameras

Art to combat vandalism and to promore e-mobility

We arrenged an art competition to cover two blank walls of the garage with e-mobility related art

Five artists submitted six suggestions. Jury chose 3 suggestions and the public voted for their favourite.

Art to combat vandalism and to promore e-mobility

The winning artwork is Watt is Love by Heidi Vuorio.

Competition created buzz around sustainableand e-mobility, the bike garage and its services as well as the project.

The walls have remained vandalism free!

16/07/2024

Thank you!

Oona Uusitalo
project coordinator
City of Turku

oona.uusitalo@turku.fi