

The Urban Transport Sector in Ukraine

Situation and key findings from
a baseline study

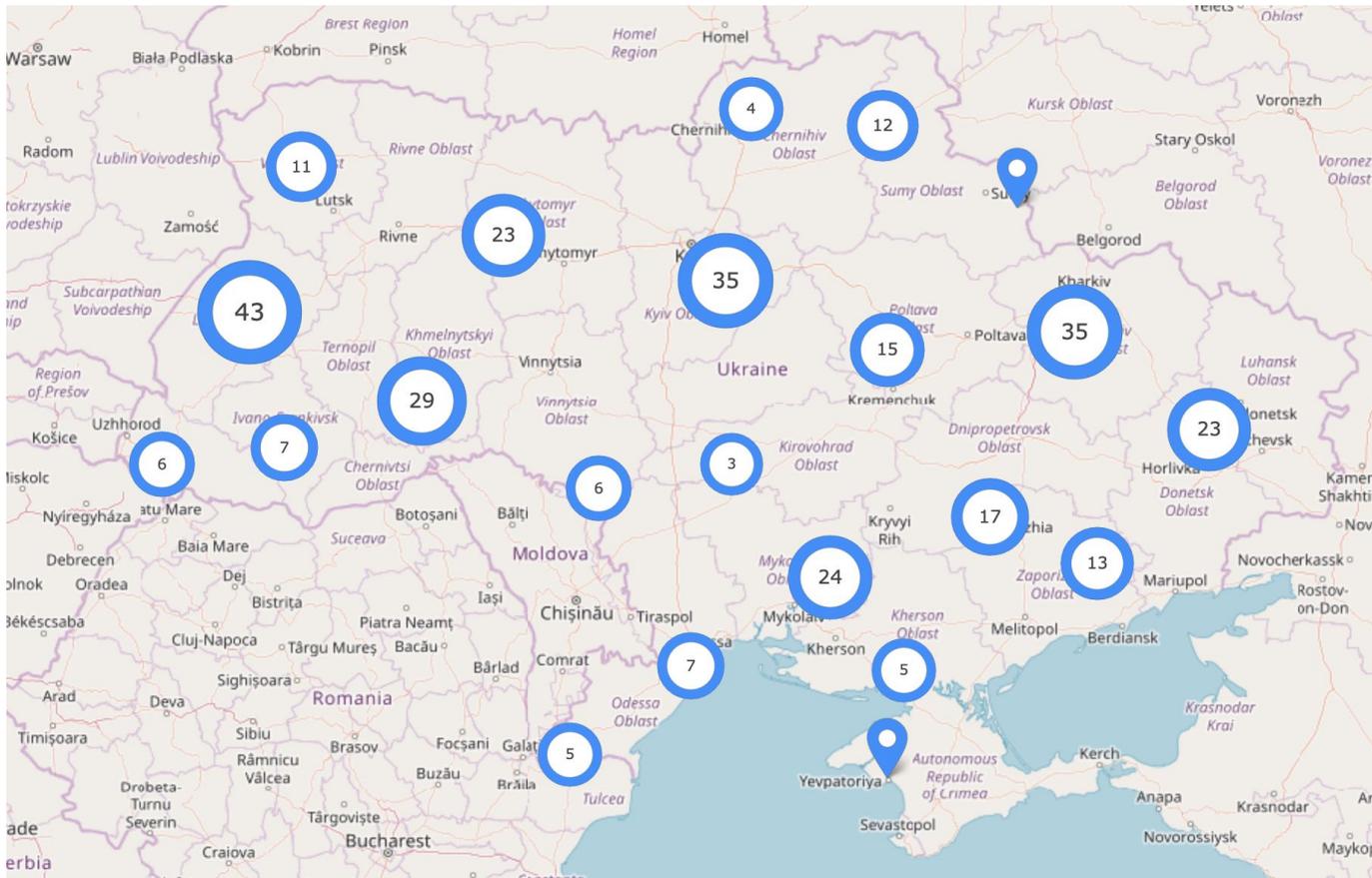
Demyan Danylyuk (NGO Vision Zero)



14.09.2023

Cities in Ukraine

- ▶ 70% – urbanization rate, 461 cities
- ▶ Modal share of public transport in big cities – over 45%
- ▶ Heritage systems of e-transport in 59 cities (2022)
- ▶ 325 signatories of the “Covenant of Mayors for Climate and Energy”:



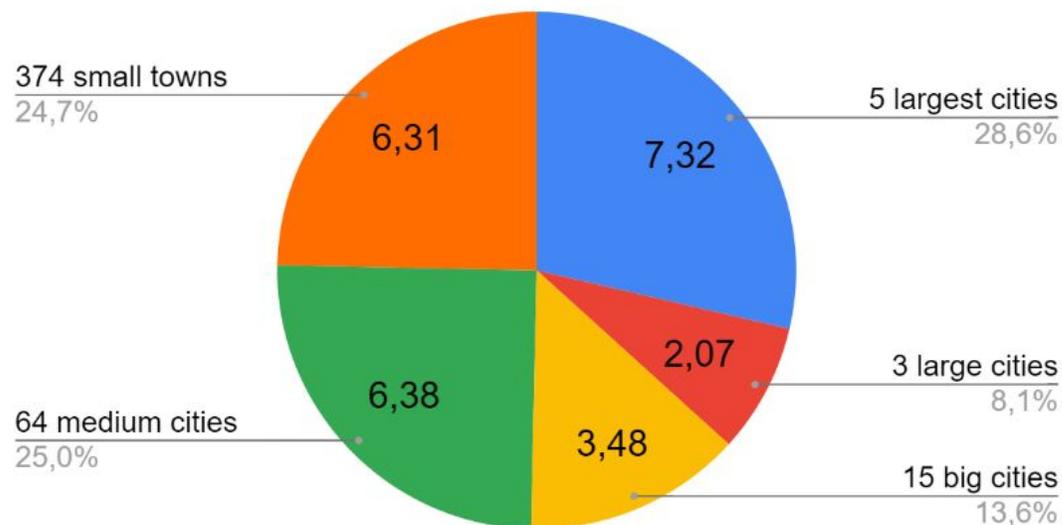
Group name (EN)	Group name (UA)	Population range	Number of cities (2014)
Largest	Найкрупніші	Over 800,000	5
Large	Крупні	500,000 – 800,000	3
Big	Великі	250,000 – 500,000	15
Medium	Середні	50,000 – 250,000	65
Small	Малі	Up to 50,000	374

Table 1. City groups in Ukraine by population size

The distribution of population by city size is balanced. About half of all urbanized Ukrainians live in big cities (250,000+), and the other half, in medium and small cities.

Distribution of urban population in Ukraine by size of cities

Data of Ukrstat.gov.ua for 2020





Urban catenary electric transport, metro and buses* in the cities of Ukraine, 2022

* buses are present in more than 80 cities of Ukraine in total

After USSR collapse

Everything decreased

Cities lost over half of rolling stock during 1990-2000s because of lack of funds for maintenance

Today Ukrainian cities has one of the cheapest fares in Europe – 0,13-0,45 euro per single ticket

Up to 35% of passengers are privileged (free to use) in all transport, and up to 65% in ET.

Motorisation increasing despite small economy and other troubles (no accurate data, but approximately 250 vehicles per 1000 citizens, 400 in Kyiv only)

Ukraine's approaches after 1991

- ▶ Since 2000s Ukraine started to develop regulations and new approaches to planning and transport organisation
- ▶ Laws and bylaws on Automobile transport [includes buses] (2001) and Urban electric public transport (2004)
- ▶ Redevelopment of soviet master plans [general plans], which still are mostly soviet-style planned (since 2000)
- ▶ Cycling conceptions development (since 2009)
- ▶ PT network redesign in Lviv, Vinnytsia etc. (since 2012)
- ▶ SUMP development in 5 cities [still not obligatory by any law act] (since 2018)

Key figures of nowadays

- ▶ Electric tram systems in **18 cities** (since 1892)
- ▶ **Bus** systems in **over 80 cities** [no accurate data] (since 1925)
- ▶ **Trolleybus** systems in **41 cities** (since 1935)
- ▶ **Metro** systems in **3 cities** (since 1960) and **1 metro-tram** (since 1986)

ET networks length (km):

Tram – 1734, Trolleybus – 4397, Metro – 112

Rolling stock (units):

Trams – 2593, Trolleybuses – 4011, Metro – 1192

not all units are in service

No accurate data for buses (not collected)

Typical rolling stock models: trams

The most widespread models:

- ▶ Tatra T3 (of different modifications) – 797 units
- ▶ Tatra T4 (of different modifications) – 278
- ▶ Tatra KT4 (of different modifications) – 167
- ▶ KTM (of different modifications) – 117
- ▶ Tatra T6 (of different modifications) – 112

not all units are in service

Overall 98 units are modern low floor trams (PESA, Electron, TatraYug) concentrated in 2 cities – Kyiv (82) and Lviv (16)

Typical rolling stock models: trams



Tatra KT4SU/D,
Old EE,
up to 46 y.o.,
No low floor,
18m,



Tatra T3SU,
up to 55 y.o.,
No low floor,
14m,



Tatra-Yug KIT306,
0-3 y.o.,
Low floor,
26m,



Electron T5L64,
0-9 y.o.,
Low floor,
30m,

Typical rolling stock models: trolleybuses

The most widespread models:

- ▶ Bohdan T701/T901 – 594 units
- ▶ ZIU (of different modifications) – 453
- ▶ YuMZ (of different modifications) – 264
- ▶ Skoda 14Tr/15Tr (of different modifications) – 260
- ▶ ElectroLAZ E183/E301 – 247
- ▶ Dnipro (MAZ) 103/203 – 246

not all units are in service

Approximately 60% of all trolleybuses are low floor vehicles,
and less than 15% are air conditioned

Typical rolling stock models: trolleybuses



Skoda 14Tr,
Old EE,
up to 34 y.o.,
No low floor,
12m,



YuMZ T2,
Old EE,
up to 30 y.o.,
No low floor,
12m,



**ElectroLAZ
E183D1,**
up to 16 y.o.,
Low floor,
12m,



**Bohdan
T90110,**
5-12 y.o.,
Low floor,
18m,

Typical rolling stock models: buses

The most widespread models:

Small buses (“marshrutka”)

- ▶ Bohdan – n/a (thousands)
- ▶ Etalon – n/a (thousands)
- ▶ I-Van – n/a (thousands)
- ▶ Ruta – n/a (thousands)
- ▶ MB Sprinter, VW LT, etc. – n/a (thousands)

No low floor, no air conditioning, dirty and very outworn vehicles.

11-18 meter buses

- ▶ MAZ (different models) – ~900 units
- ▶ LAZ (different models) – ~320
- ▶ Electron A185 – 135
- ▶ Bohdan A302/A601/A701 – ~100

Approximately – 1400 units (all communal)

Used buses from Europe – n/a (~500 units, communal and privately owned)

We have also **3 electric buses**, of which 1 was made in Ukraine

Typical rolling stock models: buses



Etalon BAZ A079,
12-16 y.o.,
Euro 0-2,
No low floor,



Bohdan A092,
12-16 y.o.,
Euro 0-2,
No low floor,



MAN A10 NL202,
18-22 y.o.,
Euro 1-2,
Low floor,
 $\frac{1}{2}$ low floor,



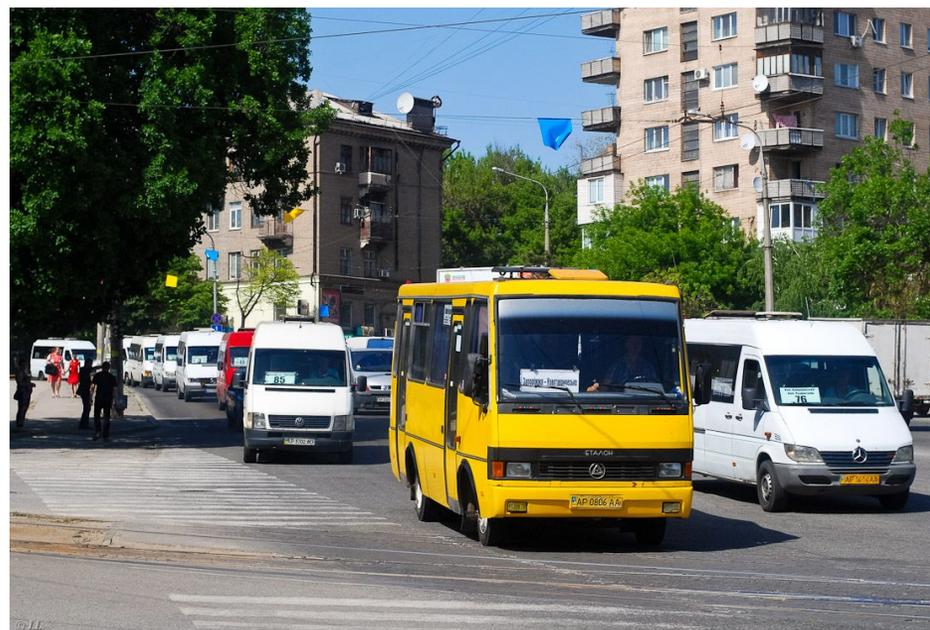
MB Sprinter,
16-20 y.o.,
Euro 2,
No low floor,

PT in a typical main city of the Oblast

Oblast (aka region or province) – is the main type of first-level administrative division of Ukraine.

- ▶ Trolleybus network established in 1950-1980
- ▶ Average number of trolleybus: 70 units
- ▶ Average age of rolling stock: 20-30+ years
- ▶ Network length: 60-130 km
- ▶ Private small buses “marshrutka” are the main service provider in most cities (~150-250 units)

PT in a typical main city of the Oblast



PT in major cities

Kyiv, Kharkiv, Odesa, Dnipro, Zaporizhzhia, Lviv, Kryvyi Rih, Mykolayiv

Metro in Kyiv, Kharkiv, Dnipro since 1960-1990

- ▶ **Tram network** established in 1890-1930
- ▶ Number of trams: 60-350 units
- ▶ Average age of rolling stock: over 35 years
- ▶ Network length: 70-230 km

- ▶ **Trolleybus network** established in 1950-1980
- ▶ Number of trolleybus: 60-400 units
- ▶ Average age of rolling stock: 20-30+ years
- ▶ Network length: 60-500 km (Kyiv has the biggest network in the world!)

Private small buses “marshrutka” are the main or half of the service provider in this cities (~200-1000 units).

Communal buses – situation varies.

PT in major cities



Key challenges of e-transport

- 1) Rolling stock needs further replacement: only 2% of trams and 20% of trolleybuses are new (less than 10 y.o.).
- 2) **Infrastructure is more pressing issue than rolling stock;**
- 3) Lack of political interest to e-transport infrastructure;
- 4) Lack of support from the government.

Table 5. Typical infrastructure problems for electric public transport companies in Ukraine

Infrastructure Problem	Consequences
Outdated tram tracks	<ul style="list-style-type: none"> ● Extremely low speed of service, about 10-12 km/h ● Extremely low speed in curves and in problematic segments (<5 km/h) ● Cases of trams running off the tracks
Outdated track forks	<ul style="list-style-type: none"> ● Manual shifting of forks, that requires stopping and physical efforts of the driver ● Frequent breakdowns of fork mechanisms ● Need to pass forks at extremely slow speed, 2-5 km/h
Outdated feeder lines	<ul style="list-style-type: none"> ● Lack of power at tram and trolleybus network segments ● Inability to allocate more rolling stock to high-demand routes because of lack of power
Outdated traction substations	<ul style="list-style-type: none"> ● Incidents inside the stations that lead to system black-outs ● Inability to receive energy obtained from recuperation during deceleration of trolleybuses
Outdated overhead wires	<ul style="list-style-type: none"> ● Frequent derailing of contact poles, occasional break-down of lines ● Inability to reach speeds more than 30-35 km/h ● Need to reduce speed to below 5 km/h at every line junction
Outdated depots	<ul style="list-style-type: none"> ● Poor energy efficiency, loss of heat in winter ● Terrible work conditions for mechanics and drivers ● Lack of equipment and human capital for proper maintenance ● Heavy understaffing, especially for drivers and technical specialists

Key challenges of bus services

- 1) Only a third of cities (out of 80+) have communal bus services
- 2) Outdated legal framework (“contest”)
 - Based on profit-making
 - Poor service for users
- 3) Private operators’ business is in trouble
 - Decrease in ridership
 - Increasing costs
 - Battles for fares
- 4) More cities are “forcefully interested” in creating communal operators

Table 6. Cities with communal bus services and the size of their fleet (2021)

City size groups	City	Number of communal buses
Largest, large and big cities (over 250,000)	1. Kyiv	536
	1. Lviv	283
	1. Kharkiv	122
	1. Zaporizhzhia	95
	1. Vinnytsia	54
	1. Mykolaiv	23
Medium-sized cities (50,000 -250,000)	1. Ivano-Frankivsk	68
	1. Ternopil	56
	1. Kropyvnytskyi	45
	1. Uzhgorod	27
	1. Poltava	20
	1. Zhytomyr	17
	1. Sumy	14
	1. Mukachevo	14
	1. Kremenchuk	10
	1. Kostopil	6
	1. Chernivtsi	5
	1. Oleksandriya	5
Total:		1400

E.g. Warsaw alone has 1,600 buses (11-18 meters)

Key findings



Electric transport:

The “Do Nothing” scenario would lead to further reduction of e-transport, an outcome completely opposite to the EU GREEN DEAL and EU SSMS.

Support is needed for infrastructure upgrade, operators’ capacity (organizational reforms) and rolling stock.



Non-electric public transport (buses):

Private operators are in dare situation and need to be (a) paid real cost, (b) replaced by communal services.

Support is needed with:

- 1) Legal framework for procurement of public service obligation (draft laws stalled);
- 2) Legal framework for communal enterprises and transport unions;
- 3) Capacity building (for ministry level as well for community level).

Cycling infrastructure

Cycling infrastructure started to develop in 2011 and it is mostly concentrated in several large and several medium-sized cities. Cycling infrastructure in cities are not connected, and often it's a separate sections of different types of cycling infrastructure.



Dutch style infrastructure



South America style infrastructure

Main problems of Ukraine's urban mobility

- ▶ Lack of “integration” to the EU policies, goals and objectives (context)
- ▶ Lack of knowledges
- ▶ Lack of capacity in all levels of power (up to no capacity in small cities and towns)
- ▶ Lack of project management approaches and tools
- ▶ Lack of people (“small government”)
- ▶ Lack of sustainable mobility infrastructure planners (old school)
- ▶ Lack of money (small economy with huge territory – biggest European country)
- ▶ Outdated infrastructure (and destroyed by russian attacks)
- ▶ Individual motorisation trends (more cars, more emissions)

Draft Ukraine Recovery Plan (Lugano, 2022)

	Major points from EU's SSMS (2020, 25 pages)	Presence in Ukraine's Recovery Plan draft (2022, 177 pages)
1	At least 30 million zero-emission vehicles will be in operation on European roads.	No
2	100 European cities will be climate neutral.	No
3	High-speed rail traffic will double.	Somewhat. "160 km/h trains between key cities" does not meet EU's definition of high speed rail
4	Scheduled collective travel of under 500 km should be carbon neutral within the EU.	No
5	Automated mobility will be deployed at large scale.	No
6	Zero-emission vessels will become ready for market	No
7	Zero-emission large aircraft will become ready for market.	No
8	Nearly all cars, vans, buses as well as new heavy-duty vehicles will be zero-emission.	No
9	Rail freight traffic will double.	No
10	High-speed rail traffic will triple.	No
11	The multimodal Trans-European Transport Network (TEN-T) equipped for sustainable and smart transport with high speed connectivity will be operational for the comprehensive network.	No
12	Boosting the uptake of zero-emission vehicles, vessels and aeroplanes, renewable & low-carbon fuels and related infrastructure - for instance by installing 3 million public charging points by 2030.	Mentions charging points but without specific numbers
13	Creating zero-emission airports and ports - for instance through new initiatives to promote sustainable aviation and maritime fuels.	No
14	Making interurban and urban mobility healthy and sustainable - for instance by doubling high-speed rail traffic and developing extra cycling infrastructure over the next 10 years.	Mentions that all urban and suburban public transport should shift to electric
15	Greening freight transport - for instance by doubling rail freight traffic by 2050.	No
16	Pricing carbon and providing better incentives for users - for instance by pursuing a comprehensive set of measures to deliver fair and efficient pricing across all transport.	No

Comparison of major points (cont.)

17	Making connected and automated multimodal mobility a reality	No
18	Boosting innovation and the use of data and artificial intelligence (AI) for smarter mobility	No
19	Reinforce the Single Market - for instance through reinforcing efforts and investments to complete the Trans-European Transport Network (TEN-T) by 2030 and support the sector to build back better through increased investments, both public and private, in the modernisation of fleets in all modes.	No
20	Make mobility fair and just for all - for instance by making the new mobility affordable and accessible in all regions and for all passengers including those with reduced mobility	Mentions that the destroyed train stations should be rebuilt accessible
21	Step up transport safety and security across all modes - including by bringing the death toll close to zero by 2050.	No
22	Ensure that all large and medium-sized cities that are urban nodes on the TEN-T network put in place their own sustainable urban mobility plans by 2030	No
23	5000 km new safe bicycle paths in cities by 2030	No
24	Connectivity with rural and suburban areas, so that commuters are given sustainable mobility options	No
25	Tolling: Smart, distance-based road charging, with varied rates for the type of vehicle and the time-of-use, is an effective tool to incentivise sustainable and economically efficient choices, manage traffic and reduce congestion.	Mentions tolling roads for commercial vehicles (trucks)

Only 5 points of 25 are mentioned in Ukraine's draft plan (quality of mentioning is not assessed).

Content analysis using keywords

Search words	English translation	Mentions
Автомобіль___	Automobile	195
Доріг / дороги	Roads	156
Залізнич__	Railroads	150
Будівництв___	Construction	143
Пасажирськ___	Passenger	43
Аеропорт___	Airport	37
Міст___	City	26
Велосипед__	Bicycle	9
Автобус__	Bus	9
Нафто_____	Oil	9
Електромобілі	Electric automobiles	6
Громадський транспорт	Public transport	5
Доріжок (велосипедних)	Bicycle paths	4
Інвестиційний клімат	Investment climate	3
Бітумний завод	Bitume factory	3
Громад, громадах	Communities	3
Трамва_	Tram	2
Тролейб__	Trolleybus	2
Сталий/а/е	Sustainable	1
Клімат (не інвестиційний)	Climate (not investment)	0
Нейтральн___	Neutral	0
Вулиц__	Street	0



Number of word mentions in the “Draft Ukraine Recovery Plan: Recovery and development of infrastructure” (presented in Lugano, 4-5 July 2022)

Urban mobility is not among priorities

City transport infrastructure and urban mobility are not among priority areas of the Government. Pages 2-3 list the priority sectors, that correspond to the areas of responsibility of the Ministry of Infrastructure:

1. Rail transport
2. Aviation transport
3. Maritime and internal waterways transport
4. Automobile, urban electric transport, roads and road economy
5. Postal services
6. Tourism and resorts
7. Strategic initiatives of transport infrastructure

P.S. The draft “Recovery Plan” for Urban Development (350 pages) led by Ministry of Community Development (former MinRegion) also doesn’t cover urban mobility and city transport.



Positive aspects

Ukraine has the biggest network and fleet of e-buses – they are trolleybuses!

About 100 battery trolleybuses are already in operation in 11 cities (and increasing)



Positive aspects

Over 200 used vehicles were delivered from European countries to Ukrainian cities as a humanitarian transport aid

Конотоп отримає трамваї з Варшави (фото)

НОВИНИ | 1750 переглядів | 10 лютого 2023, 13:38

Другому найменшому українському місту з трамвайною мережею передадуть вживані вагони з польської столиці.



Тростянецька громада отримала в подарунок від Латвії автобус



11:23 / 14 Червня

Тростянецька громада отримала благодійну допомогу від латвійського міста Валмієра. Про це повідомляє міський голова Тростянця Юрій Бова:

Positive aspects

5 cities of Ukraine developed and approved SUMP, and Khmelnytskyi announced a tender for its development in 2023

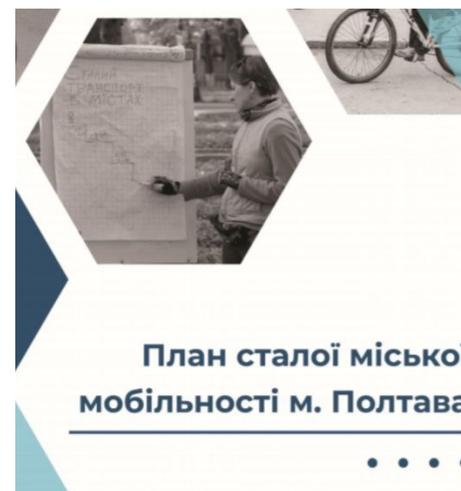
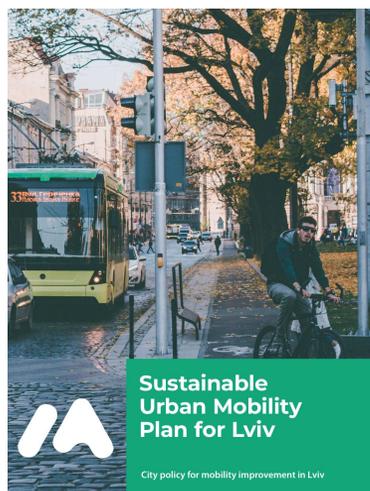
Table 7: List of cities with adopted SUMP (2021)

#	City	Population	Year of adoption
1	Mykolayiv	480 080	2019
2	Zhytomyr	263 318	2019
3	Poltava	286 649	2019
4	Lviv	724 314	2020
5	Kamianets	98 500	2020

ПЛАН СТАЛОЇ
МІСЬКОЇ
МОБІЛЬНОСТІ
МІСТА
МИКОЛАЄВА



2019 рік



E-transport industry

- 1) 8 bus- (and/or trolleybus-) manufacturing companies
- 2) 2 tram-manufacturing companies
- 3) Railroad industry sector
- 4) Electric engineering sector



Automotive industry

Automotive suppliers:

22 companies from 6 countries operate 38 factories in Ukraine, that employ about 60,000 workers.

Products: cable harnesses, plastic panels, seats, and heaters



Rolling stock procurements 2023

Despite the war cities continues to upgrade their rolling stock taking part in the projects that started before war with IFI's (EIB, EBRD) within the project “Urban Public Transport in Ukraine”



NEWS ANALYTICS INTERVIEWS

10 cities of Ukraine purchase electric vehicles for a total of more than UAH 4.5 billion

NEWS | 12 September 2023, 14:44



166 units for a 110 mln euros



NEWS:

14:44

12:23

11:16

European Mobility Week in Ukraine

Despite the war 6 Ukrainian cities will take part in EMW 2023

Participating towns and cities

« All countries 🌐, 2023

2023 ▾

6 towns and cities participating in 🇺🇦 Ukraine in 2023

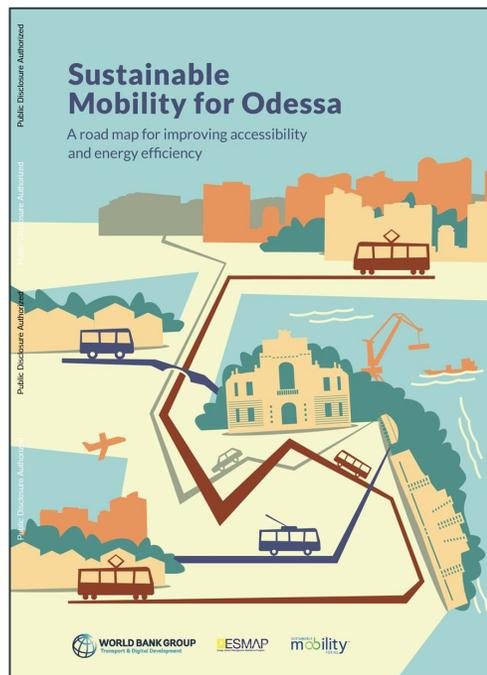
 Chernihiv Population: 285.821   	 Chernivtsi Population: 270.000   	 Lviv Population: 750.000   	 Poltava Population: 312.000   
 Uzhhorod Population: 115.164 	 Житомирська міська територіальна громада Population: 262.878   		

More about Ukraine's mobility

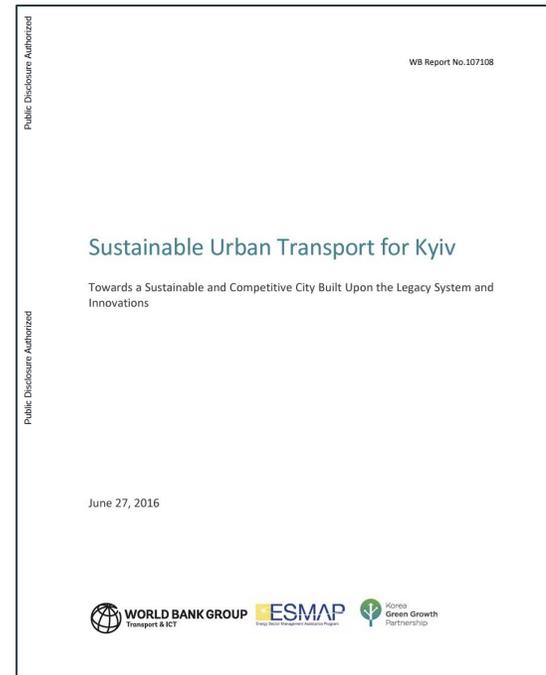
If you would like to know more please read the reports about Lviv, Odesa and Kyiv



Lviv

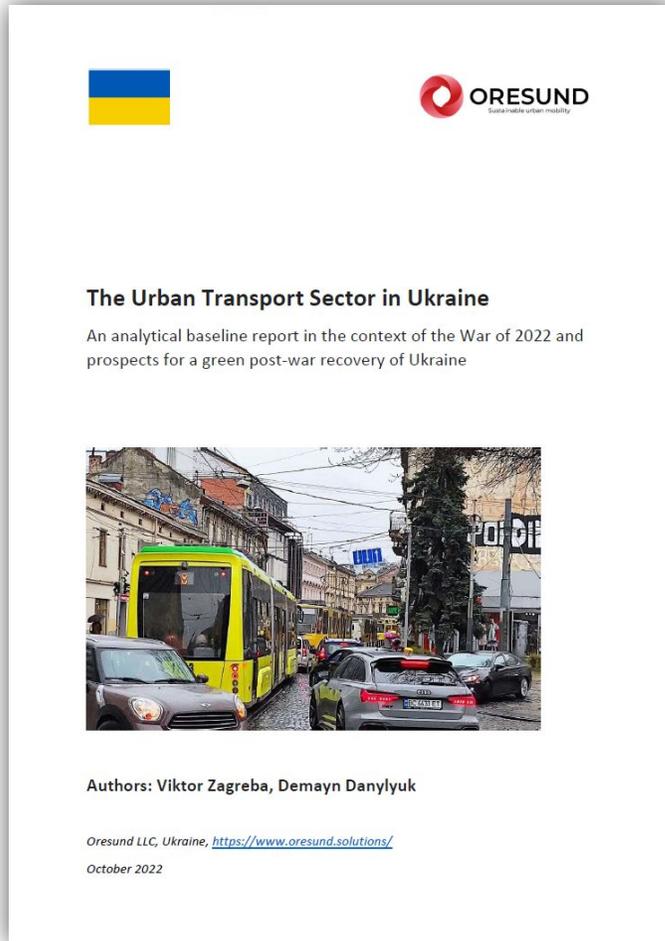


Odesa



Kyiv

Thank you for your attention!



The Urban Transport Sector in Ukraine

By Viktor Zagreba, Demyan Danylyuk
[link on report](#)

Contact us:
<http://visionzero.org.ua/>
vision.zero.ngo@gmail.com