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# Electric transport as one of the ways to achieve climate neutrality in Europe: Problems of development and legal regulation in Ukraine

**Roman Martyniuk***
Postgraduate Student
National University of Life and Environmental Sciences of Ukraine
03041, 15 Heroiv Oborony Str., Kyiv, Ukraine
https://orcid.org/0009-0004-7200-5107

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***Abstract***

The study of ways to improve the regulatory framework for the use of green technologies is becoming increasingly important due to the exacerbating climate crisis, which is prompting a reduction in greenhouse gas emissions. The purpose of this study was to identify and describe the gaps in the current legislation on the development of electric transport, as well as to investigate the feasibility and effectiveness of the proposed changes in this area, which are intended to reduce the adverse impact of transport on the environment. The methodology of the study included formal logical, formal legal, comparative legal, as well as other general scientific and special scientific methods of cognition, a review of the current laws of Ukraine and draft laws submitted to the Verkhovna Rada of Ukraine aimed at improving the current legislation on electric transport, including the regulation of the use of personal light electric transport. An analysis of current legislation and draft laws submitted for consideration revealed that some laws contain provisions that hinder the development of electric transport, and the adoption of a series of draft laws could negatively affect the economic viability and ease of

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*Corresponding author

use of such transport. The study provided recommendations, based on the approaches of EU countries, to promote and motivate drivers to change their internal combustion engine vehicles to electric ones. The study resulted in a series of proposals to address the identified problems and shortcomings of the current legislation. Specifically, the study suggested ways to encourage drivers to change their internal combustion engine vehicle to an electric one, analysed the ways of developing and popularising personal electric vehicles, examined the current state of development of green infrastructure and availability of electric vehicle charging points, and proposed approaches to solving the issue of recycling electric vehicle batteries. The practical value of this study lies in the possibility of further use of the research findings and conclusions drawn therein to address the gaps in current legislation by submitting a draft law with the proposed relevant amendments

***Keywords:*** green transition; ecological vehicle; road safety; light personal electric transport; development of green infrastructure; electric vehicle charging points; zero pollution

### *Introduction*

Finding quick and effective ways to reduce the effects of global warming is a critical task, even in the face of a full-scale invasion, as it poses a direct threat to the life and health of the country's population. The largest sources of greenhouse gas emissions in the EU are energy, industry, and transport. When analysing possible ways to reduce greenhouse gas emissions, special attention should be paid to the latter, as transport is one of the primary air pollutants. Cars with internal combustion engines cause a large environmental burden not only on the air, but also on land and water resources, and therefore reducing the impact of this category of pollutants is a priority area for research. The primary types of environmental pollution from transport include exhaust gas emissions and waste from its operation. According to the latest published data of the Ministry of Environmental Protection and Natural Resources of Ukraine (2021) (in 2022-2023, the report was not compiled due to martial law), the total amount of air emissions from mobile sources of pollution was 1,546.8 thousand t, which is about 40% of the total amount of air pollution, and considering the constant increase in the number of cars, it can be argued that this figure will only grow if effective methods of influence are not implemented. To achieve climate neutrality, one of the goals of the European Green Deal (2019) is to reduce emissions from transport by 90% by 2050, and therefore, for Ukraine, reducing road pollution is an important strategic objective.

According to the Ministry of Internal Affairs, over 160,000 cars were imported into Ukraine in the first five months of 2024, including about 20,000 electric vehicles. According to the statistics published by the Service Centre of the Ministry of Internal Affairs, as of June 2024, about 105,000 cars and 2,000 trucks with electric motors were registered in Ukraine (Service centres of the ministry..., 2024). Considering that this data does not include hybrid vehicles, which, apart from an internal combustion engine, also have an electric motor, it can be stated that environmentally friendly transport is gradually gaining popularity in Ukraine, which, if this trend continues, will have a positive impact on reducing air pollution from motor vehicles. The increase

in the number of users of such vehicles has led to an urgent need for legal regulation of their rights and obligations, as Ukrainian legislation is not adapted to the mass emergence of electric vehicles with an engine of up to 4 kW.

Several scholars have investigated this issue. According to A. Chervinchuk and Y. Atamenko (2022), the process of legitimising personal electric vehicles (PEVs) in Ukraine, even under the legal regime of martial law, is a crucial task, as the number of road traffic accidents (RTAs) involving such vehicles is constantly growing. Within the framework of the study, the researchers proposed to classify light personal vehicles into several types, depending on their design features, which in the future should facilitate the process of determining their legal status. Y. Dzyubanovskyi (2023), who investigated the legal regulation of personal light electric transport in Ukrainian legislation, addressed the lack of clear regulation of the range of rights and obligations of users of such vehicles. The researcher identified and described a series of gaps in the current legislation and the draft laws submitted for consideration and proved the need to improve the current version of the Road Traffic Rules (2001). S. Maslyanko (2023) reached an analogous conclusion, analysing the administrative legal capacity of a person to drive a vehicle, specifically an electric scooter and analogous electric vehicles. Based on the analysis of the current legislation, the researcher concludes that in the absence of a properly established legal status of the users of PEVs, it is impossible to determine their concrete legal capacity, and, alternatively, suggests that they should be equated with the existing category of road users, e.g., cyclists or drivers.

M. Spivak (2021) made a considerable contribution to the investigation and research of ways and viable solutions for legalising electric transport users, analysing ways to improve the regulation of relations in the field of ensuring the safety of light electric transport users as a separate category of road users. The researcher addressed the fact that the person who will operate the PEV must not only have knowledge of road safety rules, but also have a driver's licence, and therefore undergo relevant training and pass an exam. It was also proposed to develop a system of mandatory registration of such vehicles.

M. Kolodyazhny (2021) investigated the international practices in determining the scope of rights and obligations of users of electric scooters and analogous vehicles, describing international legal and methodological support for road safety. As one of the consequences of the lack of clear legal regulation of the rules for the use of PEVs in Ukraine, as in the EU countries, the researcher named the high mortality rate of road accidents involving such vehicles. S. Panova (2023) reached an analogous conclusion, analysing European legislation on the regulation of the use of electric scooters and analogous electric vehicles. In conclusion, the researcher noted that there is no single approach to defining the range of rights and obligations of users of such vehicles, but each country analysed has clear rules for their use.

M. Dutov (2024) investigated the European Union's climate and energy strategy and analysed its stages to achieve climate neutrality. The study described the principal tools for implementing The European Green Deal (2019), as well as the possibility of their adaptation and transfer to the national programme for achieving climate neutrality. The researcher paid considerable attention to the steps of transition from internal combustion engines to electric ones. F. Colli (2021) investigated the mechanisms of public involvement in the development and implementation of The European Green Deal (2019). Specifically,

the researcher analysed ways to ensure citizen participation in decision-making processes. Colli described the effectiveness of these mechanisms and methods and offered recommendations for improving public participation in achieving climate neutrality.

Considering the above, the purpose of this study was to investigate the current regulatory framework for the use of electric vehicles and to identify the rules which hinder and complicate the development of such vehicles. The objectives of the study were as follows: to analyse the judicial practice on bringing users of personal light electric transport to administrative liability, specifically for causing road accidents or creating emergency situations, as well as driving while intoxicated; to identify legal conflicts or inconsistencies, as well as to formulate recommendations on possible ways to eliminate them; to investigate the negative consequences for all road users caused by the existing legal uncertainty regarding the range of rights and obligations of electric transport users.

### *Materials and Methods*

The material basis for this study included the current versions of the Laws of Ukraine related to the transport sector, as well as the relevant draft laws submitted to the Verkhovna Rada of Ukraine. The analysis also used statistical information from the official websites of state authorities, including the Ministry of Environmental Protection and Natural Resources of Ukraine, regarding the level of air pollution. The study was also based on a review of Laws of Ukraine No. 3353-XII "On Road Traffic" (1993), No. 2344-III "On Road Transport" (2001), and No. 2956-IX (2023). The Resolution of the Cabinet of Ministers of Ukraine No. 1306 "On Traffic Rules" (2001) was also analysed. Beyond this, the study analysed draft laws, specifically, No. 5479 "On Amendments to Some Legislative Acts of Ukraine Regarding the Inclusion of Personal Transport in the Unified Transport System of Ukraine and Increasing the Level of Road Safety" (2021), No. 5731 "On Amendments to the Law of Ukraine "On Road Traffic" Regarding the Movement of Self-Balancing Vehicles Equipped with Electric Motors (Electric Scooter, Segway, Segwheel, Gyroscooter)" (2021) and draft laws No. 8082 (2018), No. 3023 (2020), No. 5732 (2021), which aimed to regulate the rules for the use of new electric vehicles. Additionally, the state strategies in the field of green transition and transport development were analysed, specifically, the National Transport Strategy of Ukraine for the Period Until 2030 (2018), Strategy for Promoting Road Safety in Ukraine for the Period Until 2024 (2020), Strategy for low-carbon development (2018), Strategy for environmental safety (2021). International agreements such as the Paris Agreement (2015) and the Agreement on Financing Between Ukraine and the European Commission (2020) were also investigated.

Both general and special research methods were used. Using the historical legal method, the study analysed the establishment and development of Ukrainian legislation on regulation of the rules for use of the latest electric vehicles. The formal logical and formal legal methods helped to identify contradictions and inaccuracies in the current legislation of Ukraine regarding the regulation of the rules for the use of such vehicles and examine in detail such terms as "wheeled electric vehicle", "electric vehicle", "light personal electric vehicle", "low-speed light electric vehicle", "mechanical vehicle", "vehicle", "motorcycle", and "moped". Conclusions were drawn on the logical perfection and consistency of the current legislation in the field of road safety and the impact of electric transport on air pollution. The study analysed the factors that contribute to the increase

in the number of electric vehicles on Ukrainian roads, as well as the factors that hinder such an increase. Using the comparative legal method, the study investigated and compared legal provisions and approaches to regulating the rules of use of electric scooters and analogous electric vehicles in the laws of different countries.

### *Results and Discussion*

**Substantiation of the significance of developing electric transport and green transport infrastructure.** Of all the types of vehicles, cars are the primary source of air pollution, considering their number. Most of them use various types of oil products and lubricants as fuel, which emit greenhouse and other toxic gases into the air as a result of combustion. Since it is impossible to reduce the number of motor vehicles, and their number is only growing every year, alternative fuels are being considered to reduce their pollution. The world has long faced the problem of excessive carbon emissions, which was addressed by the European Green Deal (2019), a package of policy initiatives proposed by the European Commission, whose main purpose is to make the European continent climate neutral by 2050 (Voronkova *et al*., 2021).

On its way to full membership in the European Union, Ukraine, by signing the Association Agreement with the EU, committed to a series of reforms and measures, including those to protect clean air and reduce the harmful effects of CO2 on the environment (Agreement on financing between Ukraine..., 2020), which, according to O. Gulac *et al*. (2019a), can be achieved through the development of environmentally friendly and energy-efficient vehicles. To achieve the goals of the green transition, the National Transport Strategy of Ukraine for the Period Until 2030 (2018) was developed, which prescribes a range of priority areas for the development and improvement of the transport sector, including the development of safe, environmentally friendly, and energy-efficient transport. By 2030, the share of cars with internal combustion engines on Ukrainian roads is expected to be substantially reduced, with this result to be achieved through the gradual replacement of urban passenger transport with electric analogues and an increase in the number of private electric vehicles.

Only by using clean energy sources and investing in advanced developments and technologies for the production, storage, and transmission of electricity can fuel dependence be reduced and the environment substantially improved. Specifically, the development of such technologies will be driven by the rapid development of electric transport. Cherep *et al*. (2019) and M. Vasylchenko *et al*. (2024) pointed out that there is an increasing number of old cars with internal combustion engines on Ukrainian roads, which are not even remotely environmentally friendly. In 2023, the average age of cars in Ukraine was approximately 23.2 years, while in the EU it was only 11.8 years on average. According to O. Gulac *et al*. (2019b), one of the key areas for improving environmental governance in Ukraine is to encourage the participation of individuals in solving the country's environmental problems, specifically by motivating vehicle owners to reduce their car emissions.

Fundamental changes, such as the transition from internal combustion engines to electric ones, require not only a positive attitude of society, but also proper legislative support and motivation from the state. Despite the eased taxation for the import of electric vehicles into Ukraine, it is necessary to introduce additional incentives for the development of electric mobility, including the expansion of the network of electric charging stations, as H. Kostenko (2022) concluded in his

SWOT analysis of the prospects for the development of electric transport in Ukraine. According to the study, the key factors include an increase in the coverage of electric charging stations; the introduction of loan programmes for the purchase of new and used electric vehicles; and the extension of zero taxation and duty on the import of electric vehicles into Ukraine. According to N. Kukhtyk and V. Kukhtyk (2023), the issue of development and promotion of electric vehicles should be considered not only from the standpoint of increasing their number on the roads of Ukraine, but also the introduction of production of both electric vehicles and lithium-ion batteries, and an important issue is the modernisation of the energy sector and the installation of charging stations. Furthermore, special attention should also be paid to solving the problem of recycling or disposal of batteries. O. Marynets (2020) also addressed the problem of further processing and disposal, noting that due to the unresolved issue of processing such waste, there is a threat of its accumulation, which will create a negative environmental footprint of electric mobility. L. Golovko *et al*. (2021) investigated and analysed the best European practices for the management of this type of waste, as well as the requirements of Directive 2006/66/EU (2006) on batteries and accumulators and on waste from batteries and accumulators. It is important that the end user should be able to dispose of waste portable batteries or accumulators free of charge at a nearby special collection point.

Exploring this issue, S. Kidalov *et al*. (2020) point out that according to Directive 2012/19/EU (2012) of the European Parliament and Council on Waste Electrical and Electronic Equipment (WEEE), in Europe, obsolete or physically outdated equipment is classified as waste electrical and electronic equipment, which is collected, recycled, and disposed of separately from other waste, while in Ukraine, for the most part, such waste is not separated from other waste.

**The state of development of Ukrainian legislation on the regulation of light electric transport.** One of the ways to achieve climate neutrality in the transport sector is to motivate drivers to change their private vehicles to electric public transport or personal light electric transport. This is the name proposed in Draft Law of Ukraine No. 3023 (2020) for electric devices such as electric scooters, electric unicycles, gyroscopes, electric bicycles, segways, and other analogous vehicles. A substantive study of the problem of regulating the rules for the use of electric scooters and analogous electric transport was prescribed within the Action Plan to Implement the Strategy for Improving Road Safety in Ukraine for the Period up to 2024 (2020), which, among its main areas, made provision for the analysis and improvement of legislation by developing legal acts regulating the use of personal light electric transport on the road network.

The first step in the legislative regulation of this issue was an attempt to expand the existing list of road users to include a new category – "users of personal light electric transport" – as well as to define their legal status and legislate their rights, obligations, and liability for violating traffic rules. In fact, it was proposed to introduce rights and obligations for PEV users, as well as liability analogous to that prescribed for cyclists (Draft Law of Ukraine No. 3023, 2020). The proposed amendments to the legislation provoked a broad discussion among researchers, who began to address its shortcomings and offer their suggestions for improving it. M. Spivak (2021) emphasised that the legislator did not make any proposals on the age at which PEVs can be driven and suggested that they should be allowed to be

driven from the age of 18. In her study of the legislative regulation of the rules for the use of PEVs, S. Panova (2023) concluded that each country has its own individual approach to determining the range of rights, obligations, and liability for users of such vehicles, as well as the approach to determining the age limit for being able to drive.

The absence of age restrictions for the use of electric scooters and analogous electric vehicles in the provisions of this Draft Law of Ukraine No. 3023 (2020) allowed children under the age of 14 to obtain unacceptable rights to move, e.g., along the edge of the roadway. Considering PEVs as an alternative to cycling, it is worth noting that according to clause 6.1 of the Road Traffic Rules (2001), people are allowed to ride a bicycle on the road from the age of 14. At the same time, cycling on sidewalks and pedestrian paths is allowed only for children under 7 years of age and under adult supervision.

The National Police of Ukraine, in its letters of comments to draft laws No. 3023 (2020) and No. 3023-1 (2020) (letters No. 3074/01/41-2020 dated 6 March 2020 and No. 4545/01/41-2020 dated 10 April 2020), proposed to prescribe certain age restrictions for the operation of electric vehicles by persons under 7 and 16 years of age (Conclusion of the Committee..., 2020). When regulating the issue of age limits for any category of road users, it is first and foremost necessary to consider the specific features of the national mentality, the level of legal awareness, and the economic well-being of the population. It would be advisable to prescribe in law the right to use a light personal electric vehicle, like a bicycle, from the age of 14, and a low-speed light electric vehicle, like a moped, from the age of 16. This approach to distinguishing between age restrictions and rules of use is consistent with the requirements of Directive of the European Parliament and of the Council No. 2006/126/EU (2006). The implementation of the proposed changes will not only have a positive impact on the further development of this category of ecologically friendly transport but will also substantially relieve the road network of cars, which will reduce environmental pollution, especially air pollution, by reducing traffic congestion.

Furthermore, the terms and definitions used in the regulations should be clearly described, specifically, the Traffic Rules do not yet contain a definition of the term that would cover vehicles such as electric scooters. Y. Dzyubanovskyi (2023), analysing the proposed draft law, considers it necessary to add a definition of the term PEV to clause 1.10 of the Road Traffic Rules (2001), as it contains a list of all vehicles used in Ukraine. The Road Traffic Rules (2001) should also be amended to define the terms "motor vehicle", "motorcycle", and "moped" to cover those vehicles with an electric motor exceeding than 1 kW. Furthermore, the Law of Ukraine No. 2344-III (2001) should define terms related to light electric transport and add a new category of road users – users of light personal electric vehicles.

The definition of such vehicles appeared in the text of Draft Law of Ukraine No. 8172 (2022), which prescribed their division into two subgroups: light personal electric vehicles and low-speed light electric transport, but this draft law did not make provision for the creation of a separate category of road users for such vehicles. Due to the lack of a properly enshrined legal status of PEV users, according to S. Maslyanko (2023), it is impossible to determine their concrete legal capacity. Alternatively, the researcher proposes to equate them with the existing category of road users, such as cyclists or drivers. However, the idea of dividing into two subgroups makes sense only if the rights and responsibilities for their

exploitation are further delineated for each of them, which has not been done. Due to the lack of legislative regulation of the new subgroups, they have effectively taken over all the rights and obligations of vehicle drivers. This opinion is supported by A. Chervinchuk and Y. Atamenko (2022), who support the idea of dividing PEVs into subgroups, considering their technical characteristics, but with the subsequent determination of conditions for each of them for traffic on the road network. P. Khorobrykh (2021), analysing the current version of the Road Traffic Rules (2001), concluded that electric scooters and gyroboards are vehicles of category A1, and therefore, to drive them, one needs to have a driver's licence with the relevant category, and as for monowheels, they cannot be driven on the roads of Ukraine.

Analysing the judicial practice, specifically, cases No. 738/1232/23 (2023) and No. 521/2805/24 (2024), the courts, when issuing rulings, refer to the conclusion of the Resolution of the Cassation Criminal Court in Case No. 278/3362/15-к (2018), which addresses the distinction between the concepts of "motor vehicle" and "vehicle" in the current legislation. Thus, any vehicle with an electric motor of up to 3 kW is not a motor vehicle and therefore does not require a driver's licence to drive. M. Kolodyazhny (2021), analysing the current legislation, conditionally classified such users of the PEVs as pedestrians and addressed the fact that not classifying such a category as road users does not correspond to the spirit of the times and the modern road transport reality. Thus, the issue of legal regulation of the rules for the use of electric scooters and analogous electric vehicles is long overdue and needs to be resolved as soon as possible.

Despite the remarks in the scientific and expert opinion to the Draft Law of Ukraine No. 8172 (2022), which emphasised that "the law is not a terminology dictionary, but a legal act of the highest legal force aimed at regulating the most important social relations. Definitions of terms are provided in the law not to record a particular concept, but to ensure a clear and unambiguous understanding of the provisions of the law that regulate the relevant social relations. Prescribing in the law the definitions of terms for which no rules have been established is devoid of legal meaning" (Conclusion of the Main Scientific..., 2022), it was voted and adopted without considering the shortcomings identified in it. Notably, the same terms were introduced in the Law of Ukraine No. 2344-III (2001), which also does not regulate the activities of such transport.

With the adoption of the Law of Ukraine No. 2956-IX (2023), the situation with the legal regulation of the rights and obligations, as well as liability of users of such electric wheeled vehicles, has not improved substantially, as Draft Law of Ukraine No. 3023 (2020), which envisaged such regulation, has not yet been put to a vote and is only being prepared for the second reading. Delays in the consideration of this draft law have led to a situation in which users of electric wheeled vehicles have been held liable for violations of the Traffic Code of Ukraine on a par with car drivers. Thus, for driving electric scooters and analogous electric vehicles while intoxicated or refusing to undergo a medical examination, users have been held administratively liable under Article 130 of the Code of Ukraine on Administrative Offences (1984), which prescribes sanctions in the form of a fine of UAH 17,000 and deprivation of the right to drive vehicles for a period of 1 year. Such penalties were applied, specifically, in case No. 498/89/24 (2024). However, if this Draft Law of Ukraine No. 3023 (2020) is adopted, the liability for such an offence would be prescribed in Article 127 of the Code of Ukraine on Administrative

Offences (1984) and would amount to a fine of UAH 680. An analogous conclusion was used to dismiss case No. 390/1734/23 (2023) due to the absence of an administrative offence for driving a wheeled electric vehicle. Until the legislation regulates the rights and obligations of users of vehicles equipped with an electric motor with a capacity of up to 3 kW, they cannot be subject to obligations that are not directly prescribed by law. Such actions violate the principle set out in Article 19 of the Constitution of Ukraine (1996).

To solve this problem, Draft Law of Ukraine No. 8082 (2018) was submitted, which prescribed the introduction of a new category in driver's licences – AM, which would include most vehicles classified as light electric transport. Returning to the question of whether users of wheeled electric vehicles should have a driver's licence, it is worth referring to the international practices. Legislative regulation of the rules for the use of wheeled electric vehicles makes provision for two subgroups, one of which is required to have a driver's licence, and the other is not. That is, based on the terminology of the Law of Ukraine No. 2956-IX (2023), it is logical to assume that to use vehicles classified as a subgroup "light personal electric vehicle", i.e., those equipped with an electric traction motor of up to 1,000 W and a maximum speed of up to 25 km/h, a driver's licence is likely to be unnecessary, and for those classified as a subgroup of "low-speed light electric vehicle", a driver's licence of category A1 is likely to be required, or, in case of adoption of Draft Law of Ukraine No. 8082 (2018) – AM.

**Problems with the development of electric transport in Ukraine.** Despite the adoption of the Laws cancelling taxation (Law of Ukraine No. 1660-IX, 2021) and customs duties (Law of Ukraine No. 1661-IX, 2021) for the import of electric vehicles, the cost of electric vehicles is still substantially higher than their internal combustion engine counterparts. The absence of government targeted loans for the purchase of electric vehicles is the main reason many more conventional cars are still purchased in Ukraine than electric ones. The absence of statutory regulation of incentives for switching to environmentally friendly vehicles substantially hinders the development and increase of such vehicles on the country's roads. Thus, the issue of allowing such vehicles to drive in public transport lanes has been raised on several occasions, but this initiative has not been further developed. Theoretically, the situation should be slightly better with the regulation of parking spaces for such vehicles, as the Law of Ukraine No. 2956-IX (2023) stipulates that at least half of the parking and storage spaces for electric vehicles, as well as charging spaces, must be provided during the new construction of multi-storey residential buildings. However, firstly, this rule applies only to new construction and does not prescribe the obligation to modernise old buildings, and secondly, the relevant changes have not been made to the State Construction Norm (SCN). Thus, SCN B.2.2-12:2019 "Planning and Development of Territories" (2019) does not require the developer to provide separate parking spaces for electric vehicles, and SCN B.2.3-15:2007 "Parking lots and garages for cars" (2007) requires at least 5% of the total number of parking spaces to be allocated for electric vehicles.

The situation is no better with the development of the electric charging network, even though the same Law of Ukraine No. 2956-IX (2023) stipulated that state and local authorities should have developed and approved programmes for the development of electric charging infrastructure and made provision for places for charging electric vehicles in existing car parks, garages, and other parking areas by 31 December 2023, and that

these programmes, in most cases, still remain only on paper. Furthermore, despite the opportunity to install such stations on the adjacent territory of condominium associations, without financial support from the state or a targeted loan programme, residents are not interested in implementing such solutions. The increase in the cost of electricity (Resolution of the Cabinet of Ministers of Ukraine No. 632, 2024) also hinders the development and promotion of electric transport, and the lack of any programmes to reduce its cost for charging a car makes such transport less and less cost-effective for users.

Considering the problems with the regulatory framework for light personal electric vehicles, the growth in the number of both electric vehicles and other electric vehicles on Ukrainian roads may not only stop in the near future, but their number may even decrease. The short service life of electric vehicle batteries motivates drivers to change their vehicles more often, and after the first experience of driving such vehicles and facing all the problems, some users may return to internal combustion engines.

**Goals and steps to achieve climate neutrality in the transport sector.** On 30 May 2024, the Cabinet of Ministers of Ukraine approved the Strategy for the Formation and Implementation of State Policy in the Field of Climate Change for the Period Until 2035 and approved an operational plan for its implementation in 2024-2026 (Decree of the Cabinet of Ministers of Ukraine No. 483-p, 2024). Specifically, during this period, it is planned to develop and adopt the regulations necessary to implement this strategy, as well as to ensure the implementation of the provisions of EU climate change law. M. Dutov (2024) performed a detailed analysis of this legislation. If Ukraine joins the EU, it will be obliged to follow all these regulations, including the European Climate Law (2021), and therefore any new legislative initiatives in Ukraine to reduce environmental pollution will likely be analogous to those already in place in Europe. The EU's transport policy envisages a half-cut in the use of conventional fuelled transport in urban areas by 2030, and a complete phase-out by 2050. In Ukraine, an analogous provision is prescribed in the Law of Ukraine No. 2956-IX (2023). In terms of personal transport, most European countries have or have had significant incentives for switching to electric vehicles. M. Vasylchenko (2024), analysing the best European practices in the field of sustainable transport development, draws special attention to the experience of Sweden, which can be applied in Ukraine. Specifically, the rapid, coordinated, and most importantly, cost-effective expansion of green transport infrastructure with a wide coverage of charging stations.

When analysing the European experience of developing environmentally friendly transport, it is worth addressing the incentives that states introduce to drivers to motivate them to use electric transport. Thus, in Norway, for a long time, electric cars could charge for free, park in municipal car parks and drive on toll roads and were entitled to use public transport lanes. Over time, after a substantial increase in the number of such vehicles, the incentives were reduced, but it is still much cheaper for electric vehicles to use toll roads and parking lots than internal combustion vehicles. Permission to use public transport lanes on some roads has also been cancelled, as has free charging. Environmentally differentiated fares and parking fees are an effective way to develop and promote electric transport and reduce local air pollution. The fact that petrol and diesel cars pay more than electric cars is in line with the polluter pays principle that underpins their national transport plan. Norway also provides

reduced taxes and fees and affordable loans for the purchase of environmentally friendly vehicles (Norwegian Ministry of Transport, 2021a; 2021b; 2023). In France, apart from free parking and the right to drive in a public transport lane, there is also an environmental bonus of up to EUR 7,000 for the purchase of an electric vehicle, and a substantial conversion bonus of up to EUR 6,000 for exchanging one's old car with an internal combustion engine for an electric vehicle that can be combined with an ecologically friendly one (Resolution of the Cabinet of Ministers of France No. 2022-1761, 2022). As for Ukraine, apart from the absence of taxes and fees when buying an electric car, no other substantial incentives have been provided, and therefore achieving the goals of the National Transport Strategy of Ukraine for the Period Until 2030 (2018) to reduce emissions from mobile sources of greenhouse gases into the atmosphere by up to 60% (from the 1990 level), and total pollutant emissions by up to 70% (from the 2015 level), seems problematic.

Analysing the current state of Ukrainian legislation, it can be concluded that there are no effective incentives for the development and increase in the number of electric vehicles. Considering the best European experience, including that of France and Norway, effective incentives include financial and non-financial incentives, and improved legislative regulation. The former include monetary subsidies for the purchase of an electric vehicle or the exchange of a car with an internal combustion engine for an electric one; continuation of the zero taxation and customs duty policy; introduction of state loan programmes for those who do not own a car and wish to purchase an electric one; reduction or partial compensation of the cost of charging a car during daylight hours. Non-financial – free parking and travel on toll roads, if any, as well as permission to drive in the public transport lane; increasing the coverage of electric charging stations by requiring their installation in all public authorities where such a need is supported by a petition of citizens that has received a sufficient number of votes.

Legislative changes should include the introduction of an environmental tax on the use of cars with internal combustion engines, depending on the level of pollution, as well as increased administrative liability for operating vehicles with excessive levels of pollutants in exhaust gases, as prescribed in Article 81 of the Code of Ukraine on Administrative Offences (1984), and the procedure for measuring them by the National Police. It is also important to legislate to allow upgrading a car from petrol/diesel to electric at special service centres, to ban the import of vehicles with internal combustion engines older than 20 years into Ukraine, and to bring state building codes in line with the requirements of the Law of Ukraine No. 2956-IX (2023).

In addition, the lack of clear rules for the use of electric scooters and analogous electric vehicles substantially reduces their popularity and number on Ukrainian roads. Draft Laws of Ukraine No. 3023 (2020) and No. 8082 (2018), which should regulate this, have not yet been adopted and require substantial changes and amendments, specifically due to the need to consider Ukraine's international obligations related to the implementation of the Association Agreement Between Ukraine, of the One Part, and the European Union, the European Atomic Energy Community and their Member States, of the Other Part (2017), including the implementation of Directive 2006/126/EU of the European Parliament and of the Council (2006). The Draft Law of Ukraine No. 3023 (2020) should make provision for a distinction between the rights and obligations of users of these two separate categories of vehicles,

adapting it to the terms introduced in the Law of Ukraine No. 2344-III (2001). At the same time, Draft Law of Ukraine No. 8082 (2018) should prescribe a list of vehicles that will not be classified as AM, e.g., those with a maximum design speed of less than or equal to 25 km/h. In this case, all light personal electric vehicles would be exempt.

Overall, the rules for the use of vehicles that fall under the exceptions should be equated to those for bicycles, except for some changes. Thus, to adapt the rules for them with requirements for the equipment of such vehicles, to allow them to drive on the sidewalk, as well as in residential and pedestrian areas at a speed close to the pace of pedestrians. As for low-speed light electric transport, they should be banned from sidewalks and bicycle paths, as well as pedestrian zones, and allowed only on roads with a maximum speed of 50 km/h.

Despite the ecologically friendly nature of the electric car itself, electric mobility still has a negative environmental footprint. First, this is cause by the generation of electricity needed to charge such a car, although by developing renewable energy in parallel, air pollution in this process can be minimised or avoided altogether (Taljegard, 2019). In developing a network of electric vehicle charging stations, it is advisable to develop solar and wind power plants in parallel, which will be able to generate clean electricity to charge such vehicles. The introduction of a special reduced daytime tariff for green electricity will not only help to avoid overloading the power system during peak hours, but also solve the problem of excess electricity during the day and its shortage at night. Secondly, pollution from an electric car result from the accumulation of waste from spent batteries. However, the development and implementation of new battery production technologies will not only increase the service life of batteries, but also make the process of reuse, recycling, recovery, or disposal more efficient. R. Zhang and S. Fujimori (2020) also point to the economic attractiveness of transport electrification as an opportunity to mitigate economic losses due to the introduction of a carbon tax. Thus, despite certain challenges on the way to mass adoption of electric transport, the results obtained in the end, such as reduced greenhouse gas emissions, improved air quality, reduced noise pollution, fuel independence, and a series of other benefits from replacing old vehicles with electric analogues, are worthy of government support and investment.

### *Conclusions*

This study analysed the current Ukrainian legislation governing the use of electric vehicles. A review of existing regulations, draft laws, and Ukrainian court practice on bringing users of such vehicles to administrative responsibility has revealed some legal conflicts and norms that hinder further development and promotion of such vehicles. Specifically, the level of liability for some violations, such as driving an electric scooter while intoxicated, is analogous to that for driving a car, although not only is a driver's licence not required, but there are no age restrictions. It was also found that the legislation does not clearly define the range of rights and obligations of users of such electric vehicles, nor does it make provision for a separate category of road users, since it is not only impossible but also inappropriate to classify them as existing ones. Furthermore, the legislation does not prescribe the specifics of the movement of such vehicles on roads and sidewalks, including the rules for stopping and parking them.

As a result of the study, recommendations were made to address the identified legislative shortcomings and ideas for the promotion and further development of this mode of transport, which can be used both to draft a new law and to

amend the ones under consideration. It was found that it would be advisable to amend Draft Law No. 8082 to revise the rights and obligations of all categories of road users, to set restrictions on the age of use of certain vehicles, including electric scooters, electric bicycles, and other electric vehicles that do not belong to motor vehicles and should not fall under the proposed category of AM.

The analysis of the Draft Law No. 3023 identified terminological gaps that need to be addressed by covering all possible types of electric vehicles, with their users being classified into different categories of road users, as well as adding a new category – users of personal light electric transport.

Considering the problem of electric transport in the context of the implementation of the Ukrainian Green Deal, it is worth noting that an effective approach to achieving climate neutrality is to introduce the "polluter pays" principle. That is why the effectiveness of the state's measures to implement the green transition lies in both stimulating the use of electric vehicles and introducing additional taxes and fees for the use of cars older than 20 years.

The problems with the recycling or disposal of batteries mentioned in the study and the impact of the increase in the number of electric vehicles on the energy system of Ukraine require further research and analysis.

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***Conflict of Interest***

The author of this study declares no conflict of interest.

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# Електротранспорт як один з шляхів досягнення кліматичної нейтральності в Європі: проблеми розвитку та нормативно-правового регулювання в Україні

**Роман Мартинюк**
Аспірант
Національний університет біоресурсів і природокористування України
03041, вул. Героїв Оборони, 15, м. Київ, Україна
https://orcid.org/0009-0004-7200-5107

***Анотація***

Дослідження шляхів вдосконалення нормативного регулювання використання зелених технологій актуалізується загостренням кліматичної кризи, яка спонукає до зменшення викидів парникових газів. Мета дослідження полягала у пошуку та описі прогалин чинного законодавства щодо розвитку електротранспорту, а також досліджені доцільності та ефективності запропонованих змін у цій сфері, які покликані зменшити негативний вплив транспорту на екологію. Методика наукового дослідження включала в себе формально-логічний, формально-правовий, порівняльно-правовий, а також інші загальнонаукові та спеціально-наукові методи пізнання, огляд діючих Законів України та поданих на розгляд до Верховної Ради України законопроєктів, які мають на меті удосконалити чинне законодавство щодо електротранспорту, в тому числі врегулювати питання використання персонального легкого електротранспорту. В результаті аналізу діючого законодавства та поданих на розгляд законопроєктів виявлено, що деякі закони містять норми, які гальмують розвиток електротранспорту, а прийняття низки проєктів законів може негативно вплинути на економічну вигідність та зручність користування таким транспортом. Надані рекомендації, на основі підходів країн ЄС, щодо популяризації та мотивації водіїв змінювати свої транспортні засоби з двигуном внутрішнього згорання та електричні. За результатами дослідження була сформована низка пропозицій щодо усунення виявлених проблем та недоліків чинного законодавства. Зокрема, запропоновані способи стимулювання водіїв до зміни власного транспортного засобу з двигуном внутрішнього згорання на електричний, проаналізовані шляхи розвитку та популяризації персонального електротранспорту, досліджений поточний стан розвитку зеленої інфраструктури та доступності пунктів зарядки електротранспорту, а також запропоновані підходи щодо вирішення питання утилізації акумуляторів електромобілів. Практична цінність статті полягає у можливості подальшого використання отриманих результатів дослідження та сформованих у ній висновків для усунення прогалин чинного законодавства шляхом подання законопроєкту зі запропонованими відповідними змінами

***Ключові слова:*** зелений перехід; екологічний транспортний засіб; безпека дорожнього руху; легкий персональний електротранспорт; розвиток зеленої інфраструктури; пункти зарядки електромобілів; нульове забруднення