

Sustainable mobility concepts and decarbonization strategies

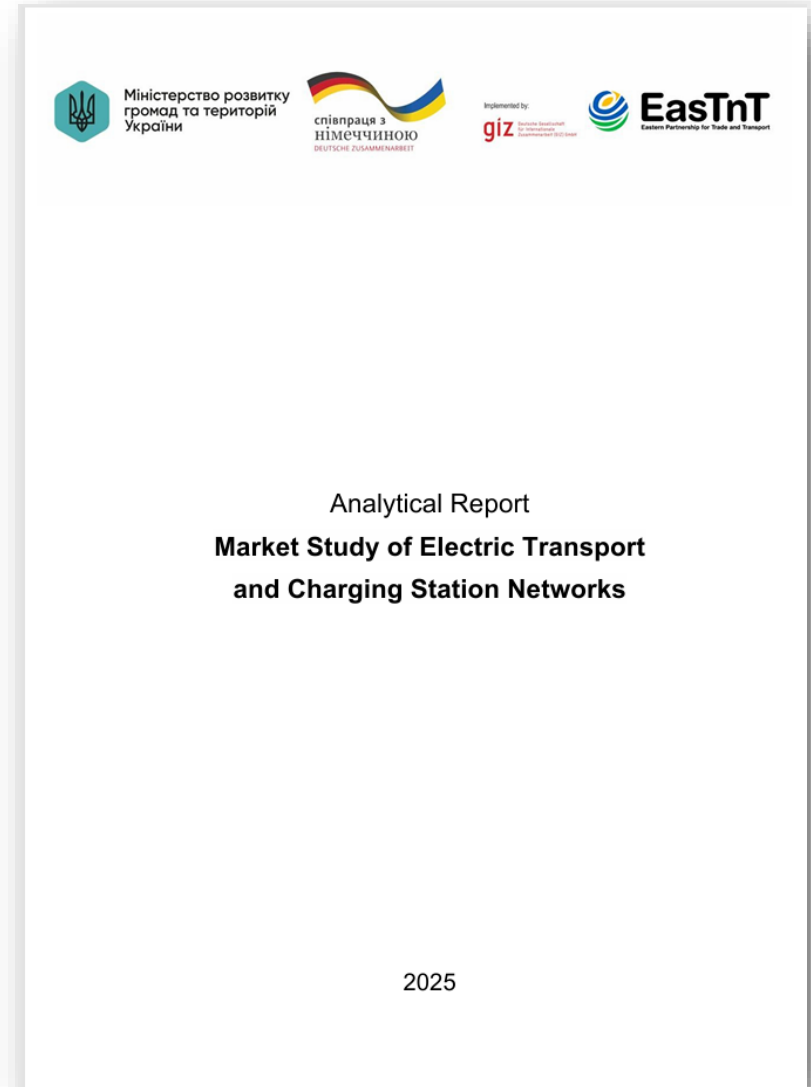
Prof. Olga Kunytska
National Transport University





- **Study:** Market Study of Electric Transport and Charging Station Networks
- **Year:** 2025

Report prepared within the framework of the EasTnT project with the support of BMZ and GIZ





The aim of the study

Comprehensive analysis of **EV market and charging infrastructure in Ukraine**, identifying *key trends, challenges, and prospects* for integration into the European transport and energy system, with recommendations for further development.

TABLE OF CONTENTS

INTRODUCTION	4
1. ELECTRIC CHARGING INFRASTRUCTURE IN UKRAINE	6
1.1. Dynamics of EV Charging Network Development	6
1.2. Profile and Market Structure of Charging Station Operators	12
1.2.1. Methodological Framework of the Study.....	12
1.2.2. Analysis of Operators' responses.....	12
1.2.3. Comparison of Operators' responses with Market Macro-Analysis.....	14
1.2.4. Summary of Trends and Structural Patterns.....	14
1.3. EV Charging Infrastructure along the Ukrainian Area of the TEN-T Network	16
2. CONSUMER NEEDS AND BEHAVIOR IN THE UKRAINIAN EV CHARGING STATION MARKET	23
3. ELECTRIC TRANSPORT MARKET IN UKRAINE	38
3.1. General Overview and Key Trends	38
3.2. Electric Bus Market	42
3.3. Electric Cargo Transport: Current State and Prospects in Ukraine; Comparison with EU Experience	43
3.3.1. Analysis of the Current Situation in Ukraine.....	44
3.3.2. Analysis of the Current Situation in EU Countries.....	46
3.4. Price Dynamics of New and Used EV	52
3.5. Incentives and Constraints Affecting the Development of the EV Market in Ukraine.....	55
4. EXPERIENCE OF EUROPEAN COUNTRIES	60
4.1. Development of EV Charging Networks	60
4.2. Compliance with EU Technical Regulations and Standards	65
4.3. Instruments for Stimulating the Development of EV.....	70
5. EXPERIENCE IN IMPLEMENTING HYDROGEN REFUELING STATIONS AND HYBRID ENERGY HUBS IN EUROPEAN COUNTRIES	72
5.1. Multi-Fuel Refueling Points (Multi-Energy Hubs, Hybrid Refueling Stations, Energy System Integration)	72
5.2. European Experience with Hydrogen Refueling Stations.....	73
CONCLUSION	76
LIST OF REFERENCES	78



Main contents

- ❑ Analysis of the status of the Electric Vehicle Sector in Europe
- ❑ Analysis Ukrainian case study:
 - Electric Charging Infrastructure
 - Electric Transport Market
 - Consumer Needs and Behaviour
- ❑ EV Charging Infrastructure along the Ukrainian Area of the TEN-T Network



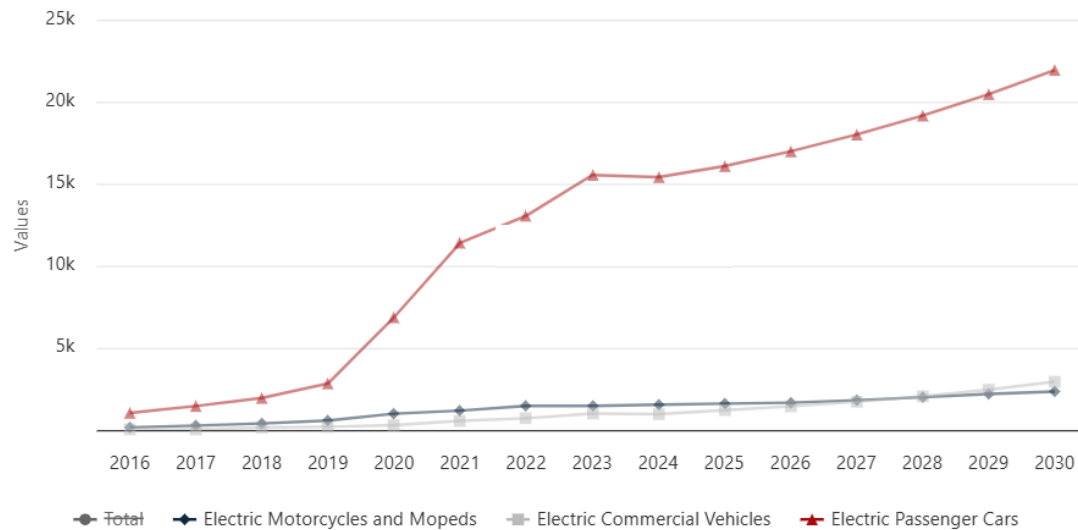
Analysis of the status of the Electric Vehicle Sector in Europe



EV market development: cars

Unit Sales

Vehicle Sales

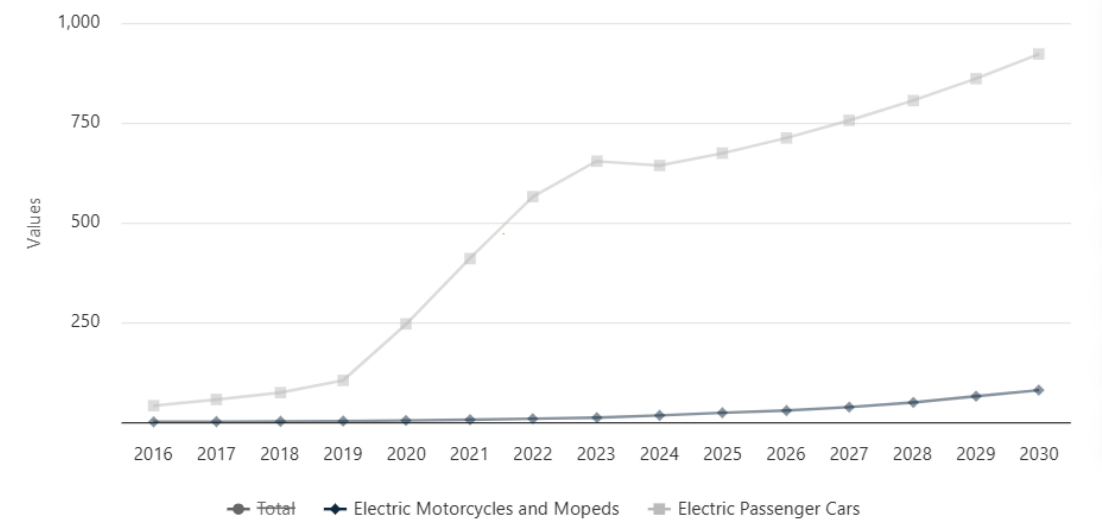


Most recent update: лист. 2025 р.

Source: Statista Market Insights

Revenue

Electric Vehicles Revenue



Notes: Data was converted from local currencies using average exchange rates of the respective year.

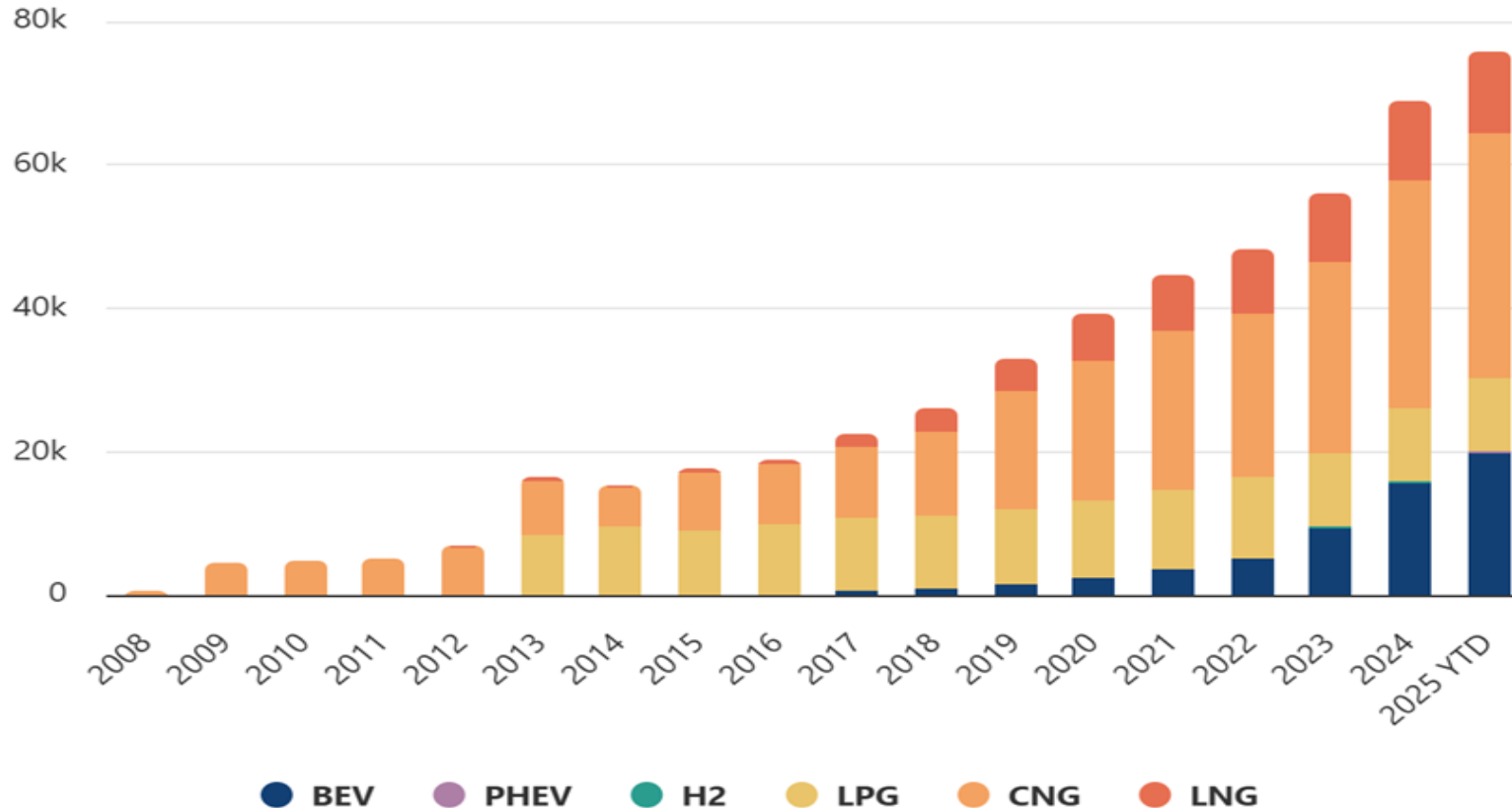
Most recent update: лист. 2025 р.

Source: Statista Market Insights



EV market development: freight transport

Dynamics of changes in the total number of alternative fuel trucks in EU countries



Germany, France, the Netherlands, and Sweden lead the adoption of electric trucks, accounting for 85% of zero-emission heavy truck sales

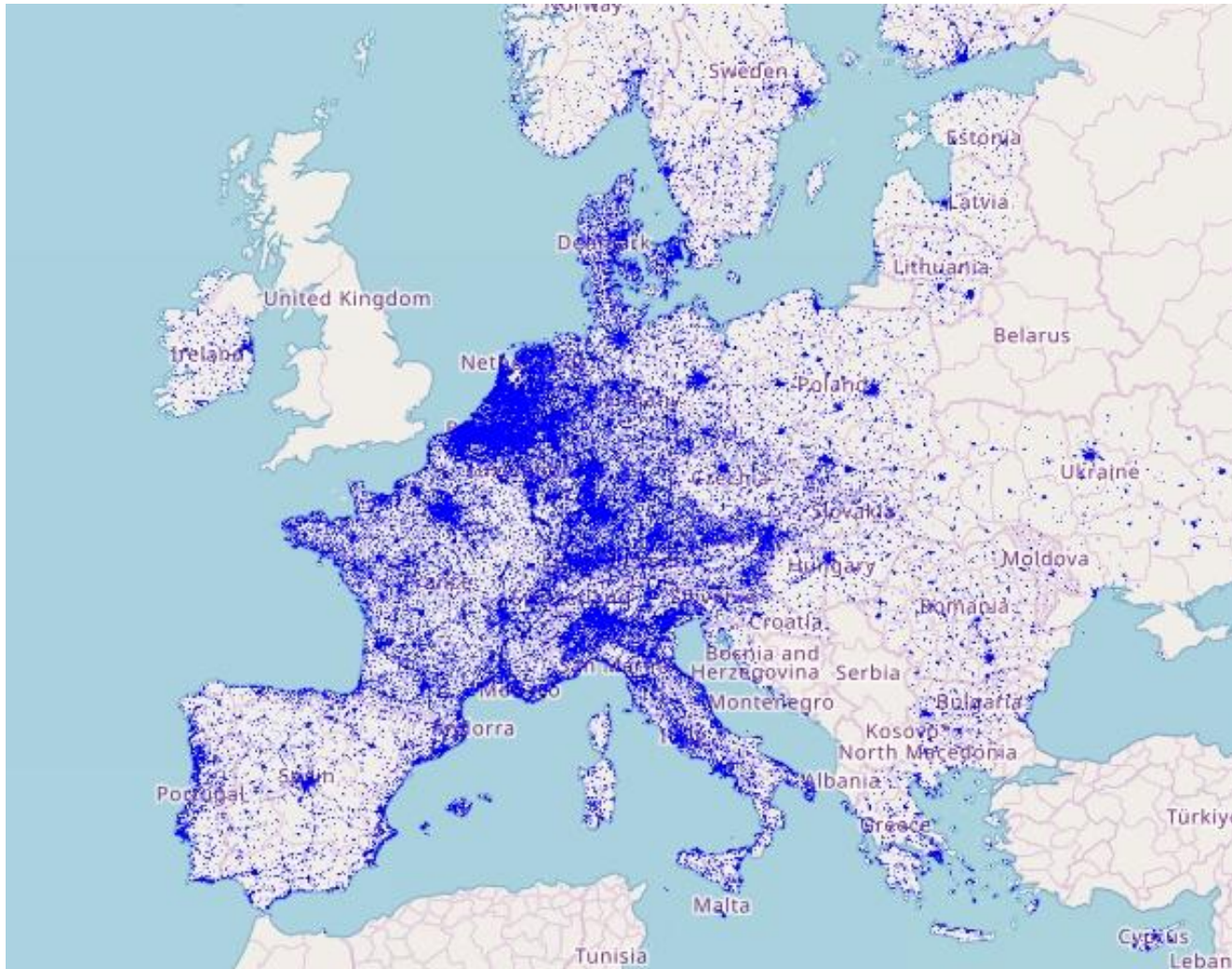


Comparative analysis of the development of electric freight transport in leading EU countries and Ukraine

Direction	EU	Ukraine	Comment
Direct subsidies for the purchase of BEV trucks	Yes (Germany, France, Netherlands)	None	One of the key drivers of demand in the EU
Road toll exemptions/reductions	Yes	None	There are no road tolls in Ukraine in general
Grants for high-power infrastructure (200–1,500 kW)	Yes in all leading countries	Selectively, without a state program	The main barrier in Ukraine
MCS corridors	Deployment in Germany, Netherlands	None	Only isolated plans in Ukraine
Urban eco-zones (diesel ban)	Operating in the Netherlands, France, Sweden	None	In Ukraine, this is only possible after the war
Industrial incentives for localizing production	Yes (tax breaks, investment grants)	No targets	Needed to support Luaz, Electron, etc.
Energy programs for logistics hubs	Yes	None	In Ukraine, restrictions due to military risks



Charging infrastructure development



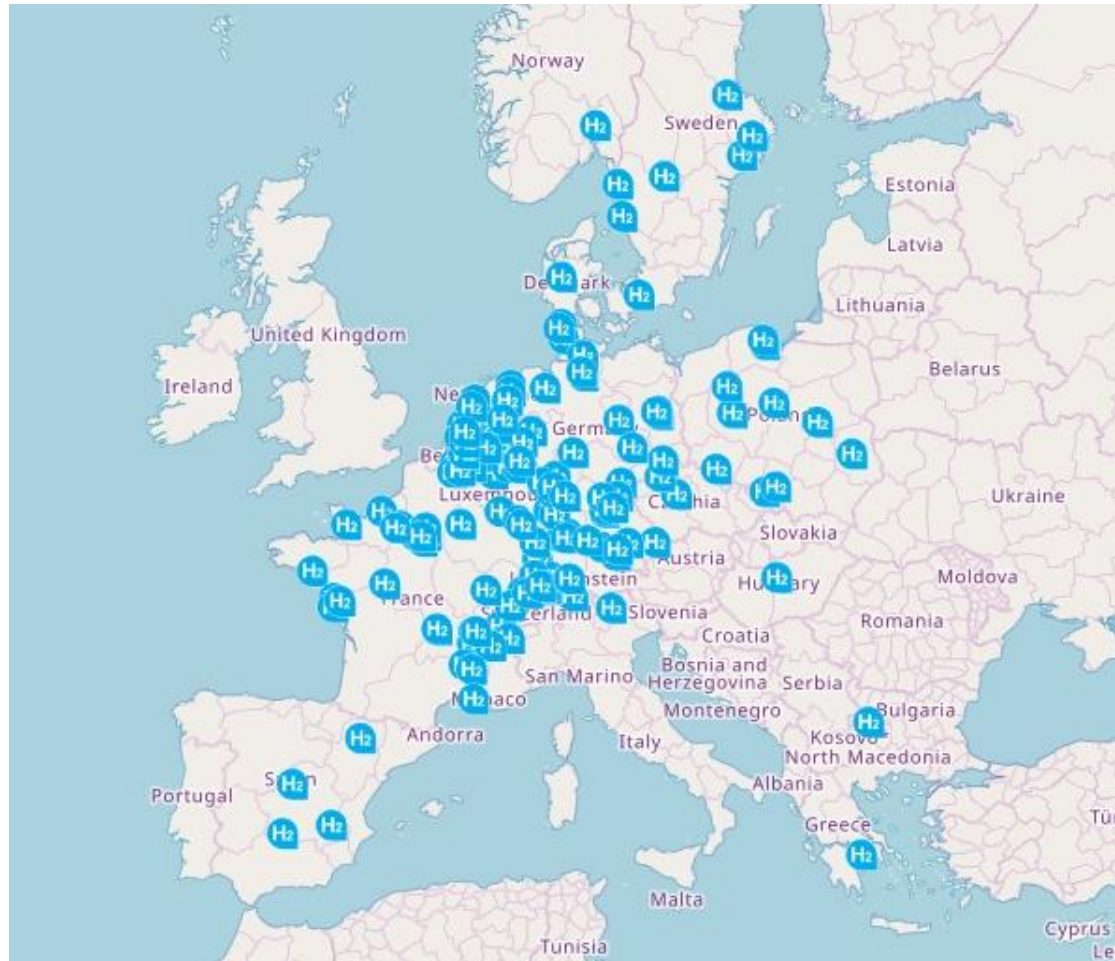
Recharging and refuelling stations map

The number of Electric Recharging Points is **1,106,692**

[TENtec interactive map](#) TENtec is the European Commission's Information System to coordinate and support the Trans-European Transport Network Policy (TEN-T)



European Experience with Hydrogen Refuelling Stations



The European hydrogen refuelling station (HRS) network comprises hydrogen refuelling stations, including

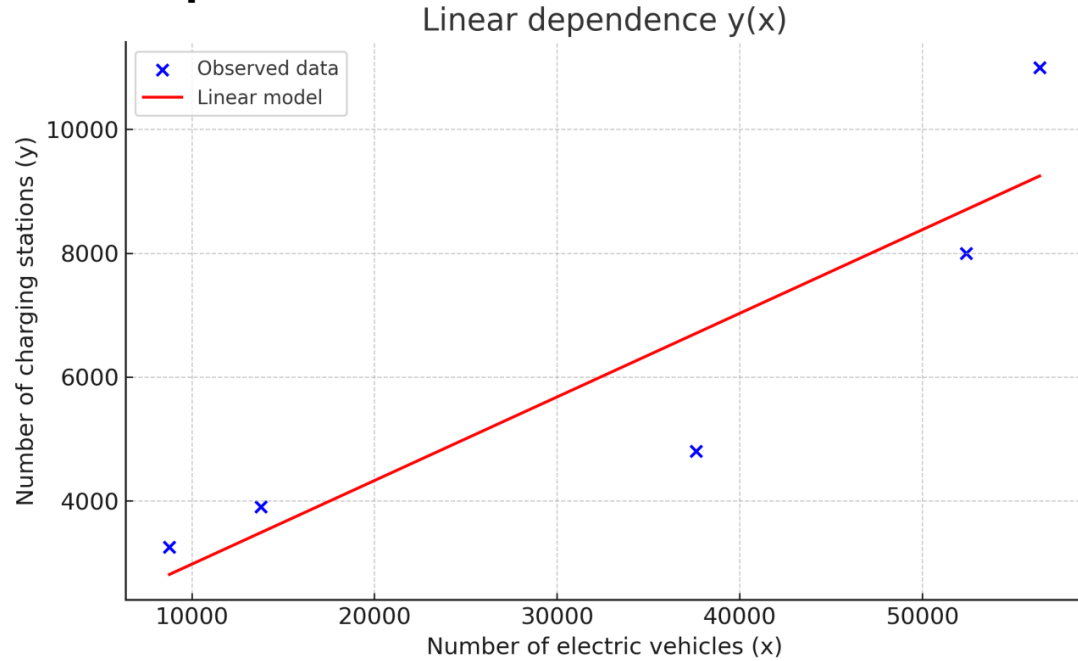
- Germany – 113
- France – 65
- the Netherlands – 25
- Switzerland – 19
- Bulgaria – 1
- Slovakia – 1



Ukrainian case study: Electric Charging Infrastructure



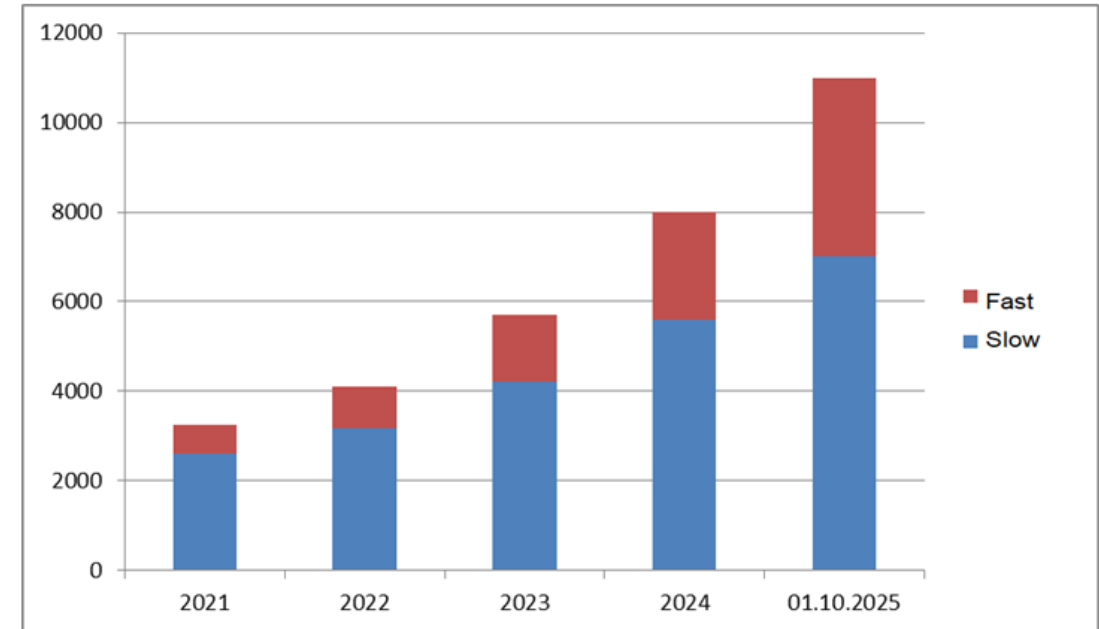
Dependence of Public EVCS Network Development on the Number of Electric Vehicles



The model implies that for every 1,000 new electric vehicles, there are approximately 286 new public EVCS.

The correlation coefficient $r = 0.98$ indicates a very strong dependence: as the number of electric vehicles grows, a proportional increase in the number of charging stations is observed.

Dynamics of the Public Electric Charging Stations Network Development





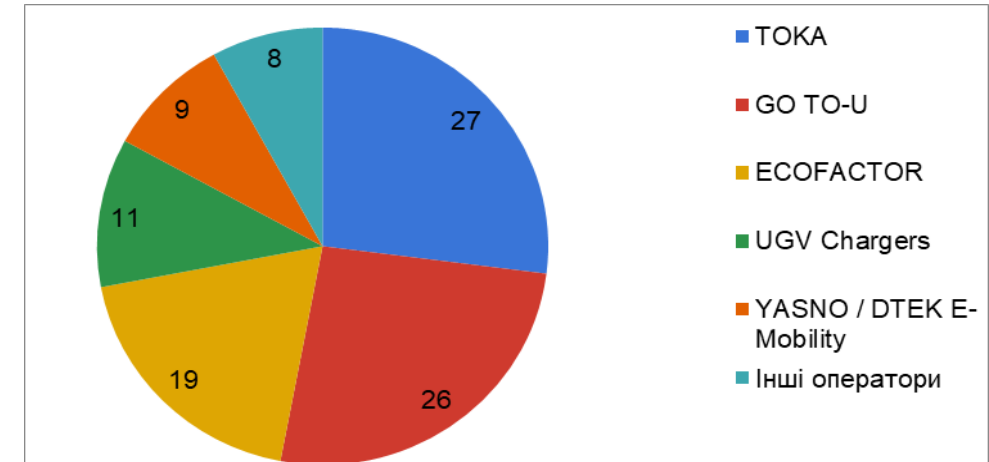
Profile and Market Structure of Charging Station Operators

To analyze the EV charging station (EVCS) market in Ukraine and identify the strategic models of key participants, **an expert survey was conducted** among four leading operators: GO TO-U, YASNO (DTEK E-Mobility), ECOFACTOR, and TOKA.



Distribution of the Networked EVCS Market by Operator

Operator	Estimated Market Share, %	Characteristics
TOKA	27	The largest national network with full billing; active participation in the development of high-speed hubs on TEN-T corridors.
GO TO-U	26	An extensive network in cities and along highways; utilizes a mobile application with reservation capabilities.
ECOFACOR	19	Active presence in the central and southern regions; focus on DC stations.
UGV Chargers	11	A company with state participation; strategic projects with major retail chains.
YASNO / DTEK E-Mobility	9	Integration with energy services, corporate clients.
Other operators	8	Small regional or corporate networks.





Key Technological Trends

- Shift from AC stations to high-power DC/HPC stations (60–400 kW).
- Fast-charging stations are becoming the backbone of networks. <>>> especially along international transport corridors.



Functional Market Segmentation

- Platform type: digitalization and interoperability: >>>
- Manufacturing integrated type: full infrastructure cycle.
- Classical CPO-investors: capital-intensive networks. >>>>

EVCS Market UKRAINE 2021–2025



New Factors Driving Market Growth

- **Local production** reduces import dependence.
- **Digitalization** becomes key (roaming, billing, analytics).
- Competition shifts from equipment to digital services
- **TEN-T corridors & highways** key for HPC stations.



Key Challenges & Gaps

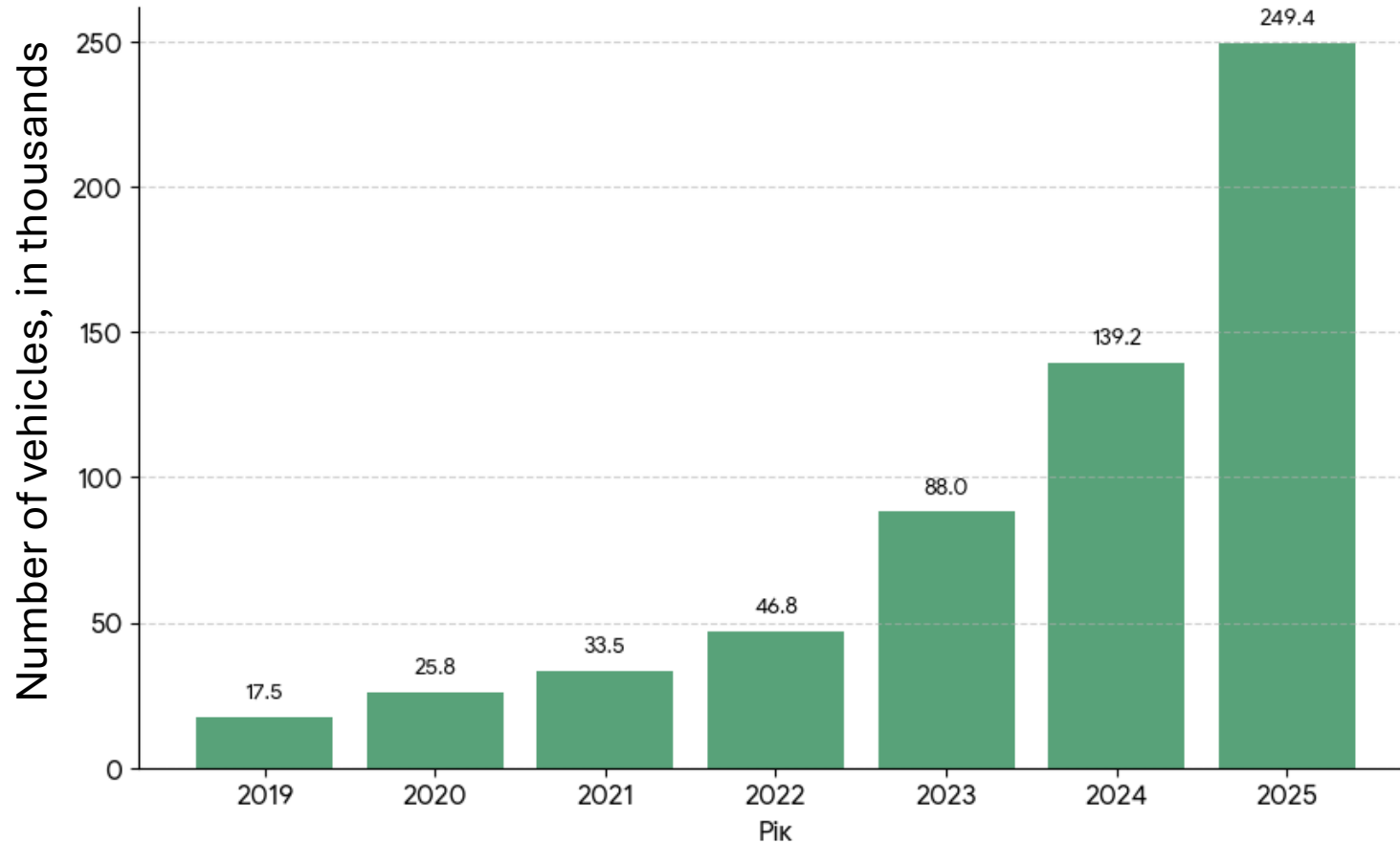
- **No centralized registry** of charging stations.
- **Different methodologies** used by operators.
- **Non-standardized AC/DC and power ratings.**
- **Lack of transparency on roaming & integration >>**



Ukrainian case study: Electric Transport Market



Dynamics of the electric vehicle market in Ukraine



Market structure:

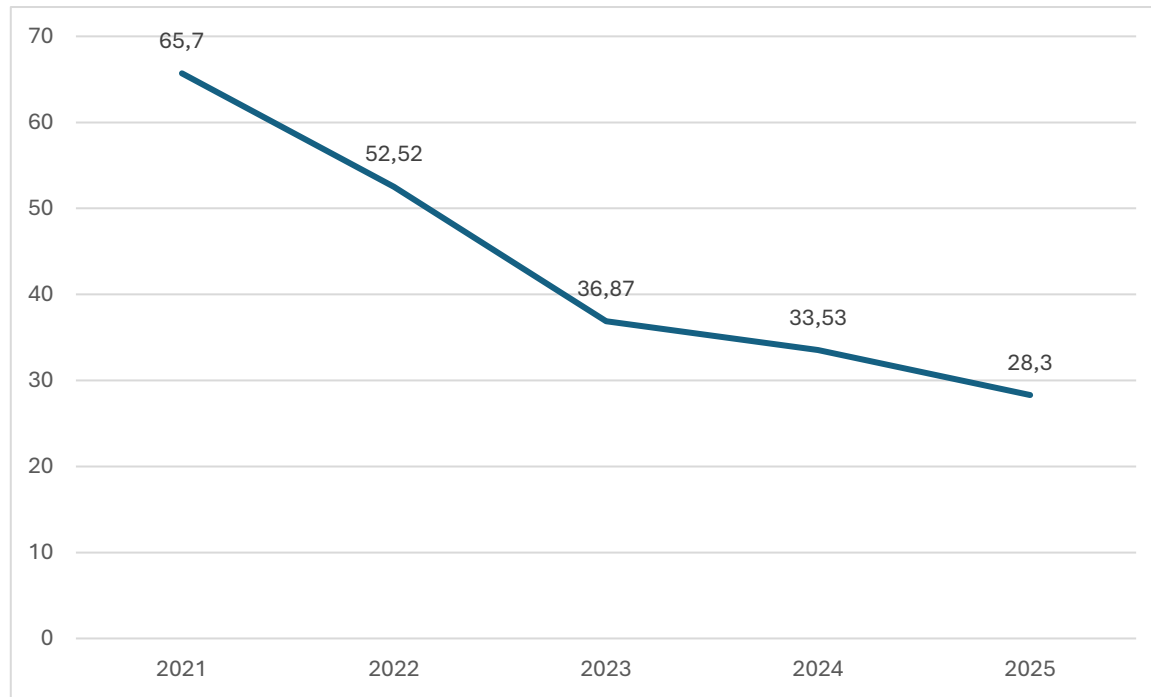
Of the 110,000 new registrations in 2025:

- New cars: 22,800 (+123% compared to 2024).
- Used cars (imports): 84,400 (+105% compared to 2024)

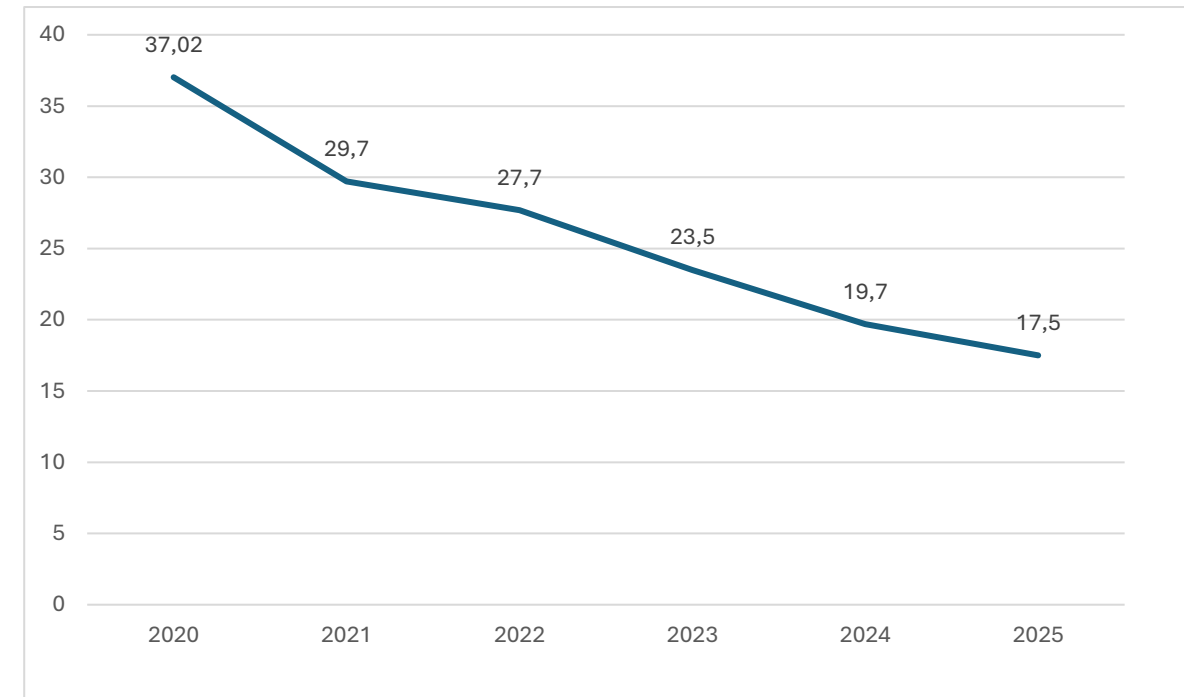


Price Dynamics of New and Used EV

Analysis of average prices for **NEW** electric vehicles

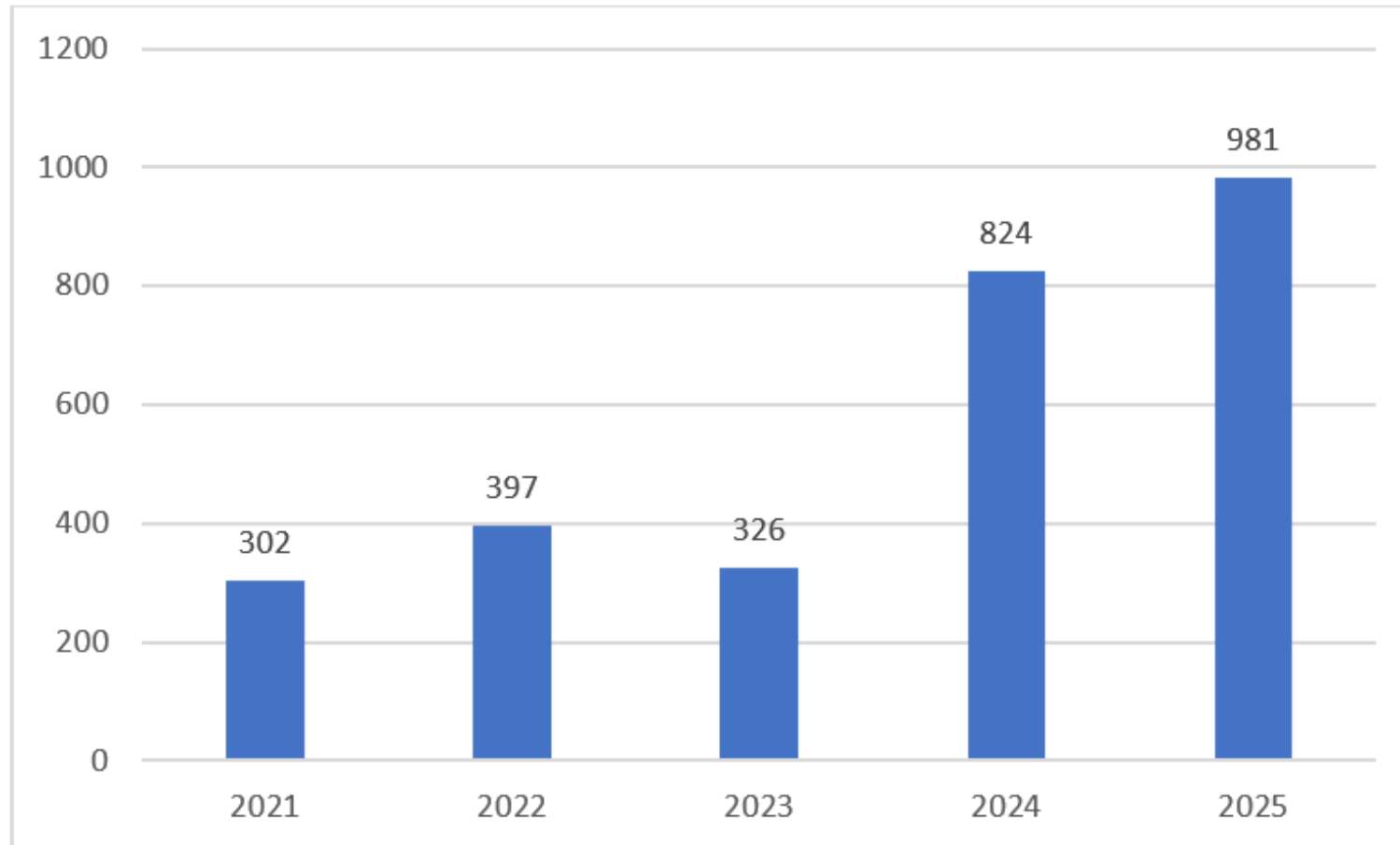


Analysis of average prices for **USED** electric vehicles





Electric freight (commercial) transport in Ukraine



Initial registrations of electric trucks increased from 302 in 2021 to 981 in 2025 (≈ 3 times), indicating the development of the commercial BEV segment and growing business interest.



EV Market in Ukraine



Constraining Factors



Energy Instability



Insufficient Charging
Infrastructure



Limited Service Centers



Driving Factors



Tax & Customs Benefits



Lower EV & Battery Costs



Infrastructure Growth



Rising Imports & Used EVs



Government Policies



Ukrainian case study: Ukrainian Consumer Needs and Behavior



To assess the current state of the EV and charging market in Ukraine from a consumer perspective and identify user needs, an online consumer survey was conducted.

A total of **680 respondents** participated in the survey

Міністерство розвитку громад та територій України

співпраця з німецькою співпраця з німецькою

giz

EasTnT

Опитування власників електричних транспортних засобів

Дякуємо за те, що ви приділите час опитуванню, яке є абсолютно анонімним.

Це дослідження потрібно для того, щоб зрозуміти, як зараз розвивається ринок електротранспорту і зарядних станцій в Україні, і які потреби його користувачів. Отримані результати допоможуть краще планувати майбутні кроки, створювати зручності для споживачів та підтримувати нові ідеї в сфері сучасного екологічного транспорту.

Зірочка (*) указує, що запитання обов'язкове

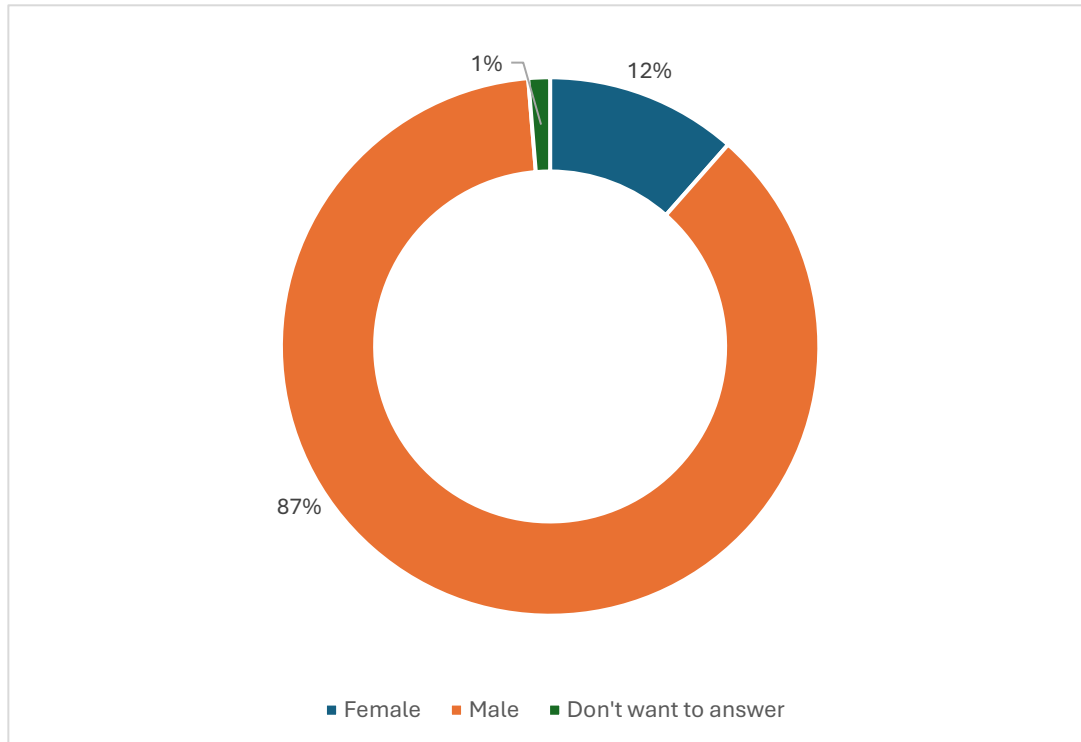
Вік *

- до 25
- 25-34
- 35-44
- 45-54
- 55-64
- 65 і більше

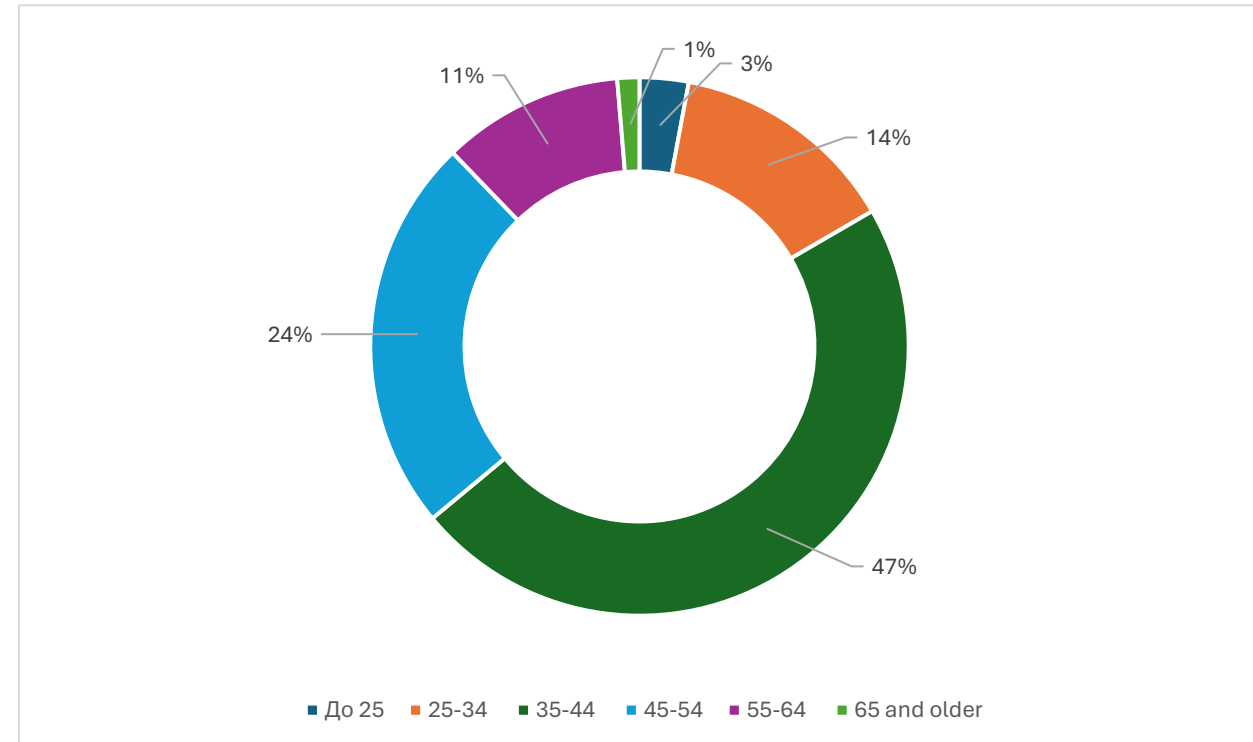


Respondent profile

Gender distribution of respondents



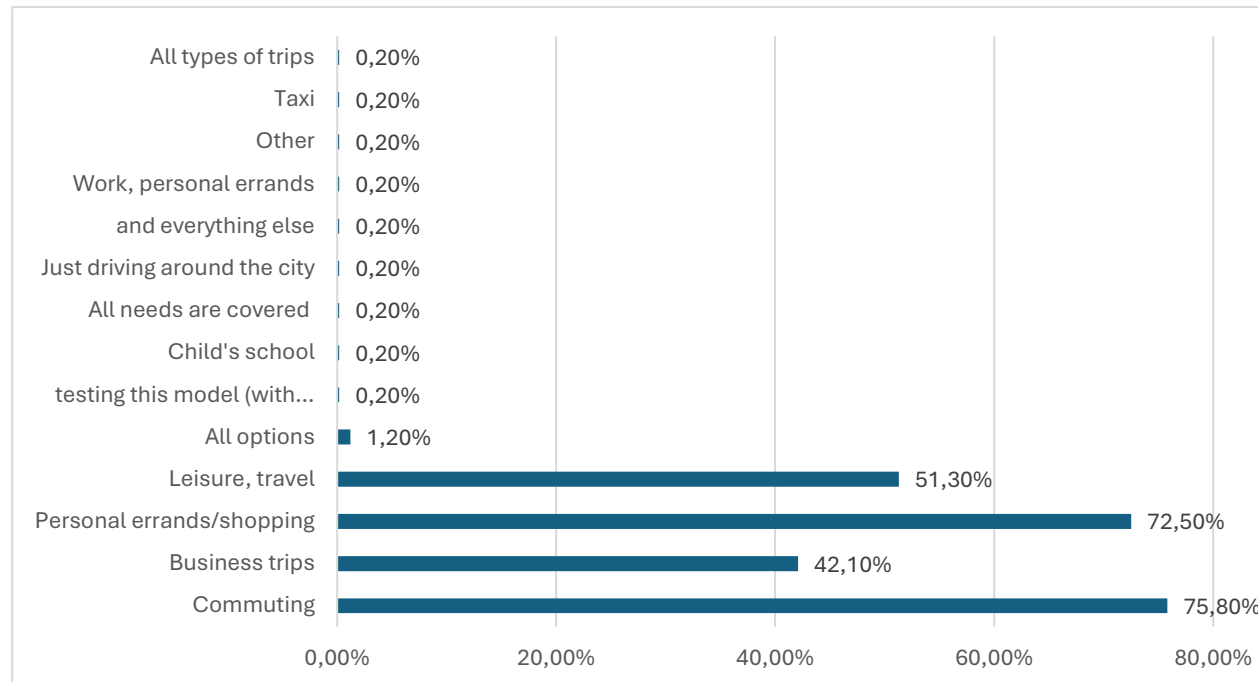
Age distribution of respondents





User behavior patterns

The most frequent purpose of using electric transport



Most respondents **use their electric vehicle daily** (83%), while the rest use it less frequently – several times a week or a month (17%).

77% of respondents indicated that they most often use their electric vehicle **for trips within their city** or town. Only 23% mainly use it for long distances.

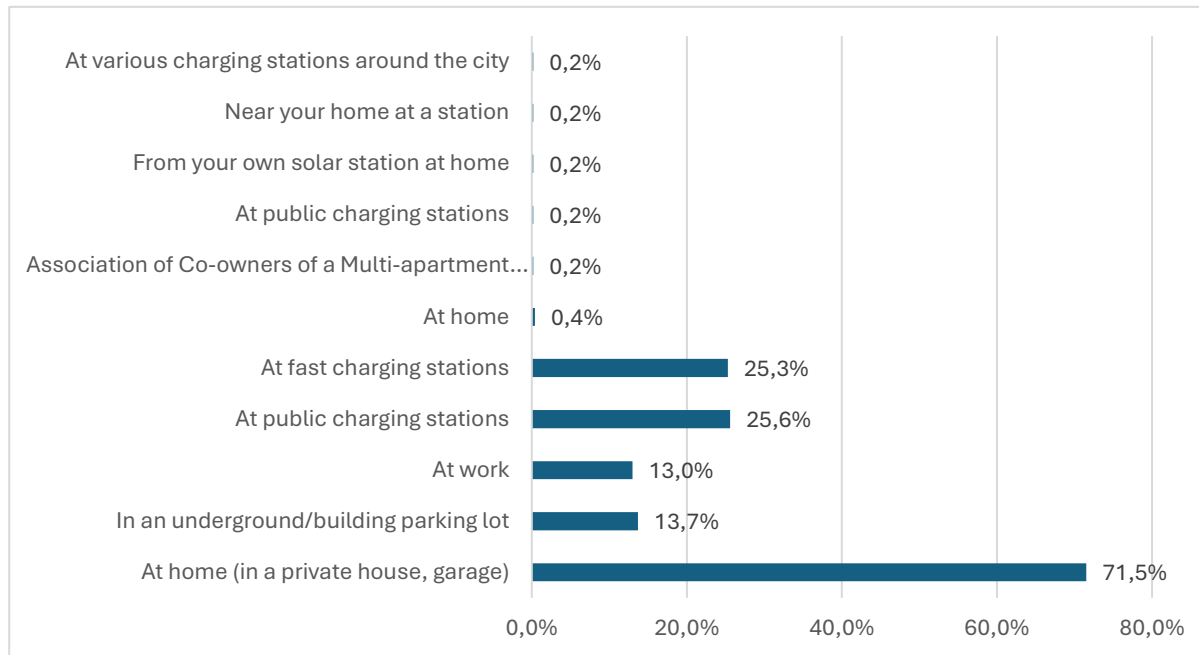
The main purpose of trips, is to travel for **commuting** (75.8%) and to **run personal errands and go shopping** (72.5%).

**respondents could choose several answers)*



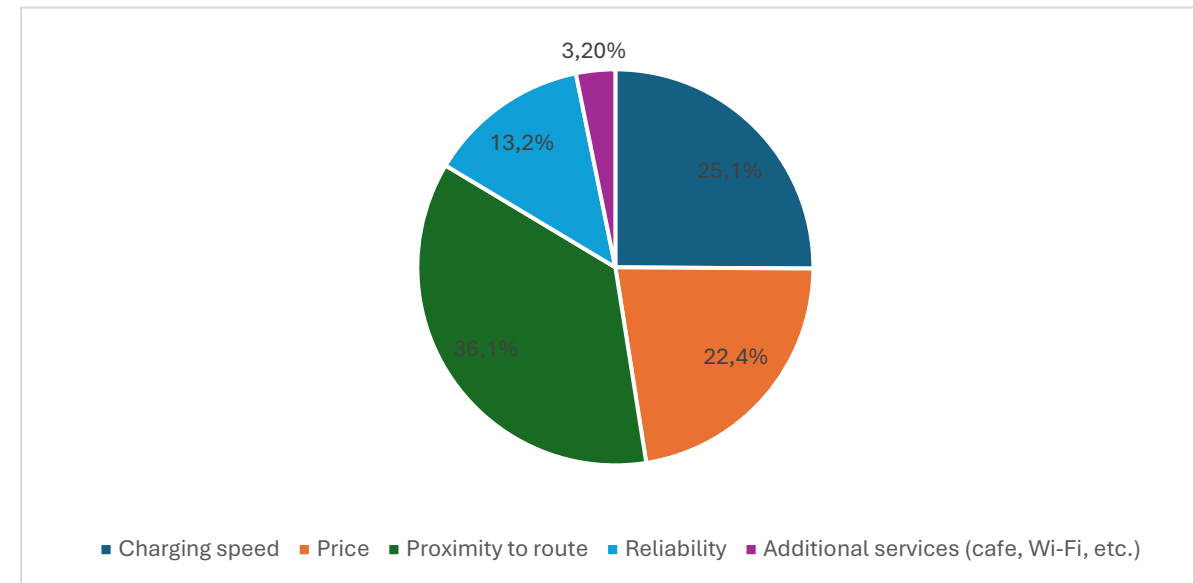
User behavior patterns

Analysis of the popularity of electric vehicle charging stations



**respondents could choose several answers)*

Analysis of the importance of factors influencing the choice of a network charging station



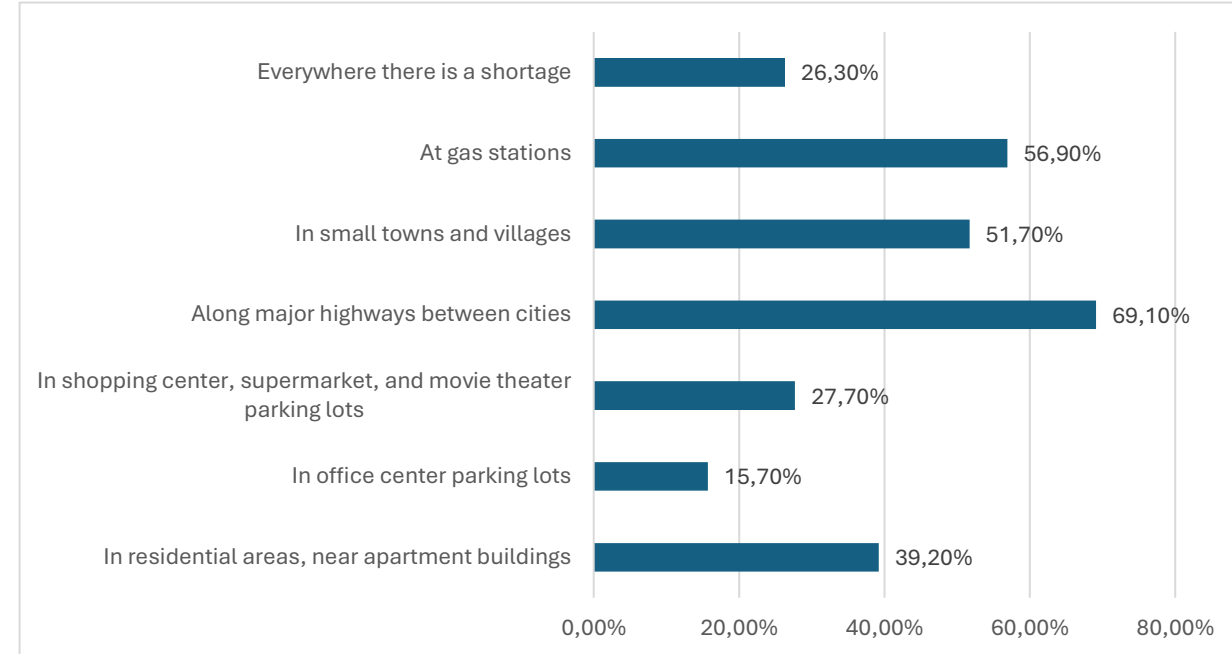
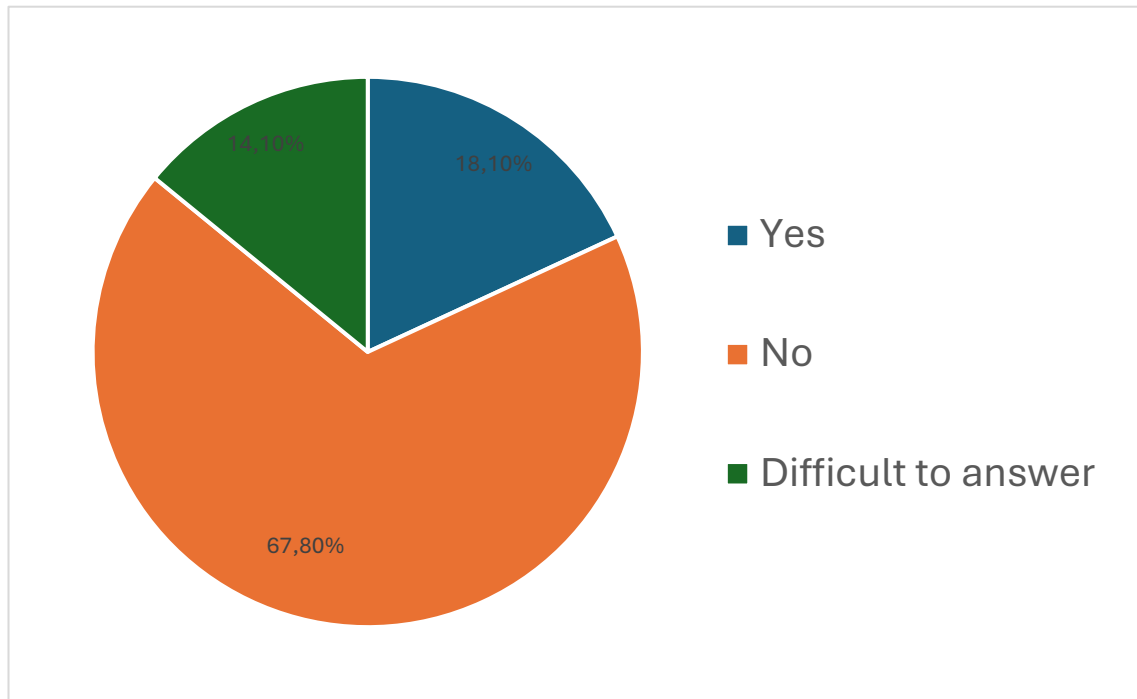
Users cite “proximity to the route” (36%) as the main factor in choosing a network station operator, while the cost of refueling took third place (22%), after the “charging speed” factor (25%)



Consumer Assessment of Infrastructure Coverage

Response to the question of whether there is sufficient charging infrastructure for comfortable use

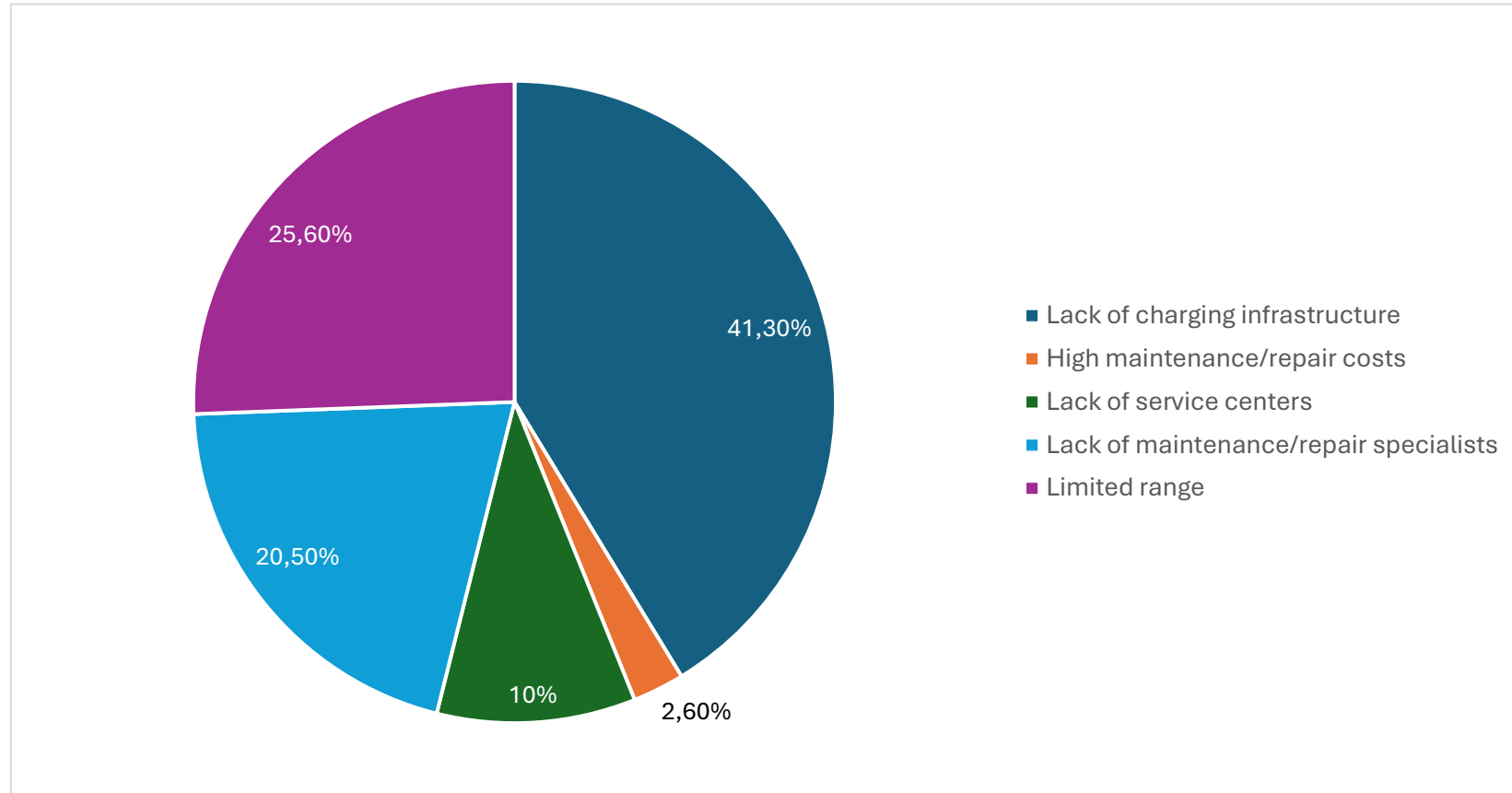
Responses to the question about places where there is a shortage of charging stations





Analysis of technical and service needs

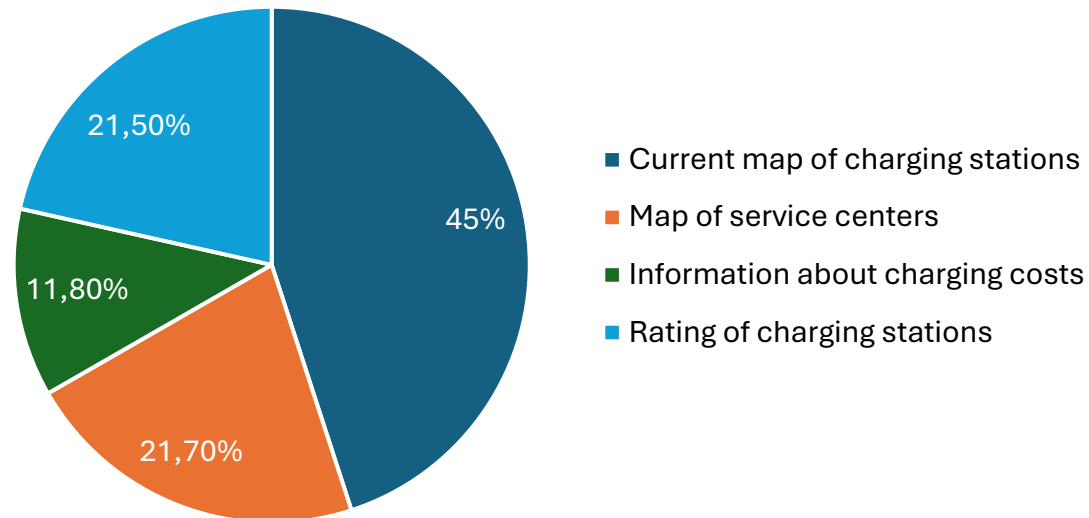
Respondents' assessment of the most significant difficulties in using electric transport



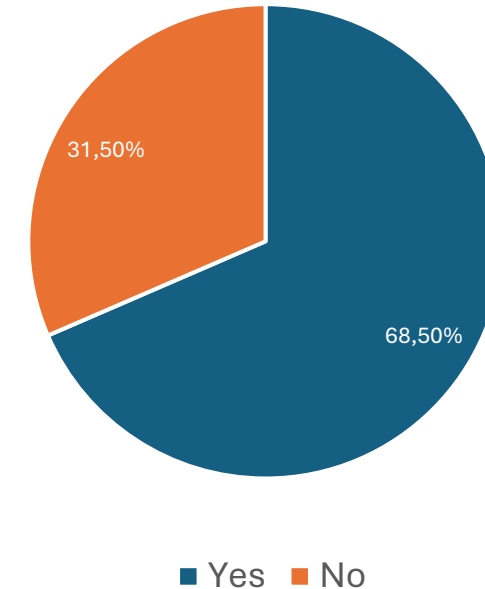


Analysis of future user expectations

Visualization of answers to the question of what network station operators should improve first



The responses to the question of whether respondents plan to purchase another electric vehicle in the next 3 years





Conclusions of the online survey

- The electric vehicle market in Ukraine **is growing rapidly**, but the **infrastructure is behind** — there are few fast-charging stations, especially outside of cities, and there are issues with power supply.
- **People are buying electric cars more and more often**, but they are deterred by **high prices**, the **lack of charging stations**, and the **absence of convenient home charging solutions** in high-rise buildings.
- **Users want more fast-charging stations**, cheaper charging, the ability to install home chargers, and a single, convenient mobile platform.
- **Government support is needed**, along with a network of charging stations along highways and in small towns – then the market will grow steadily.



EV Charging Infrastructure along the Ukrainian Area of the TEN-T Network



Formation of the Ukrainian Sections of TEN-T



1 Strategic Integration into the Single EU Transport Space



Funding Technical Assistance European Standards

Unlocks access to infrastructure project funding, technical assistance, and European standards

2 Precondition for New EU Regulatory Requirements



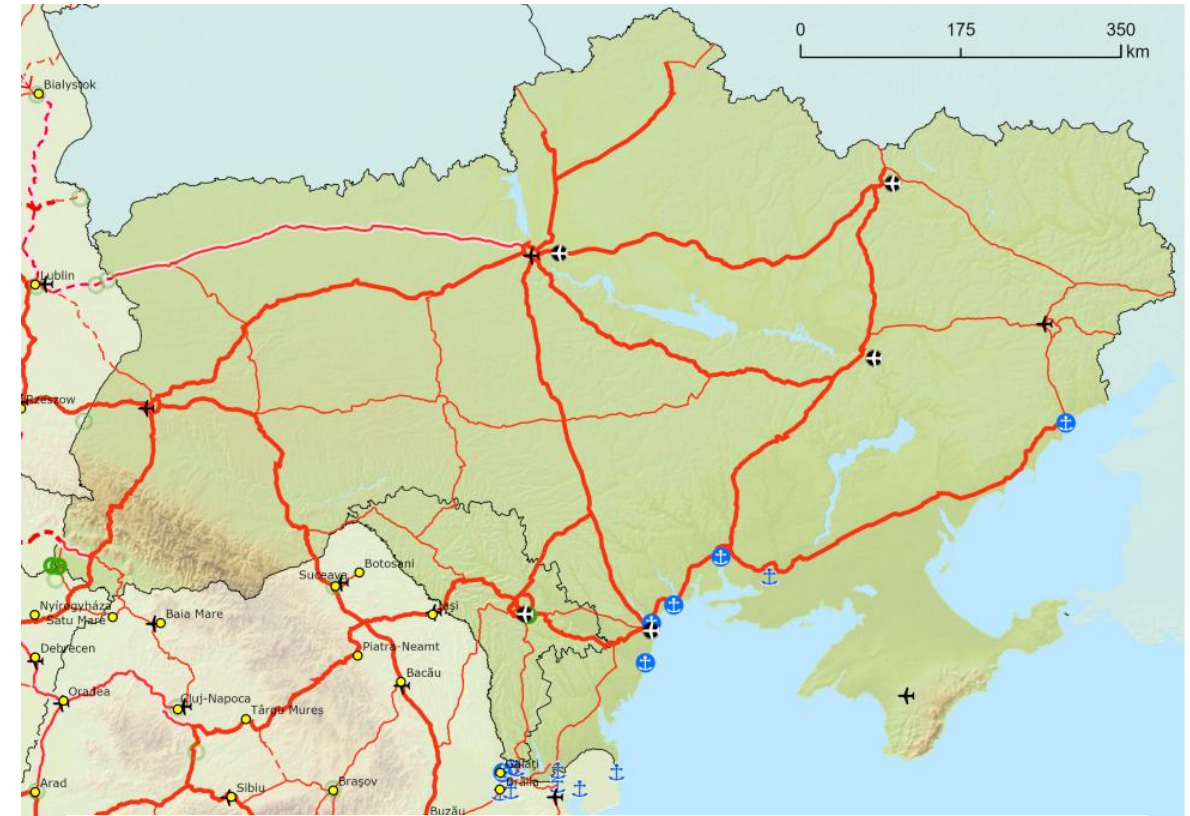
Regulation (EU) 2023/1804
Targets for electric charging infrastructure along transport corridors





Within the framework of the updated TEN-T Regulation, Ukraine is integrated into four European transport corridors:

- North Sea – Baltic Corridor
- Baltic – Black – Aegean Sea Corridor
- Rhine – Danube Corridor
- Baltic – Adriatic Corridor



Roads Core	Roads Extended Core	Roads Comprehensive	Comprehensive Core	Urban Nodes
— Road	— Road	— Road	⚓ Ports	● Capitals
- - - Road/ New Constr.	- - - Road/ New Constr.	- - - Road / New Constr.	⚓ RRT	● Urban Nodes
		<- - -> Projected	✈ Airports	



Map of the TEN-T Network in Ukraine with EVCS Markings





Analysis of Ukraine's Compliance with AFIR Requirements

AFIR Requirement	Current Status in Ukraine	Compliance Assessment
60 km Interval	Met only on specific sections of the busiest highways (e.g., Kyiv-Zhytomyr). On most corridors, the interval is significantly larger.	Non-compliant
Total Power Output 400 kW	Most locations are represented by 1–2 stations of 50 kW each. Hubs with 150–300 kW capacity are just beginning to appear. Reaching 400 kW is still a long way off.	Non-compliant
One Station at 150+ kW	Positive dynamics. Operators TOKA, YASNO, and IONITY are installing such stations, but their quantity is currently insufficient .	Partially compliant
Direct Card Payment	Almost all operators work via proprietary mobile apps. The possibility of direct card payment at the station itself is practically non-existent.	Non-compliant
Data Openness (open data / roaming)	Ukraine lacks a standardized open-data framework for EV infrastructure. There is no centralized registry; data is fragmented across voluntary platforms. Alignment with AFIR and the ITS Directive is underway (2024–2025), but not yet implemented in legislation.	Partially compliant



CONCLUSIONS

The results of the study indicate that during 2021–2025, the market for electric transport and electric vehicle charging infrastructure in Ukraine underwent a dynamic phase of growth and structural transformation. Despite the war, energy system shortages, and infrastructure challenges, the country demonstrates one of the fastest trajectories toward e-mobility in Europe. These positive changes are driven by a combination of tax incentives, an expanding supply of electric vehicles, declining prices for new and used models, technological development of charging infrastructure, and growing public trust in EVs as a cost-effective and reliable alternative to internal combustion engine vehicles. The structural shift in the passenger car market is evident: the share of electric vehicles increased from 1.33% in 2021 to 17.23% in the first nine months of 2025, fully aligning with global trends and closely correlating with European dynamics.

Charging infrastructure has expanded proportionally to the growth in the number of electric vehicles, forming an increasingly dense network in cities, along highways, and along the TEN-T corridors. As of 2025, the ratio of approximately one charging station per eight electric vehicles indicates relatively high market adaptation rates, although coverage gaps persist, particularly in rural areas and on certain international corridors. Public policy in the infrastructure domain is gradually converging with AFIR requirements and European standards for station capacity, interoperability, and spatial deployment. The preparation of a State Policy Concept for Charging Infrastructure Development represents a critical step toward systematic network planning in line with TEN-T requirements, AFIR provisions, and EU best practices.

From the perspective of consumer behavior, survey data show a high willingness among Ukrainians to switch to electric transport, provided that charging infrastructure is accessible, charging costs are predictable, and technical servicing is efficient. The primary motivators are cost savings (electricity and maintenance), environmental values, and technological convenience. The main constraints include risks related to power outages, an insufficient number of fast-charging stations, and a limited network of specialized service centers. However, these barriers are largely tactical in nature and tend to diminish as infrastructure continues to develop.

In the electric bus segment, a gradual transition is observed from isolated procurements to more systemic modernization of urban public transport, driven by the economic efficiency of electric bus operation, environmental benefits, and the readiness of local communities to upgrade urban mobility. The prospects for electric freight transport are closely linked to the rapid deployment of high-power charging hubs, the standardization of MCS, modernization of depots, development of roaming platforms, and integration of stationary energy systems with charging sites.

The analysis of electric vehicle price dynamics demonstrates a sharp decline in the cost of both new and used EVs. Over five years, the average price of a new electric vehicle decreased almost twofold (from USD 65.7 thousand in 2020 to USD 28.3 thousand in 2024), while the average price of used EVs fell from USD 37 thousand to USD 17.5 thousand. This significantly increased market accessibility for a broad range of consumers. The price decline is driven by global technological progress, production scaling, intensified competition among manufacturers, and active imports to Ukraine.

A key macroeconomic driver of market growth in Ukraine remains tax and customs incentives. Exemptions from VAT, customs duties, excise taxes, and pension fund contributions for most EV categories have substantially reduced market entry costs, stimulated record demand in 2024–2025, and supported infrastructure development. The analysis shows that the state's fiscal benefits outweigh temporary tax revenue losses: consumer savings translate into additional consumption and VAT revenues, reduced fuel imports save hundreds of millions of dollars in foreign currency annually, and the charging and service market creates new jobs. Conversely, the cancellation of incentives could lead to declining EV imports, slower infrastructure development, and increased foreign currency expenditures on fuel.

European experience in developing charging networks, charging hubs, hydrogen stations, multi-fuel complexes, and integrated energy systems highlights a promising pathway for the future modernization of Ukraine's infrastructure. Hybrid energy hubs form the backbone of European decarbonization policy and can be adapted in Ukraine within the TEN-T and AFIR frameworks. Based on an analysis of technical parameters, energy integration models, and EU regulatory practices, a set of instruments has been identified that can accelerate Ukraine's transition to sustainable mobility: standardization of technical requirements, investment programs, incentives for operators, public network planning, and the development of local energy hubs.

Overall, the study confirms that the Ukrainian electric transport market is entering a phase of sustained growth and systemic development. Provided that tax incentives are maintained, infrastructure expansion proceeds in a planned manner, European technical standards are adopted, and state support continues, e-mobility could become a fully integrated, high-tech, and resilient segment of Ukraine's transport system within the next 3–5 years.



The report was prepared by experts:

- NTU team: Olha KUNYTSKA; Oksana HULCHAK; Stanislav POPOV
- Team lead: Vasyl TURCHYN

with financial support from the German Federal Ministry for Economic Cooperation and Development (BMZ)

within the framework of the project EasTnT – "Strengthening sustainable and digital trade routes and logistics concepts between the Eastern Partnership countries and with the EU", implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.