

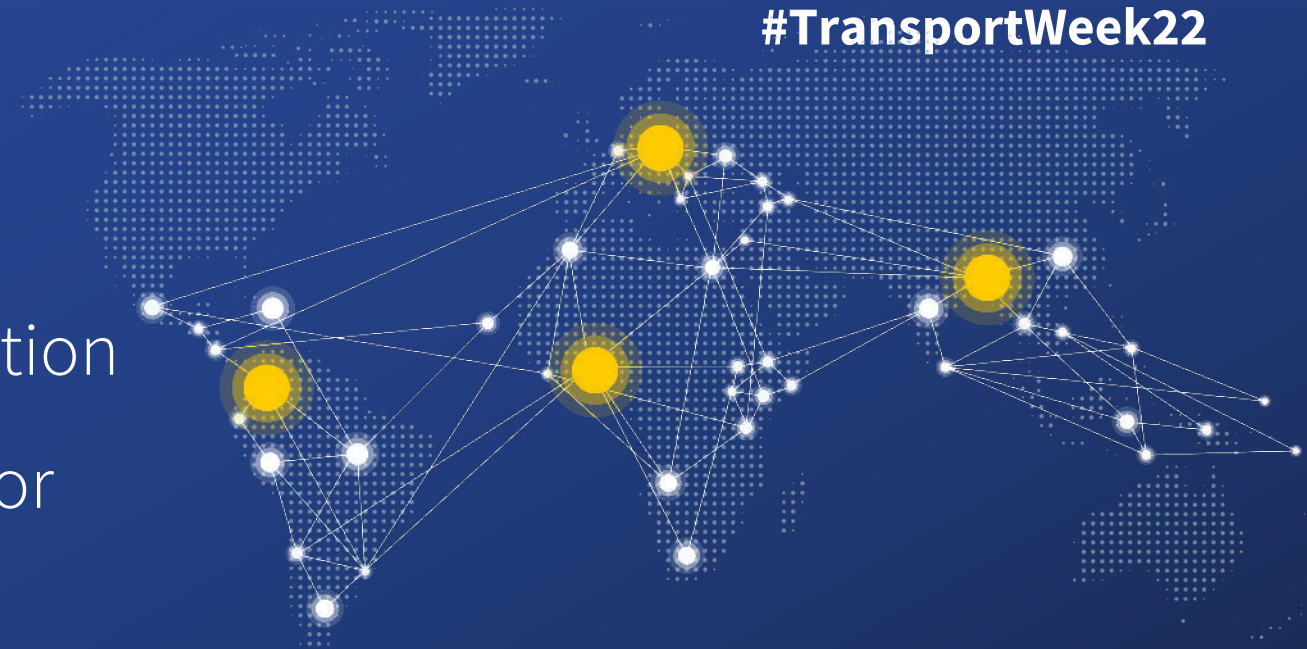
# Transport Emissions Disaggregation Tool (TEDiT)

A new perspective on emissions reduction  
potentials in passenger transport sector

**Andrzej Ancygier, Kristina Gaučė, Raul Cazan, Piotr Chrzanowski**

Monday 9 May 2022  
16:00 CEST

Transport and Climate  
Change Week  
**#TransportWeek22**



# Agenda

- 01 Transport Emissions Disaggregation Tool - TEDI
- 02 Shifting the levers – Best Practices from Lithuania
- 03 Shifting the levers – Best Practices from Romania
- 04 Shifting the levers – Best Practices from Poland
- 05 Q&A





## Transport Emissions Disaggregation Tool

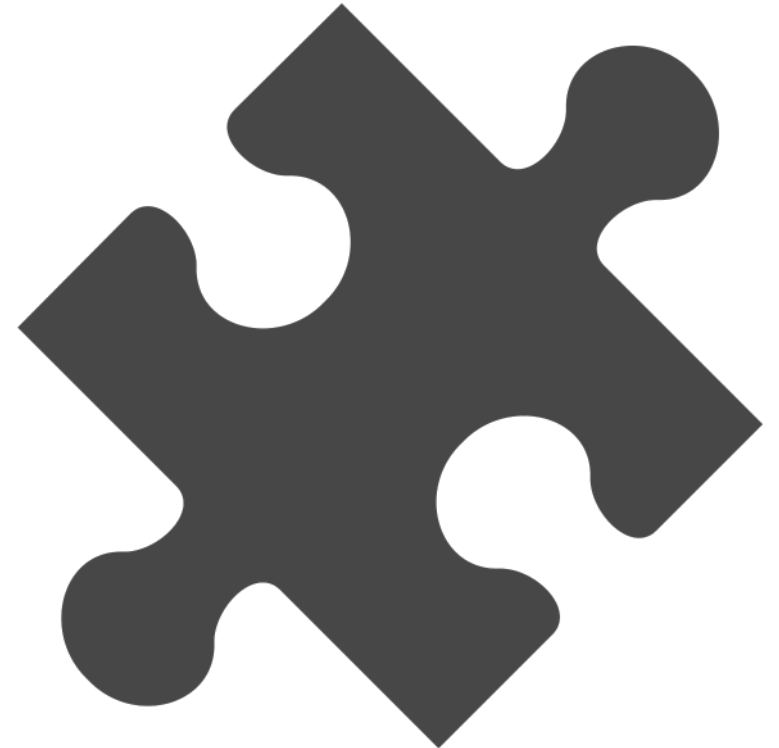
Explore how the transport sector can reduce emissions while keeping activity up



# Transport Emissions Disaggregation Tool – TEDI




# Challenges facing policy makers when designing policy for passenger transport

- **Lack of policy-relevant data:**
  - Different data may be available but not relevant to the policy-making process due to lacking clear connection to clear policy measures
  - Data may be spread across different places and available for different sectors and subsectors (e.g. European vs. national sources)
  - Some data not available at all (e.g. walking and cycling at the national level)
- **Time pressure resulting in:**
  - Application of less efficient and effective solutions than possible
  - Lack of information about best practices that could close a legislative policy gap
- **Lack of comprehensiveness of the emissions reduction strategies:**
  - Often too much focus on one area, and lacking action in other areas (e.g. emissions intensity of passenger cars vs. activity levels or load factors)
  - Misalignment between effort and outcome (e.g. emissions intensity of passenger vehicles vs. activity levels and load factors)

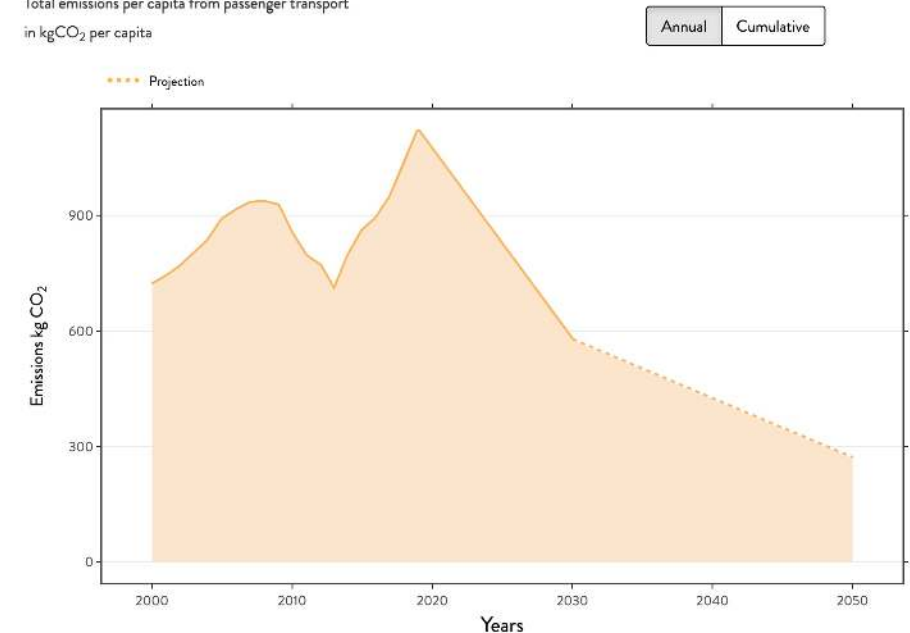


# The rationale behind the Transport Emissions Disaggregation Tool (TEDiT)

- Disaggregation of emissions and mobility across different modes of transport and levers of emissions
  - 9 modes of transport
  - 3 levers for each except for walking, cycling, and subway (only activity)
  - => resulting in 21 levers
- Values for the levers provided for 2000-2019. Users can select values for 2030 and 2050
- Changing the values of different levers will immediately show the impact on emissions and mobility
- TEDiT ready for Hungary, Lithuania, Poland, Romania, and EU27
- (Almost) every lever is accompanied with a list of policy measures that can shift the values of the levers in the desired direction
- => <http://tools.climateanalytics.org/tedit/>

TRANSPORT LEVERS	
TRANSPORT EMISSIONS DISAGGREGATION TOOL	
LEVER UNIT	TRANSPORTATION METHOD
EMISSIONS gCO <sub>2</sub> PER VEHICLE KILOMETRE TRAVELLED	
LOAD FACTOR PERSONS PER VEHICLE ON AVERAGE	
ACTIVITY LEVEL PASSENGER-KILOMETRES TRAVELLED PER CAPITA PER YEAR	

Total emissions per capita from passenger transport  
in kgCO<sub>2</sub> per capita



# What can TEDiT do?

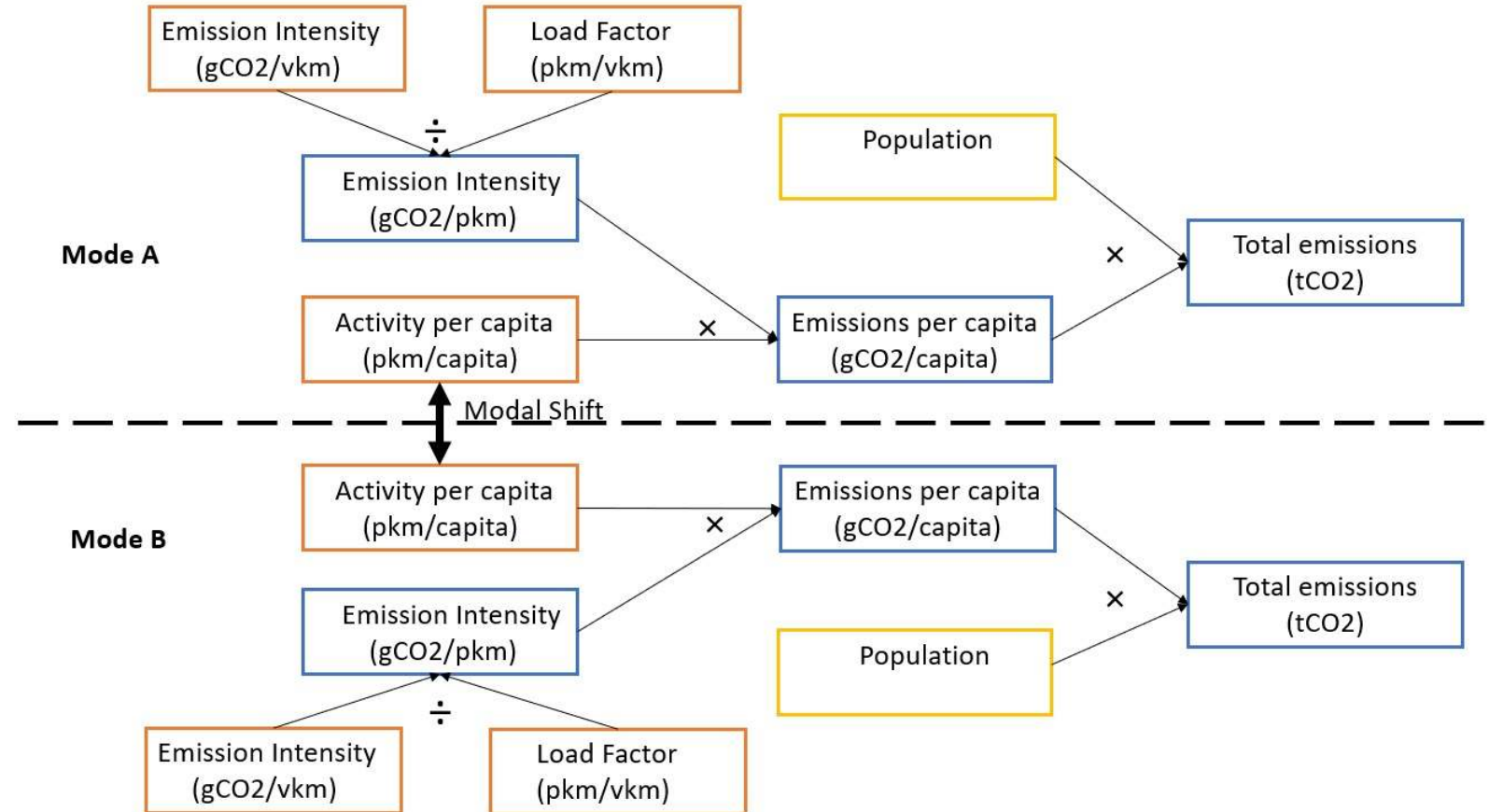
- Help to **identify gaps and overlaps** in policies addressing emissions from passenger transport
  - Is there a policy that could drive emissions reduction by addressing respective lever?
  - Has too much attention been given to certain lever at the cost of another one?
- Support in **developing drafts of emissions reduction scenarios** from passenger transport sector for different years, e.g. what would be the impact on emissions from passenger transport if in Poland
  - Activity levels from passenger cars decreased by 1000 pkm /person (around 15%)
  - Emissions intensity from passenger cars and buses on the road halved to 80 and 730gCO<sub>2</sub>/vkm, respectively
  - Load factor of passenger cars increased to 1.5 person/vehicle
  - 500 pkm/person moved from aviation to rail?
  - **Emissions would decrease by 59% and mobility by 11%.**
- Provide **initial ideas** on how to shift the values of the levers in the desired direction
  - Over 60 policy measures identified that could decrease activity levels for high emitting modes of transport, increase activity for low/zero carbon means of transport, decrease emissions intensity for each mode of transport, and increase load factor for some.

# What can TEDiT not do?

- **Quantify** the impact of different policy measures on emissions
  - The impact depends on specific (and changing) circumstances in a given country
  - Instead, the description of the policy measures includes references to studies already published that could help governments conduct such quantifications in their specific circumstances.
- Compare the selection to an existing **future** scenario
  - The tool uses historic data for between 2000-2019 from a combination of sources, for Hungary, Lithuania, Poland, and Romania but no future scenario
  - This has been driven by the desire to keep the tool simple and easy to understand
- Illustration of the impact of different measures at the **city** level
  - While some data are easier to gather at the city level (e.g. cycling and walking), other are only available at the national level
  - The tool can be adapted to the city level if data is made available

# TEDiT – The issue of modal shift

- The tool addresses shift between different modes of transport **indirectly**: it can be expected that an increase in activity levels for low-carbon mode of transport will result in decreased activity levels for high carbon modes of transport
- The scale of the shift and modes of transport affected is strongly determined by existing circumstances and accompanying policies







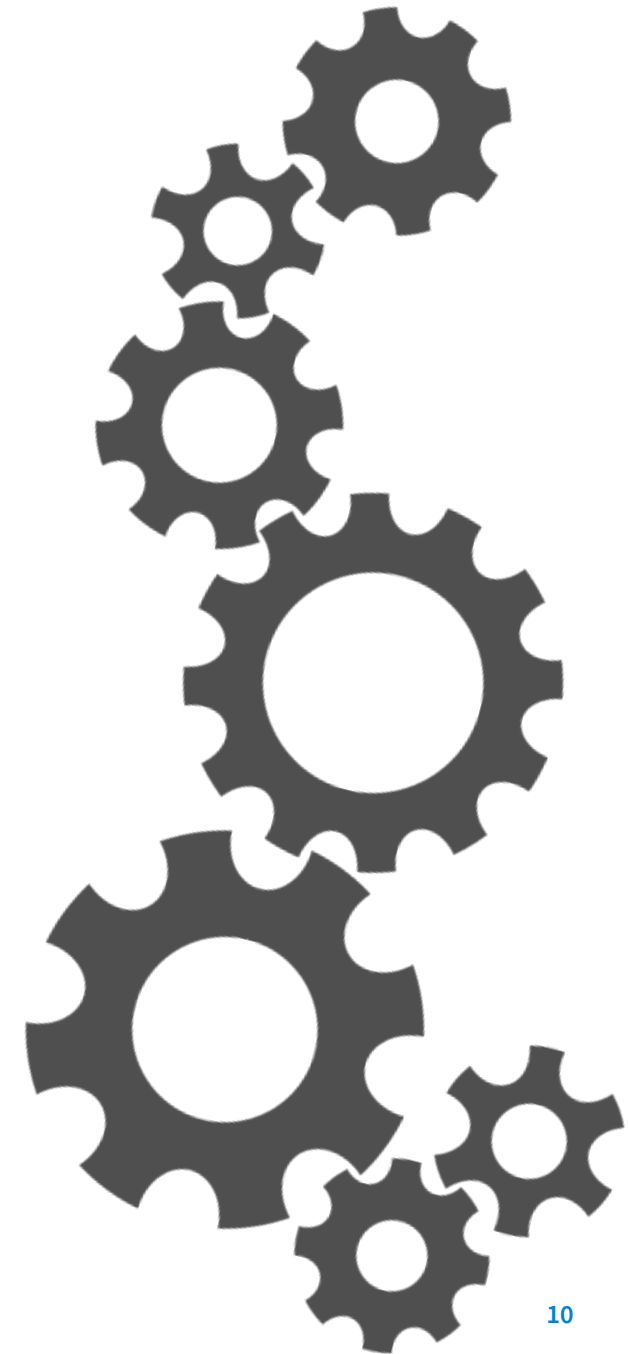
How to shift the values of the levers with selected best practices? - Lithuania

# Integrated transport system: current problems

SEGREGATED BY ADMINISTRATIVE BOUNDARIES PUBLIC TRANSPORT SYSTEMS	NO UNIFIED TICKET SYSTEM
LACK OF COMFORTABLE CONNECTIONS BETWEEN DIFFERENT MODES	COUNTLESS DIFFERENT CARRIERS UNDER DIFFERENT AUTHORITIES
WEAK MULTIMODALITY OPTIONS	LACK OF UNIFIED ACCOUNTING AND MONITORING



**A NEED FOR NEW SPATIAL APPROACH**

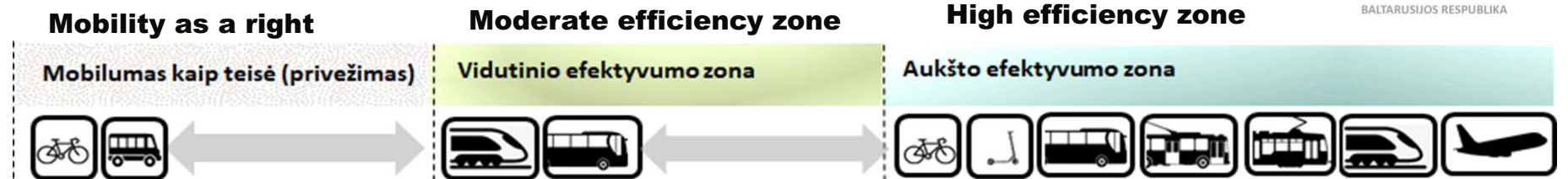
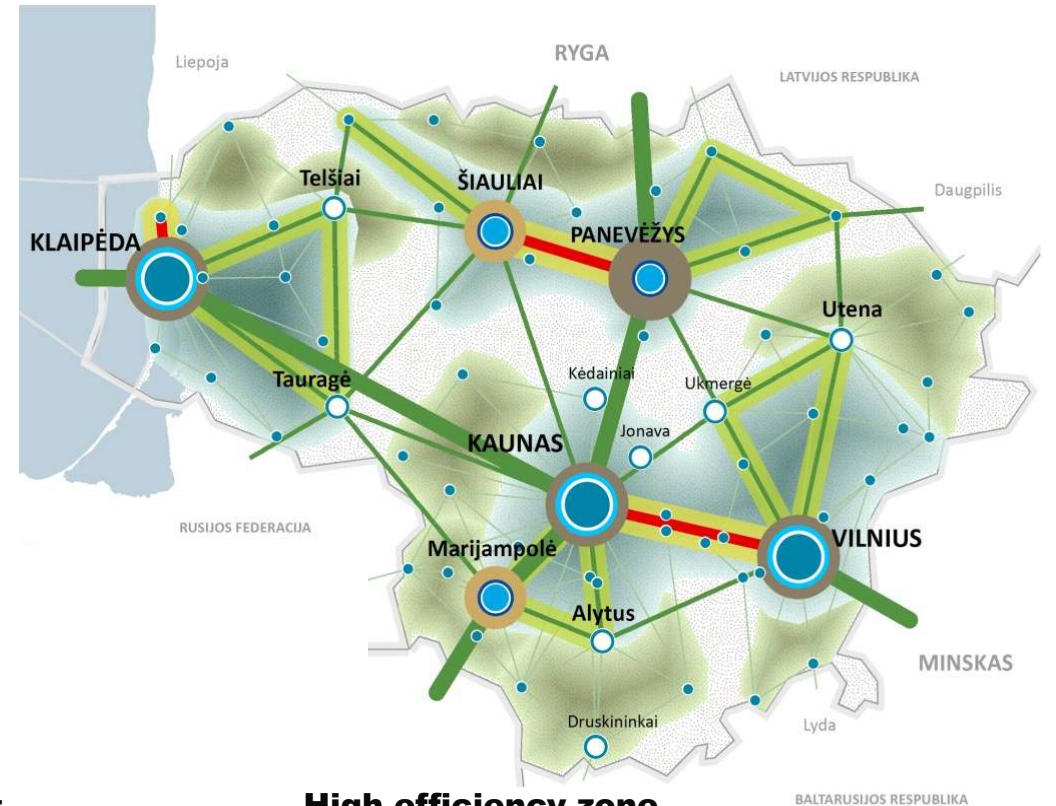


# Integrated transport system: national approach

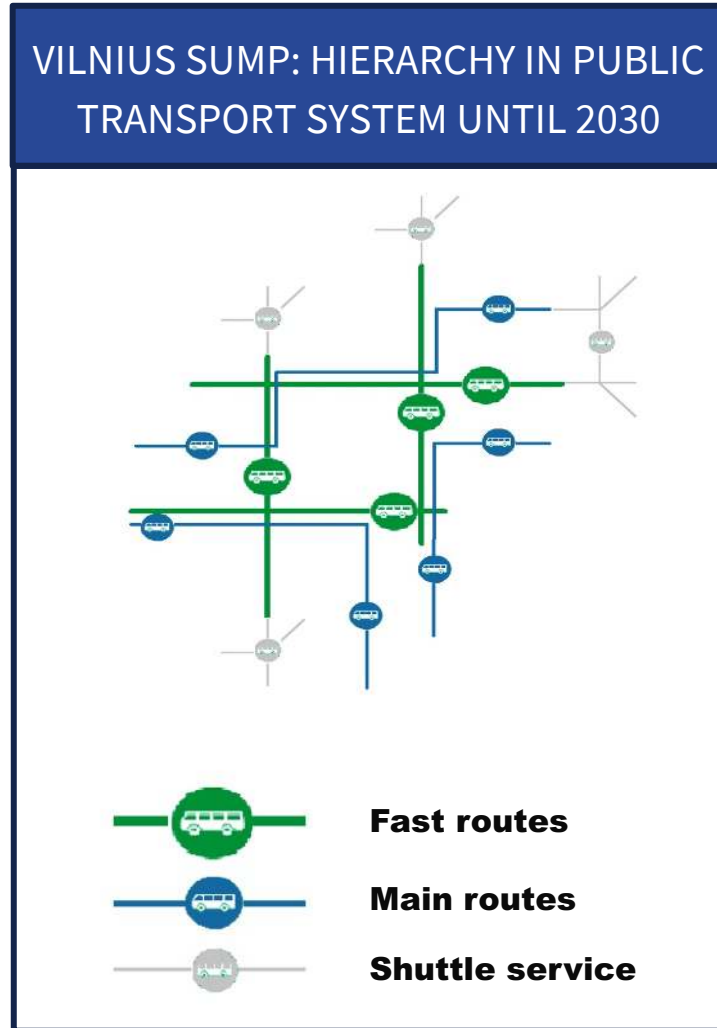
## “Comprehensive Plan of the Territory of the Republic of Lithuania 2050” introduced a strategy of integrated transport system on a national level

- Pack of measures to enhance partnerships between municipalities, cities, towns, settlements etc.
- Strategy contains 3 levels of mobility services
  - 1) *high efficiency public transport zones*
  - 2) *moderate efficiency public transport zones*
  - 3) *zones with mobility as a right*

Clear guidelines for partnerships and integrated public transport system in particular are needed for the concept to be implemented nation-wide



# Integrated transport system: Vilnius approach



## PRESENT SERVICES AND ACTIVITIES

- 5 fast public transport routes and public transport lanes
- 5 Park & Ride facilities...
- 2 multimodal points
- ...and many more

**Multimodalinė aikštelė**

**MIESTO CENTRAS**

**Labas, Vilniau!**

**Statyklai ir važiukai**

**JUDU**



# SUMP enhancement: Vilnius SUMP example

## 2017 MODAL SPLIT IN VILNIUS IN FUNCTIONAL ZONES

### TRAVEL MODE



Public transport

25,4 %



Bicycles

1,5 %



Pedestrians

24,5 %



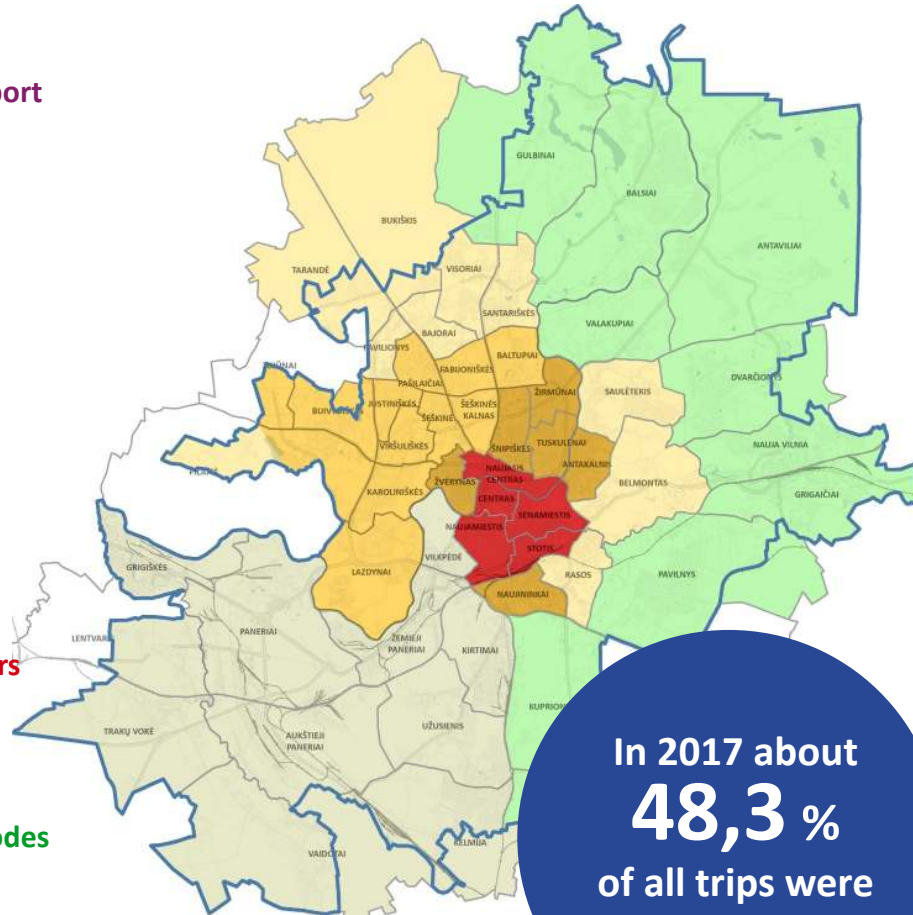
Individual cars

48,3 %



Other car modes

0,3 %



In 2017 about **48,3 %** of all trips were made by car

## COMMUNICATION FOR CHANGING BEHAVIOUR OF PASSENGERS

- 1 Not only the SUMP is communicated, but the IDEAS OF SUSTAINABLE MOBILITY;
- 2 Through the communication SUMP is introduced to the society;
- 3 Emotional direction - the emotions of the society, a sense of responsibility being evoked;
- 4 Data direction – statistics and facts that are important in making long-term decisions are presented;
- 5 It is necessary to carry out sustainable mobility ideas' dissemination through and after completion of the SUMP, because change of habits is a long-term process.



%				
21,8	1,3	41,7	35,2	
21,9	0,7	35,3	42,1	
37,1	0,8	23,1	39,0	
22,1	2,6	11,0	64,3	
34,3	0,3	12,1	53,6	
13,7	0,6	17,9	67,8	

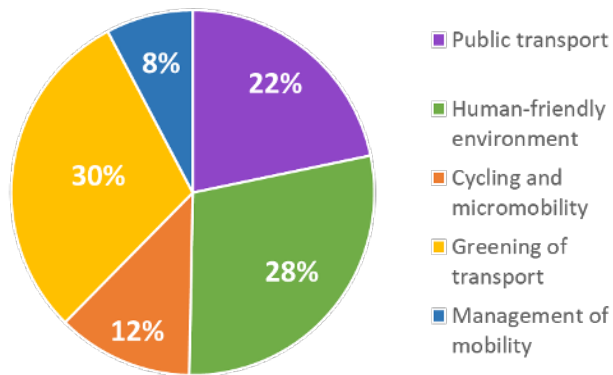
# SUMP enhancement: SUMP implementation evaluation

VILNIUS SUMP 2030 CONTAINED ACTION PLAN 2020

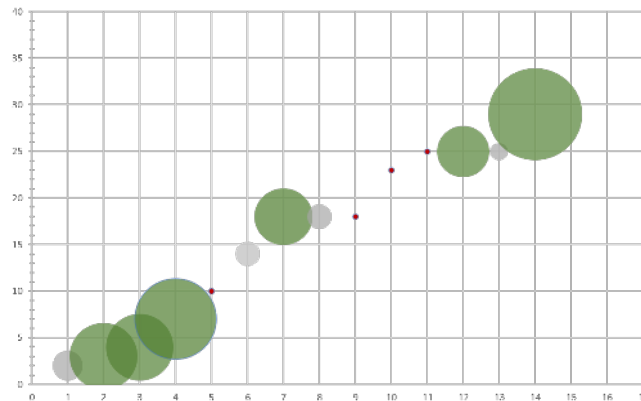
IN 2021 SUMP IMPLEMENTATION EVALUATION WAS DONE

BASED ON RESULTS OF EVALUATION RECOMMENDATIONS FOR FURTHER IMPLEMENTATION WERE PREPARED

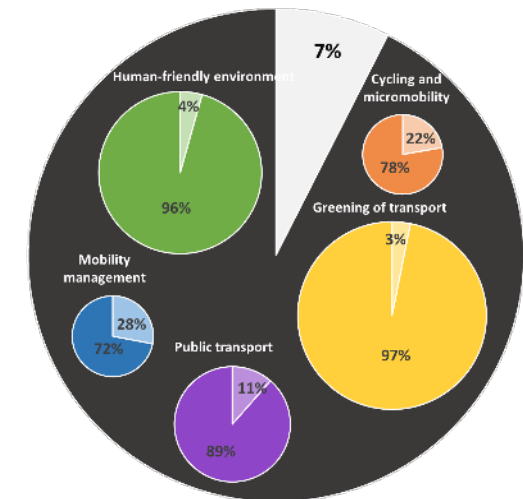
## DISTRIBUTION OF SUMP MEASURES



## CORRELATIONS BETWEEN PRIORITIES AND IMPLEMENTATION STATUS



## IMPLEMENTATION LEVEL

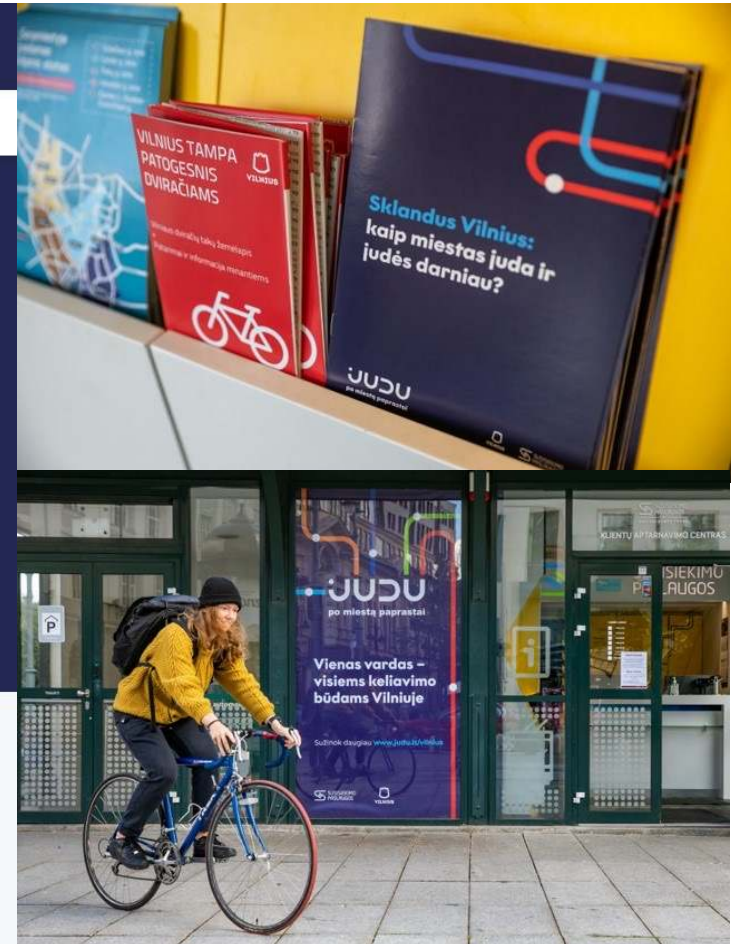


# SUMP enhancement: Responsible authorities

AUTHORITY RESPONSIBLE FOR SUMP IMPLEMENTATION AND SUSTAINABLE MOBILITY GOALS IN VILNIUS –  
**JUDU (MUNICIPAL ENTERPRISE)**

The screenshot shows the JUDU Vilnius website. At the top, there is a dark blue header with the JUDU logo and 'VILNIUS' on the left, a phone number '+370 5 210 70 50', a language selector 'A A A', a 'Self-service' button, and 'LT EN' language options. Below the header, there are navigation links: 'For public transport passengers', 'For drivers', and 'For pedestrians and bicycle riders'. A search bar is also present. The main content area features a large 'JUDU po miestą paprastai' logo. Below this, there are three columns of service categories, each with an icon and a list of services:

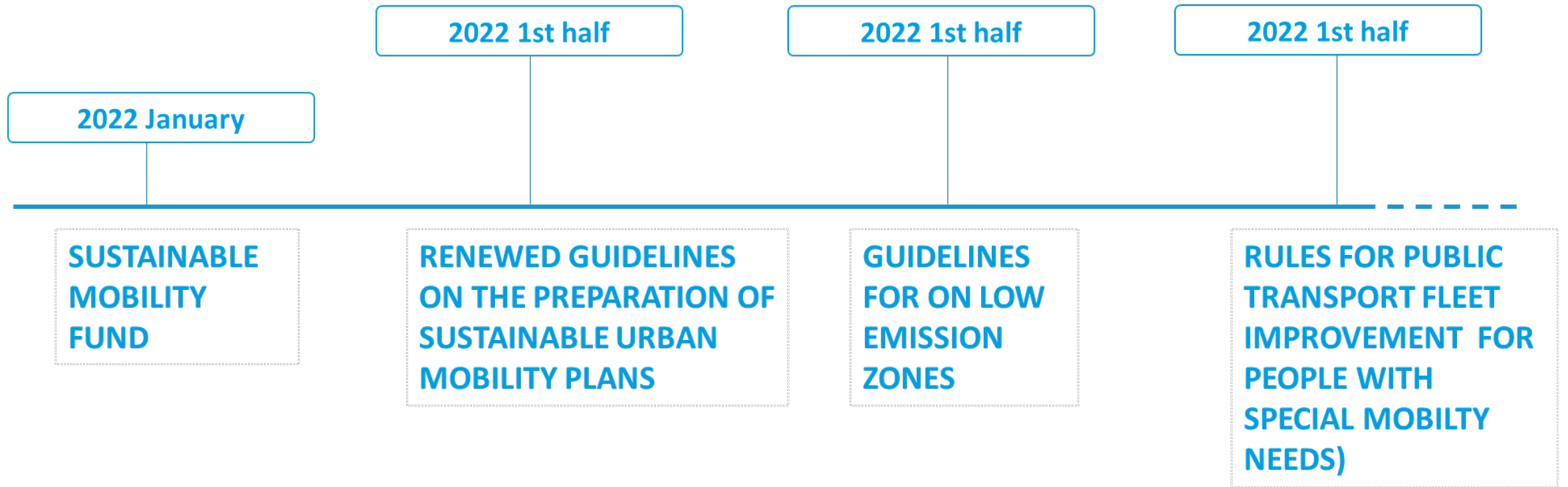
For public transport passengers	For drivers	For pedestrians and bicycle riders
Trip planner	Parking zones in Vilnius	Plan cycle trip
Public transport display board	Long term parking on street	Maps and routes for pedestrians
Routes and timetables	Payment for a parking ticket	Micro-mobility sharing systems
Ticket types and prices		Multimodal bike parks





# SUMP enhancement: new policies

TO IMPROVE SUMPS AND EFFECTIVENES OF IMPLEMENTATION OF SUMP'S MEASURES, MINISTRY OF TRANSPORT AND COMMUNICATIONS IS PREPARING SOME NEW DOCUMENTS





How to shift the values of the levers with selected best practices? - Romania

# Low Emission Zones

Low Emission Zones (LEZ) are measures that a local government is taking to reduce CO2 emissions and air pollutants from road traffic.

Official data shows high levels of air pollution with:

**PM2.5**

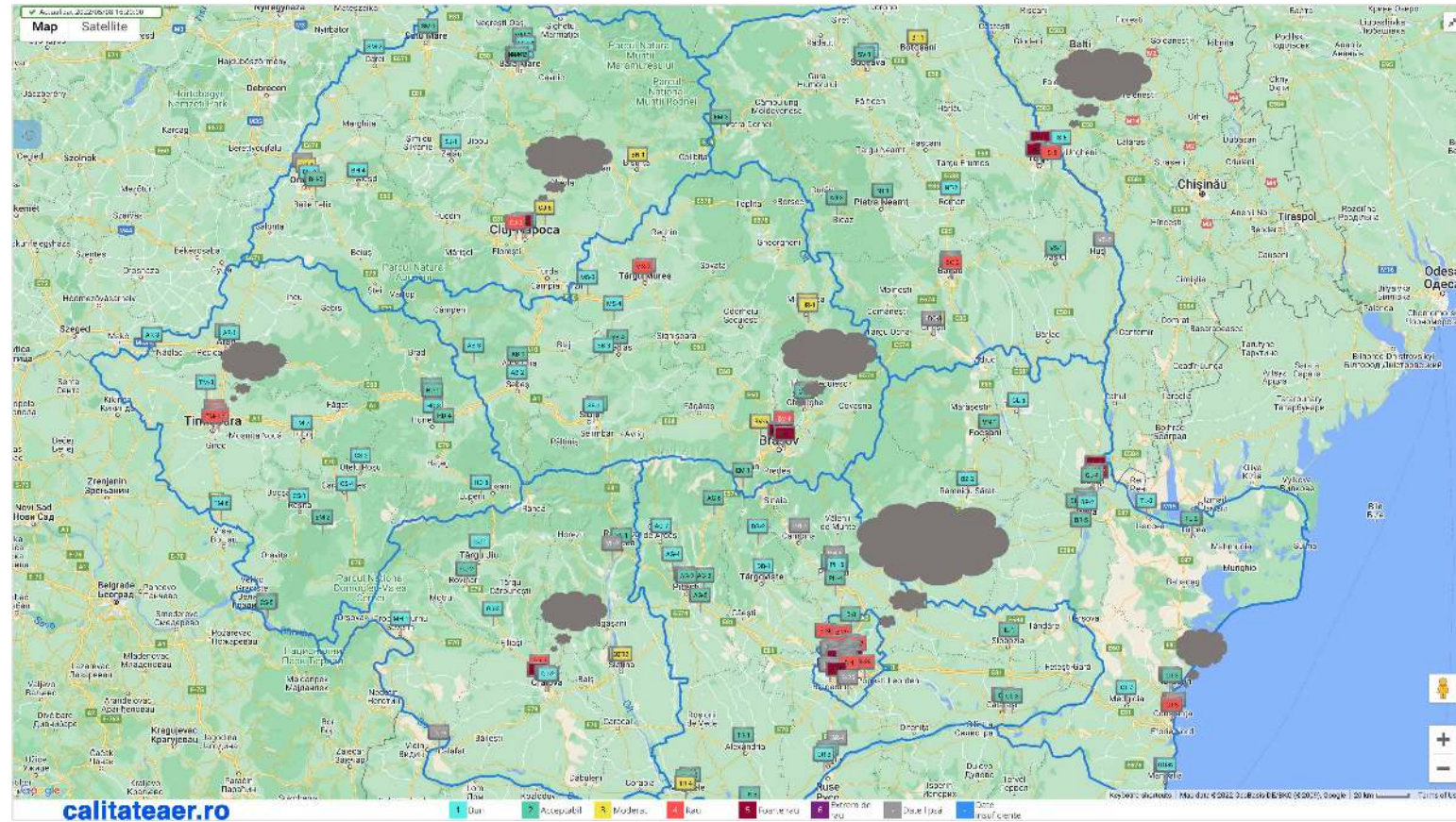
**PM10**

**NOx**

**SOx**

**CO**

*These levels are recorded in urban agglomerations and expanding cities with metropolitan areas.*



# Low Emission Zones

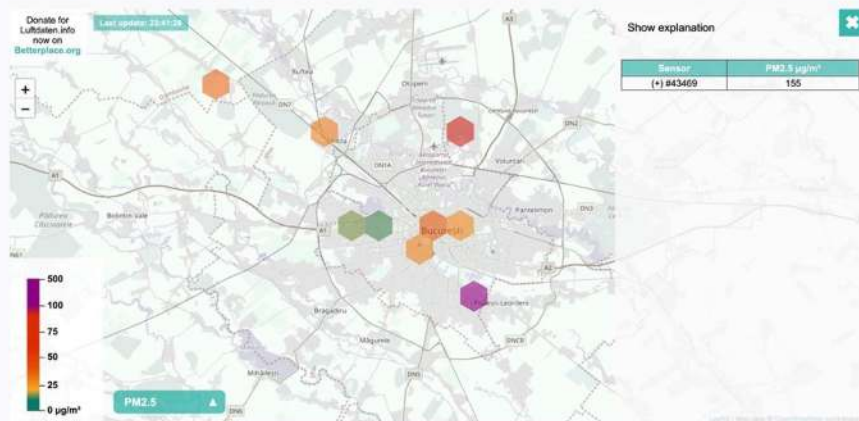
2Celsius got involved in promoting LEZ as a local practice to tackle pollution and CO2 emissions.

- Organized **air quality measurements** (Luftdaten Ro and AerLive);
- Strategic Litigation:** Bucharest Clean Air Case.



DESPRE CAMPANII PRODUȚIE MEDIA PODCAST COMUNICATE CONTACT

**Vezi aici în timp real valorile înregistrate de senzorii Luftdaten instalați de 2Celsius și de alți cetățeni îngrijorați!**



Platformă pentru măsurarea calității aerului din București



## Indicele de calitate a aerului este dat de valoarea cea mai mare a poluanților cuprinși în determinare.

Pentru a calcula Indicele de Calitate a Aerului (ICA) se face conversia de la unitățile de măsură transmise de senzori (ppb per milion) la µg/m³ (micrograme per metru cub). Tabelul de mai jos arată corecțiile între valorile poluanților și valoarea indicelui.

Nivel de poluare	Foarte scăzut	Scăzut	Mediu	Ridicat	Foarte ridicat
Interval	<25	25-50	50-75	75-100	>100
NO2	<50	50-100	100-200	200-400	>400
PM10	<15	15-30	30-50	50-100	>100
PM2.5	<10	10-20	20-30	30-60	>60
CO	<5k	5k-7.5k	7.5k-10k	10k-20k	>20000
SO2	<50	50-100	100-350	350-500	>500

Mai multe detalii despre metodologie puteți consulta aici.

### Aer Live in București

București  
Vilitor  
Renova  
Progresul

### Parteneri

Environix  
Fundatia FIA2U  
Clarin  
IColabus  
ClientEarth

### Newsletter

Nome  
Prenume  
Email  
→

## Alte articole din ICA, Metodologie

Indicele Calității Aerului  
(1600, 08/02/2022) (ICAR)

**București**  
dat de Popescu Leardoni

**13**

Vezi detalii →



21 °C  
Clear Sky

Limbaștea 0.76  
Vilitor 18 km/h  
Pescara 10.4 ppb



# Low Emission Zones



As LEZ have little to no success within local policies of local public administrations due to weak social capital and poor administrative capacity, an initiative has taken shape in the **Romanian Parliament – Senate’s Environment Committee** as to design a law that would regulate Low Emission Zones at central/national level and local governments will be held responsible to enforce it.

Identify the size of the LEZ based on concrete evidence of the local problem:

- major local pollutants and their sources, exposed population, including residents, workers, commuters, schools and outdoor recreation centers
- the extent and spatial extent of the congestion problem
- local demographics and the car park
- public priorities around the atmosphere and air emissions.



The impact assessment should include the distribution of LEZ beneficiaries and the introduction of transport alternatives. You need to introduce support measures to ensure that the benefits are fair. This may include financial support for citizens and small businesses moving to cleaner vehicles and providing bus routes and bike lanes that reach, for example, the low-income areas. LEZ should be a central part of a city-wide strategy to promote access to and use of public transport, walking and cycling. A LEZ will not work in isolation; residents and businesses need to have access to affordable, attractive and convenient alternatives. Establish access routes that are excluded from the low-emission zone, as well as certain transit parking lots (Park & Ride) or roads that allow access to the bypass for traffic coming from outside the area. The low emission zone is permanent and applies to any vehicle that uses the public road in the mentioned area.

# Low Emission Zones

## Principles to follow:

- Establish an implementation schedule for access to the low-emission zone and phasing out access to polluting vehicles in the city. Calendar must be approved following public consultation. Consider introducing daily subscriptions and a maximum of annual days to allow access to vehicles for which access is normally prohibited.
- Consider the opportunity to establish support schemes and / or exemptions, such as special access hours, to support deliveries to low-emission businesses. A system of derogations will be established at national level regarding the categories of special purpose vehicles, such as ambulances, vehicles of the armed forces, vehicles adapted for the transport of persons with disabilities, etc.
- Establish systems of monitoring, control, enforcement, review, as well as for public consultation.

<b>PETROL, GPL</b>	2023	2024	2025	2026	2027	2028	2029	2030
EURO 6, 6b, 6d, temp / VI	+	+	+	+	+	+	+	+
EURO 5, 5a, 5b / V EEV	+	+	+	-	-	-	-	-
EURO 4 / IV	+	+	-	-	-	-	-	-
EURO 3 / III	+	+	-	-	-	-	-	-
EURO 2 / II	-	-	-	-	-	-	-	-
EURO 1 / I	-	-	-	-	-	-	-	-
Non-EURO	-	-	-	-	-	-	-	-

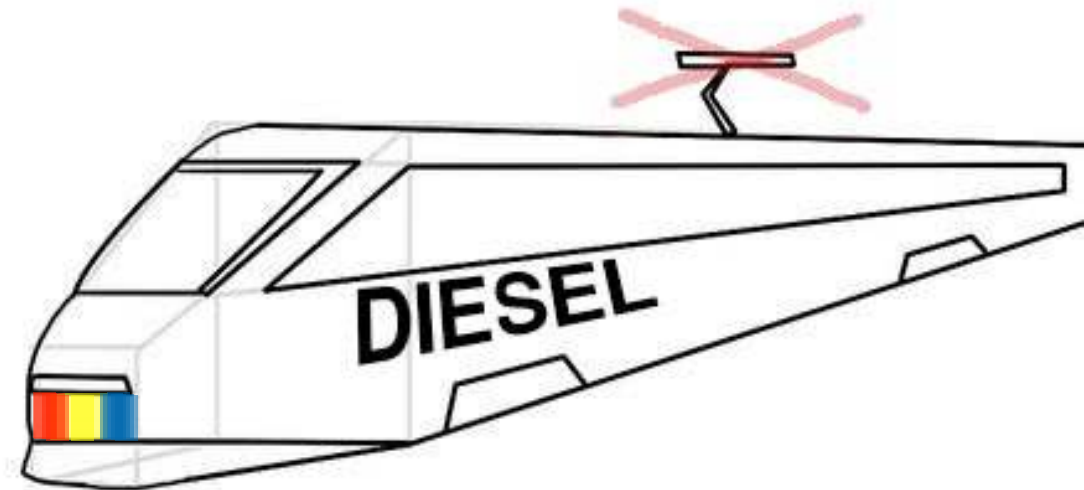
## **CALENDAR FOR 'GRADUAL IMPLEMENTATION'**

<b>DIESEL</b>	2023	2024	2025	2026	2027	2028	2029	2030
EURO 6, 6b, 6d, temp / VI	+	+	+	+	+	+	+	-
EURO 5, 5a, 5b / V EEV	+	+	+	+	-	-	-	-
EURO 4 / IV	+	-	-	-	-	-	-	-
EURO 3 / III	+	-	-	-	-	-	-	-
EURO 2 / II	-	-	-	-	-	-	-	-
EURO 1 / I	-	-	-	-	-	-	-	-
Non-EURO	-	-	-	-	-	-	-	-

# Railway electrification

In matters of greening railways, Romanian operators find themselves in a deep crisis of rolling stock. Naturally, the poor (electric) infrastructure is the very root of the problem, however [the Romanian paradox](#) must be overcome.

- **Romanian paradox: trains pulled by diesel engines roll on electrified railways**
- Only EUR 5 bn were attracted under the previous EU budget with which Romania managed to modernize 500 kilometres - absorbed from 2017 until today (absorption of only 33%)
- Attainable max speed of all passenger trains on average: 68 km/h; real average speed: **around 55 km/h**.
- Night trains lost the battle with **domestic flights**.
- Road transport has become the **only option** for most regions in Romania.
- International trains **slashed by 80%** in the last 2 decades.



# Railway electrification

What policies to look out for?

- The EU can offer loans at preferential interest rates via the European Investment Bank (EIB);
- The EU (or member state governments together) sets up its own rolling stock pool. For regional and some national operations, rolling stock is sometimes owned and leased out by the regional/national government (awarding authority) or a government-owned company;
- Trains (acquisition of new rolling stock) must be included in the National Plans within the **Recovery and Resilience Facility**.
- Rehabilitation of railways via **Connecting Europe Facility**.

EUROPE ON RAIL





# Railway electrification

Alternative solutions towards greening of railways:



[Hydrogen powered trains](#)

Institutional response:



MINISTERUL TRANSPORTURILOR ȘI INFRASTRUCTURII  
AUTORITATEA PENTRU REFORMĂ FERROVIARĂ





# How to shift the values of the levers with selected best practices? - Poland

# Electrification of buses – the Polish approach



**Share of zero-emission buses (BEV, FCEV) in the city bus fleet in cities with more than 50,000 inhabitants**

≥ 5%

from 01/01/2021

≥ 10%

from 01/01/2023

≥ 20%

from 01/01/2025

≥ 30%

from 01/01/2028

- The Act on electromobility introduces goals regarding the development of infrastructure and electric vehicles for the Polish local governments
- The largest fleet of electric buses in Poland is in Warsaw - 160 buses (more in Europe are used in London and Moscow)
- The cities with the highest share of zero-emission vehicles are: Jaworzno (63%), Zielona Góra (48%), Lublin (30% - trolleybuses), Poznań (18%), Kraków (14%) and Warsaw (11%)
- There are over 700 electric buses registered in Poland
- Poland registers most electric buses (7,1%) after Great Britain (13,5%), France (11,9%) and Sweden (7,4%)
- Hydrogen-fueled buses are not present due to lack of infrastructure

# Electrification of buses – the Polish approach

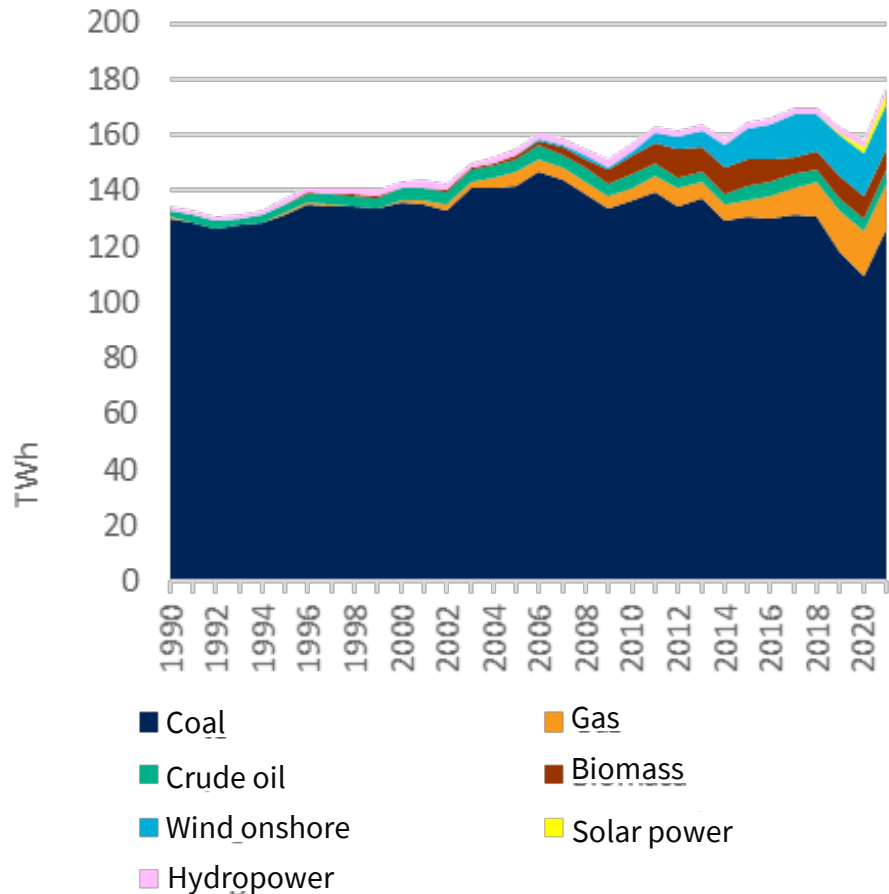
- In Poland, there were four large calls for funding for electric buses last years.
- Each of the calls was very popular and the number of submitted applications significantly exceeded the budget assumed by the institutions.
- Summary of implemented co-financed programs:

	Cities	Electric buses	Hydrogen buses	Budget
Green Public Transport (I)	34	302	122	1,1 bln PLN (ca. EUR 230 mln)
Green Public Transport (II)	67	340	48	1,26 bln PLN (ca. EUR 270 mln)
Centre for EU Transport Projects (Operational Programme Infrastructure and Environment)	13	200	-	460 mln PLN (ca. EUR 100 mln)
NFOŚiGW (Kangaroo)	16	16	-	40 mln PLN (ca. EUR 8,5 mln)

# Electrification of buses – the Polish approach

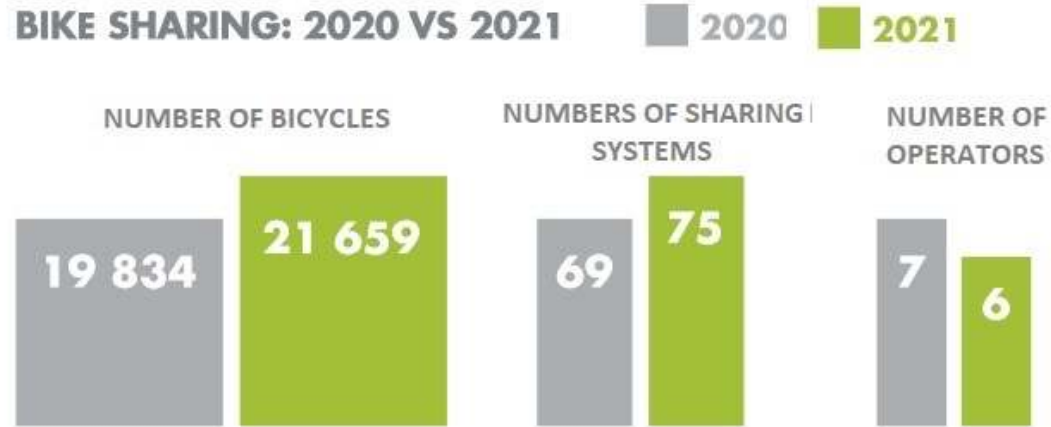
What needs to change?

Structure of Polish energy mix



- Change in the generation of the electricity mix (the context of the war in Ukraine and the need to move away from fossil fuels)
- Construction of sufficient infrastructure – especially for hydrogen-fuelled buses
- Continuation of governmental projects, boosting the capacity of smaller communities to pay for the fleets
- Increasing the domestic potential - Poland is the **largest exporter of electric buses** in the EU (almost every second bus in the EU comes from Poland) and the **largest producer of batteries for electric vehicles** in the EU (5th in the world)

# Bike rental



- Most of the vehicles rented in Poland in 2021 are electric scooters (67%). Shared bikes account for almost 32% of rentals.

- Public bike rentals have been operating in Poland for 13 years

- There are 75 public bike sharing systems in operation in almost 100 localities

- More than half of all shared bikes were available in four cities: Warsaw (23% of the market), Łódź (12%), Wrocław (11%) and Poznań (8%)

- Most operators use billing system based on the length of bike rides, with first 30 minutes being free

## POLISH BIKE SHARING MARKET

	number of bicycles	number of systems	market share
<b>Nextbike</b>	<b>16 188</b>	<b>37</b>	<b>75%</b>
<b>Freebike</b>	<b>2680</b>	<b>4</b>	<b>12%</b>
<b>Roovee</b>	<b>1910</b>	<b>25</b>	<b>9%</b>
<b>GeoVelo</b>	<b>613</b>	<b>6</b>	<b>3%</b>
<b>Filfri</b>	<b>250</b>	<b>2</b>	<b>1%</b>
<b>blinkee.city</b>	<b>18</b>	<b>1</b>	<b>0,1%</b>

# Bike rental

What needs to change?

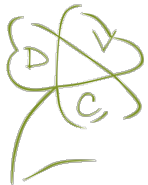
- **Recovery of the COVID pandemic** - with a difficult 2019 year and significant drops in bicycle rentals caused by the COVID pandemic, a slight increase and improvement in the situation can be seen
- **The fight with the scooter rental system** - it will increase the demand for bicycle transport and its popularity among citizens
- **Expansion of infrastructure** - construction of a sufficient amount of bike stations in the right locations
- **Increased safety for cyclists** - improving bike infrastructure and safety – bike lanes, law protecting bikers from cars
- **Change of the rental model** - the dominant model in Poland is the rental of bikes from the station, which significantly reduces the possibility of moving residents
- Improvement of the **technical quality** of the rented bikes



# Thank you!

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Levegő Munkacsoport



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